biodiversa+
European Biodiversity Partnership

EUROPEAN PARTNERSHIP

Guide on best practices sharing biodiversity data for private companies

Co-funded by
the European Union

biodiversa+
European Biodiversity Partnership

To cite this report

Ostermann Frank, Willemen Louise, Paspaldzhiev Ivan, Pavlova Denitza and Georgiev Martin (2025). Guide on best practices sharing biodiversity data for private companies. Biodiversa+ report. 70 pages. https://doi.org/10.5281/zenodo.16967457

Report contributors

Iiris Kallajoki (MoE_FI), Cécile Mandon (FRB), Petteri Vihervaara (MoE_FI), Ron Winkler (NWO).

Work package title

WP2 Promote and support transnational biodiversity monitoring

Task or sub-task title

Subtask 2.4.2: Use of biodiversity monitoring data in decision-making (public and private)

Lead partners

French Foundation for Research on Biodiversity (FRB) & Ministry of Environment of Finland (MoE_FI)

Date of publication

October 2025

Photography credits

Pixabay

Layout

Thibaut Lochu

To contact Biodiversa+

contact@biodiversa.eu

Website

www.biodiversa.eu

Follow us

@Biodiversa.eu

@BiodiversaPlus

What is Biodiversa+

The European Biodiversity Partnership, Biodiversa+, supports excellent research on biodiversity with an impact for policy and society. Connecting science, policy and practise for transformative change, Biodiversa+ is part of the European Biodiversity Strategy for 2030 that aims to put Europe's biodiversity on a path to recovery by 2030. Co-funded by the European Commission, Biodiversa+ gathers 81 partners from research funding, programming and environmental policy actors in 40 countries to work on 5 main objectives:

1. Plan and support research and innovation on biodiversity through a shared strategy, annual joint calls for research projects and capacity building activities
2. Set up a network of harmonised schemes to improve monitoring of biodiversity and ecosystem services across Europe
3. Contribute to high-end knowledge for deploying Nature-based Solutions and valuation of biodiversity in the private sector
4. Ensure efficient science-based support for policy-making and implementation in Europe
5. Strengthen the relevance and impact of pan-European research on biodiversity in a global context

More information at: https://www.biodiversa.eu/

List of acronyms

ABCD - Access to Biological Collections Data

CSRD - Corporate Sustainability Reporting Directive

DCAT - Data Catalog Vocabulary

DwC - Darwin Core

EBV - Essential biodiversity variables

EEA - European Environmental Agency

EIA - Environmental Impact Assessment

EFRAG - European Financial Reporting Advisory Group

EMAS - European Eco-Management and Audit Scheme

EML - Ecological Markup Language

ERA - Ecosystem Regeneration Associates

ESRS - European Sustainability Reporting Standards

FAIR - Findable Accessible Interoperable Reusable

GEO BON - Group of Earth Observation's Biodiversity Observation Network

GBIF - Global Biodiversity Information Facility

GRI - Global Reporting Initiative

IAPB - International Advisory Panel for Biodiversity Credits

iDIV - German Centre for Integrative Biodiversity Research

JSON-LD - Javascript Object Notation for Linked Data

NetCDF - Network Common Data Format

OBIS - Ocean Biodiversity Information System

PPSR - Public Participation in Scientific Research

RDF - Resource Description Framework

SBTN - Science Based Targets Network

SDI - Spatial Data Infrastructure

SEEA - System of Environmental Economic Accounting

SFDR - Sustainable Finance Disclosure Regulation

TDWG - Biodiversity Information Standards (formerly Taxonomic Databases Working Group)

TFND - Taskforce on Nature-related Financial Disclosures

XML - eXtended Markup Language

XBRL - eXtensible Business Reporting Language

Table of contents

Executive summary 6

1. Untapped resources: private sector biodiversity data 8

2. Profiles of relevant business 12

3. Current biodiversity data sharing practices and platforms 28

4. Matching opportunities and demand 40

5. Best practices for effective and efficient biodiversity data sharing 52

6. References & annex 62

Executive summary

A significant amount of biodiversity data are collected by private companies due to increasing regulatory and voluntary reporting standards, such as the Corporate Sustainability Reporting Directive. However, these data remain largely untapped and are rarely shared on public platforms, where corporate contributions remain minimal.

The report identifies four main profiles of companies that generate biodiversity data:

1. **Companies with large impacts from their own operations** (e.g., mining, construction), which collect site-specific data for environmental impact assessments.
2. **Companies with large impacts in their value chain** (e.g., food, textiles), which often rely on secondary data for risk screening.
3. **Companies pursuing "no-net-loss" or "nature-positive" outcomes**, often generating primary data through restoration projects and biodiversity credit schemes.
4. **Company enablers**, such as environmental consultants and "nature tech" firms, that act as intermediaries, collecting and processing data for clients.

The landscape of data sharing is shaped by established standards and platforms. **Key standards** include **Darwin Core**, used for structuring species occurrence data, and the conceptual framework of **Essential Biodiversity Variables**, which standardizes how biodiversity change is monitored across different levels, from genetics to ecosystems. While numerous platforms exist, the most prominent for private sector engagement are the **Global Biodiversity Information Facility** and the **Ocean Biodiversity Information System**, which serve as global hubs for species data, and the **GEO BON portal** for Essential Biodiversity Variables. However, a fundamental challenge identified is the mismatch between the functionalities of these platforms, which are primarily designed for research, and the needs of the private sector. Businesses require features like robust access control for sensitive information, clear liability frameworks, and user-friendly interfaces, which are often lacking.

Case studies of biodiversity data sharing frontrunners like **TotalEnergies, Holcim, Barilla, Biotope, and Lake Constance Foundation** reveal that while data sharing is beneficial, common obstacles include data ownership issues and a lack of in-house expertise. To address these challenges, this report provides a practical, seven-step guide for businesses. The process begins with **defining goals and stakeholders** to ensure data sharing meets specific needs. It then moves to **auditing and preparing data**, which includes cleaning, standardizing, and documenting datasets with metadata. The third and fourth steps focus on **resolving legal and licensing issues** by clarifying data ownership and applying community standards like Darwin Core to ensure interoperability. Companies must then **choose an appropriate sharing platform**, before moving to **publish, validate, and maintain** the data. The final step emphasizes the need to **build internal capacity and foster collaboration** with experts to ensure the long-term success of data-sharing initiatives. The report concludes by urging companies to adopt a culture of data stewardship to unlock the value of their biodiversity information.

1

Untapped resources: private sector biodiversity data

1.1 Increasing demand of biodiversity data for reporting and certification

The motivation for this report stems from an increasing demand of biodiversity data for reporting and certification in the private sector, which is not yet matched with sharing of such data by the private sector. This report aims to contribute to reducing this mismatch and support private sector companies in using the untapped potential of sharing biodiversity data and as such increase our ability to sustainably manage critically important biodiversity.

Biodiversity is under pressure globally and declining at unprecedented rates, with far-reaching consequences for the prosperity of human civilization (IPBES, 2019; Crona et al., 2022). New technologies to observe and record the state of biodiversity, as well as increased efforts from the public sector driven by research and regulations and policies, have led to an increased collection and sharing of biodiversity data. While governments and researchers have promoted data collection, one critical source remains underutilized: the private sector. A key question is therefore: **What role can businesses play in sharing biodiversity data?** The purpose of sharing biodiversity data is to enable their reuse by other stakeholders, which another Biodiversa+ report (Bakker & Teske, 2025) investigates.

Human economical activities in general, especially in the form of agriculture and resource extraction, form a significant impact on biodiversity, while the decline of biodiversity and the ecosystem services it underpins is also threatening the future validity of many private businesses. Yet a quick check of existing biodiversity data sharing platforms shows that there is comparatively little information on biodiversity shared by the private sector.

The Taskforce on Nature-related Financial Disclosures (TFND) roadmap for enhancing market access to nature data contains a lot of relevant information on needs and standards. Interestingly, this roadmap seems to view the private sector mainly as data users, not as data producers, arguing that data needs to fit three domains: scientific, open, and corporate reporting standards. The roadmap asks with good reason for "intuitive experience for non-experts" and a "customizable user experience". It emphasizes the role of secondary data and linking with existing repositories, with licensing and Intellectual Property as important factors. We take up these elements in our assessment of current platforms in chapter 3.

There are different reasons why entities share biodiversity data. The Global Biodiversity Information Facility (GBIF) lists some incentives listed in their Quick guide to publishing data:

1. contribute to global knowledge about biodiversity
2. new opportunities for collaboration
3. giving visibility to publishing institutions (which can be further increased by publishing a peer-reviewed data paper)
4. trace usage and citations of digitized data
5. comply with requirements from funding agencies

While these incentives were primarily aimed at public research institutions, incentives 2, 3, and 5 are of high relevance to private sector stakeholders as well.

In summary, private sector activities are extremely relevant for our understanding of changes in biodiversity, and the private sector needs to collect an increasing amount of biodiversity data for regulatory compliance. Yet the publication of such data is not yet visible in the most common platforms, with the exception of a few frontrunners who we approached in our outreach activities.

1.2 Research questions and report reading guide

Both businesses and biodiversity data have a common characteristic of being very diverse. The main objectives of this guide will therefore be twofold: to identify common, relevant, and crucial combinations of business and biodiversity data standards and practices, and to describe how this combination can be implemented in practice. There are four corresponding guiding questions:

Q1. What are the main typical profiles of businesses that create, provide, and use biodiversity data?

Q2. What are the main biodiversity data sharing practices and infrastructures?

Q3. What are efficient combinations between the profiles and practices?

Q4. What are recommended best practices to share biodiversity data to realize these combinations for mutual benefit?

The end-goal was to produce this business-relevant guide with clear steps for improved data sharing practices. To address the first question in chapter 2, it presents profiles of business actors (in terms of size, but also in terms of their position in the value chain) that are potential producers of biodiversity data, and highlighting the importance and the benefits of sharing such data (such as compliance, reputational, or commercial benefits). These are presented in the context of existing business requirements and initiatives, such as disclosure metric requirements under the Corporate Sustainability Reporting Directive (CSRD) or Sustainable Finance Disclosure Regulation (SFDR) and private sector-led standards. Barriers and needs to enable different profiles of business actors to share biodiversity data are explored and guidance for tackling these needs are presented. This guide then introduces the reader to biodiversity data management, platforms, standards, and Essential Biodiversity Variables (EBV) in chapter 3 to address the second question.

Moving to practice, the guide includes concrete examples from specific case studies for different profiles of businesses, sharing their success stories, but also the challenges they overcame along the way (chapter 4). We paid special attention to emerging private-sector initiatives for data sharing and we directly engaged with such initiatives to align and receive feedback. Lastly, we combined all of the above information into best practices for private sector companies to share biodiversity data (chapter 5) to address the fourth and final question.

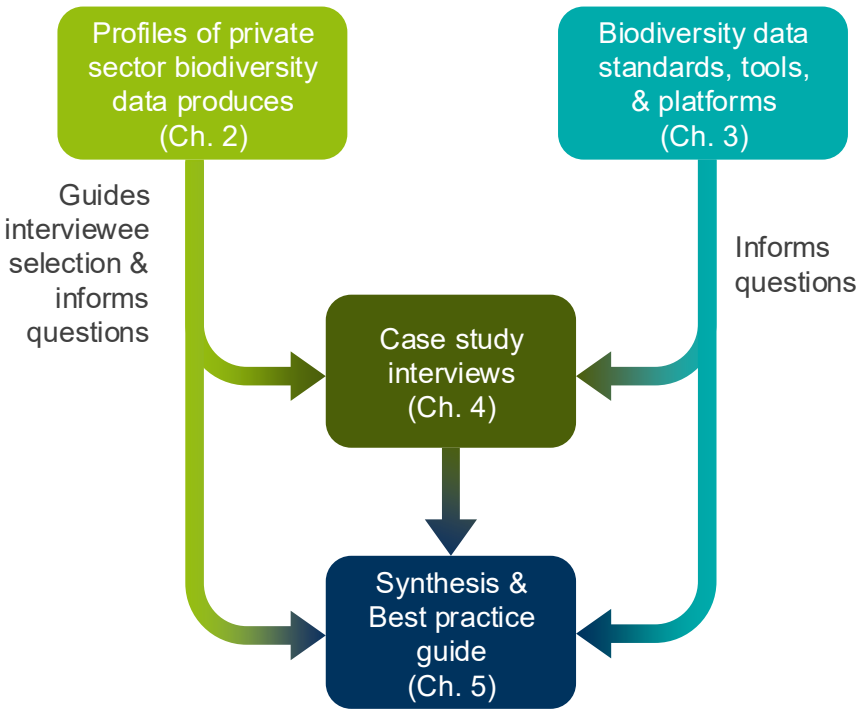
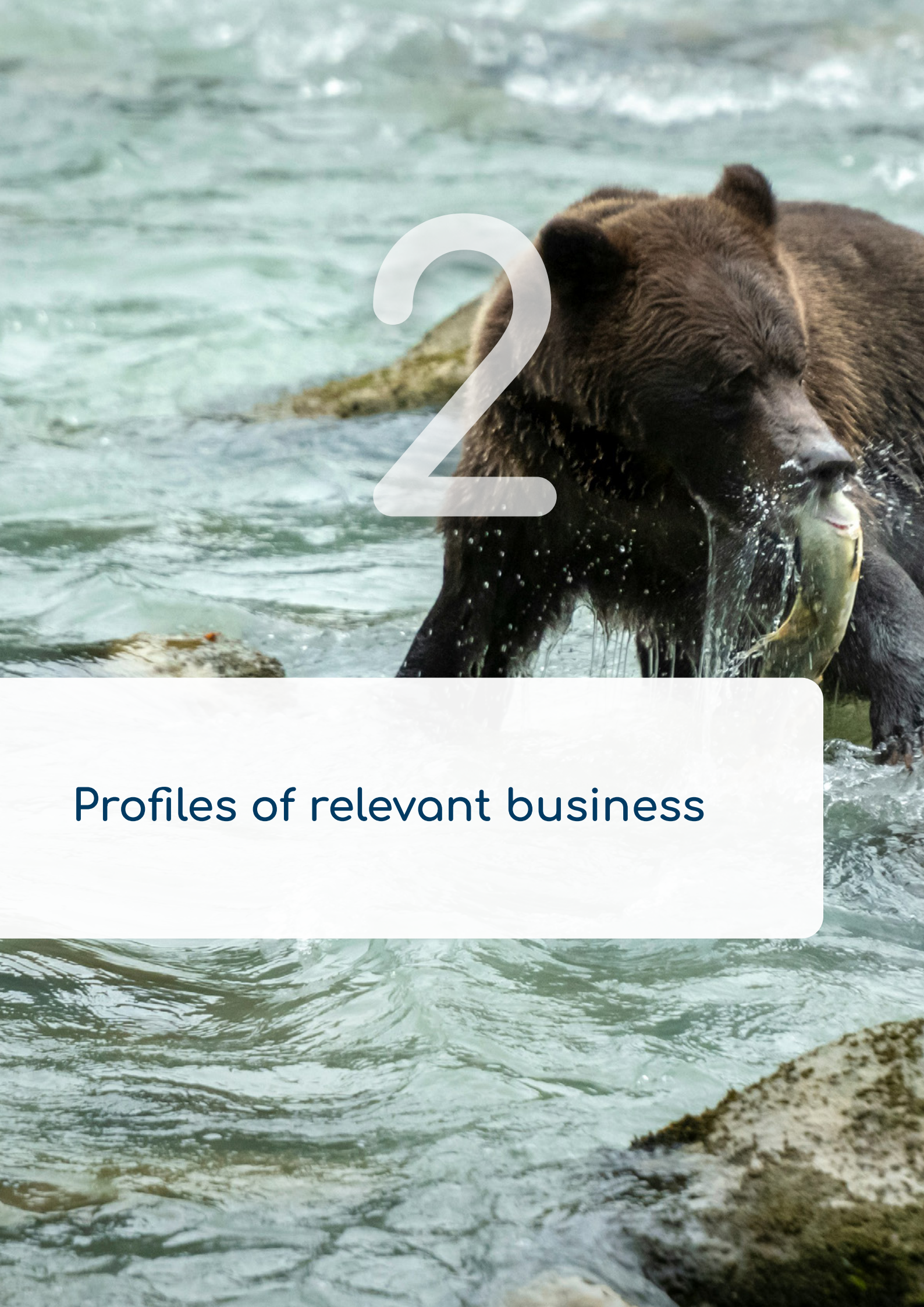


Figure 1. Overview of the report's main elements



2

Profiles of relevant business

To illustrate the biodiversity data value chain and its different actors, we derived profiles of biodiversity data producers by reviewing existing private sector standards with respect to biodiversity data, including regulatory compliance/reporting, voluntary standards and management instruments. We checked for inclusion of EBV in business standards and review lists of data publishers in important repositories and platforms.

We began with existing research completed under the 2022-2027 CircHive EU project. This includes an overview of reporting data under regulatory requirements like CSRD/SFDR and voluntary standards from organizations like TNFD, Science Based Targets Network (SBTN), Global Reporting Initiative (GRI), or CDP, plus a review of 21 ecolabels in the food, textile and forestry sectors. The emerging world of biodiversity credits as part of corporate transition plans has been reviewed as well, with over 30 biodiversity credit schemes as part of ongoing engagement with the International Advisory Panel for Biodiversity Credits (IAPB) and the recent EU Nature Credits roadmap. We then created different profiles of business biodiversity data providers along the "biodiversity data value chain". We focused on companies as data producers but also on enablers (consultants, data aggregators, tool providers), and interconnections in terms of data ownership and flows between actors. By reviewing lists of data providers on GBIF and the Ocean Biodiversity Information System (OBIS) etc., we identified business actors who already submit their data, clustering by sector, country, business size. This identification of businesses who are already submitting data to biodiversity platforms informs the outreach (Chapter 4).

2.1 What types of companies already share their biodiversity data?

With more than 60,000 datasets published by over 1700 institutions, GBIF represents diverse repository of biodiversity data. These contributions primarily come from government agencies, museums, herbaria, universities, research centres, and NGOs. However, the business sector remains underrepresented. Despite the amounts of biodiversity data collected by companies worldwide, only 0.7% of datasets and 0.3% of occurrence records in GBIF originate from private companies, amounting to around 7.8 million records. This limited participation from the corporate world restricts access to data which is inherently difficult to collect due to the high costs related to field data collection. In many cases, companies already gather such data to meet regulatory requirements, and while sharing it may involve some effort, the additional cost is relatively low compared to the potential benefits for biodiversity research, conservation, and sustainable development (Figueira et al. 2020).

Figure 2 highlights the uneven distribution of biodiversity data contributions to GBIF from different private sectors (these numbers may change quickly – for an up-to-date overview, consult GBIF's dynamically updated web page). The energy sector stands out with 303 datasets, accounting for most private sector contributions. This likely reflects the sector's regulatory obligations and environmental monitoring practices, which often require extensive biodiversity assessments. Consulting firms follow with 56 datasets, due to their role in conducting environmental impact assessments for various industries. This disparity underscores the limited engagement of most industries in biodiversity data sharing, despite their potential to generate valuable information through routine operations or compliance activities.

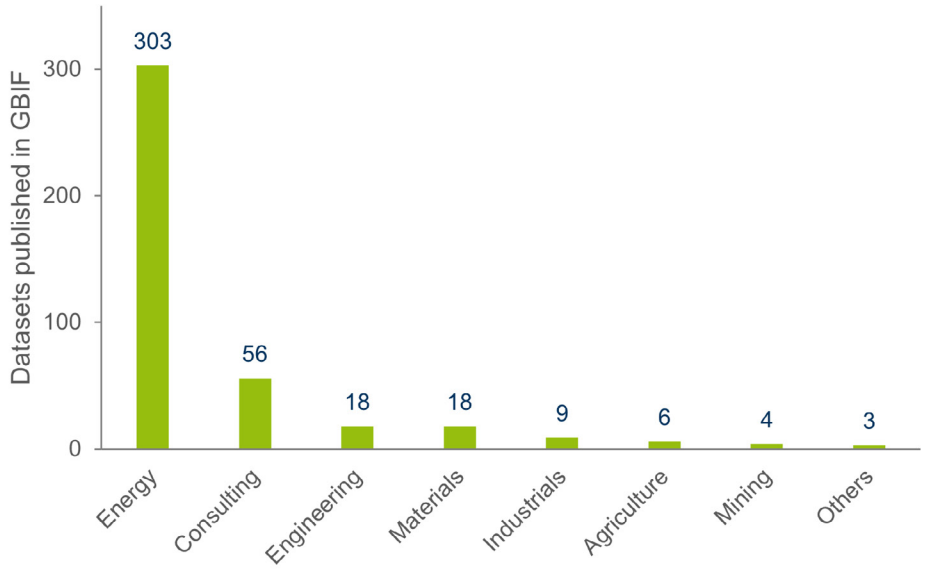


Figure 2. Datasets published in GBIF by private companies based on sector (adapted from Figueira et al. 2020).

Figure 3 visualises the same datasets, however now focusing on countries. Colombia stands out with 289 datasets, followed by France (45) and Norway (36). These three countries are characterised out not only for their higher dataset counts but also because they have regulations requiring biodiversity data sharing, which likely drives corporate contributions. In contrast, countries without such legislation show lower levels of participation.

OBIS, like GBIF, is a global open-access platform for biodiversity data focusing on marine ecosystems. Despite having over 2786 data publishing institutions, OBIS sees limited private sector involvement with 5.9% of datasets and 3.2% of data points coming from companies. This highlights a significant gap in data sharing, especially considering the scale of industrial activity in marine environments and the high costs associated with offshore data collection, which often requires access to or ownership of seafaring vessels.

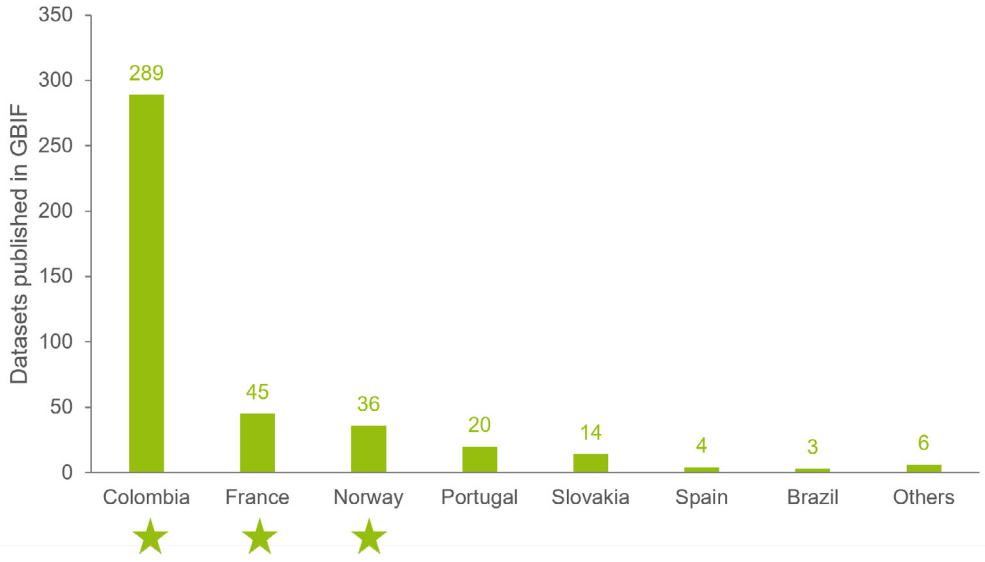


Figure 3. Datasets published in GBIF by private companies based on country of origin of data. The stars indicate Countries with regulations requiring biodiversity data sharing. (adapted from Figueira et al. 2020)

2.2 What corporate standards can support biodiversity data creation?

Private sector actors in the business & biodiversity space operate in a complex environment of regulatory and voluntary market standards. In the past several years, there has been a proliferation of nature-related disclosure requirements, and an increasing alignment between voluntary standards, as well as between standards and regulations (Tin et al. 2024). It is via said standards that biodiversity-relevant data may be generated by the private sector.

For the purposes of this report, 93 standards have been identified and reviewed, grouped into five key categories (see Figure 4 for an overview, and the Annex for a full list with links):

1. **Regulations** include statutory requirements for management of impacts on biodiversity and for reporting of biodiversity-relevant datapoints. Only EU legislation has been reviewed. The standards in scope include the Environmental Impacts Directive and requirements for Appropriate Assessment under the Habitats Directive, as well as corporate reporting requirements under the European Sustainability Reporting Standards (ESRS) E4: Biodiversity[1], the SFDR, and the EU Sustainable Finance Taxonomy for biodiversity.
2. **Voluntary Reporting** includes standards requiring voluntary disclosure of specific nature-related information. All major market standards for nature-related disclosures have been reviewed, sourced from a recent review (Paspaldhiev et al. 2023) by the CircHive EU project, with addition of known standards specifically linked to best-practice biodiversity management.
3. **Environmental Management Systems & certifications** include structured certifiable frameworks that organizations can use to manage their environmental impacts. The review includes ISO 14001 and the European Eco-Management and Audit Scheme (EMAS), as well as specific sector standards focusing on heavy industry and the built environment.
4. **Ecolabels** include standards that indicate that a product or service meets specific environmental criteria. A recent review (Hammerl et al. 2023) includes 23 standards with specific requirements for nature & biodiversity, sourced from a recent review by the CircHive EU project.
5. **Biodiversity Credits** as a mechanism for mobilizing private finance for nature restoration are gaining prominence on the corporate agenda. Credits represent a quantifiable unit of biodiversity value, allowing for investment in projects conserving or enhancing biodiversity. The review includes 52 biodiversity credit standards which propose various methodologies and indicators for quantifying biodiversity value, sourced from a review conducted by EY for the IAPB.

1. This analysis has been conducted prior to the announcement of specific simplification provisions of the EU Omnibus Simplification Package, which as of the time of writing is still not in force.

Figure 4. The mandatory and voluntary reporting standards reviewed.

2.3 What biodiversity data can private sector companies create?

The 92 standards presented in the previous section were reviewed at the level of individual disclosures in order to identify specific instances where biodiversity-related datapoints may be generated. The following information was recorded:

- **Type of data generated**: whether the disclosure requirement in question requests *primary data*, *secondary data*, or disclosure of EBV.
- **Type of biodiversity variable required**: was recorded using the definitions of the 21 variables under the EBV typology (see section 3.3)
- **Type of biological entity monitored**: species, habitats, or ecosystems.
- **Spatial scale of monitoring**: site or value chain
- **Type of variation recorded**: absolute values, or variation over space and/or time

A total of 121 relevant disclosure requirements were identified, visually presented in Figure 5.

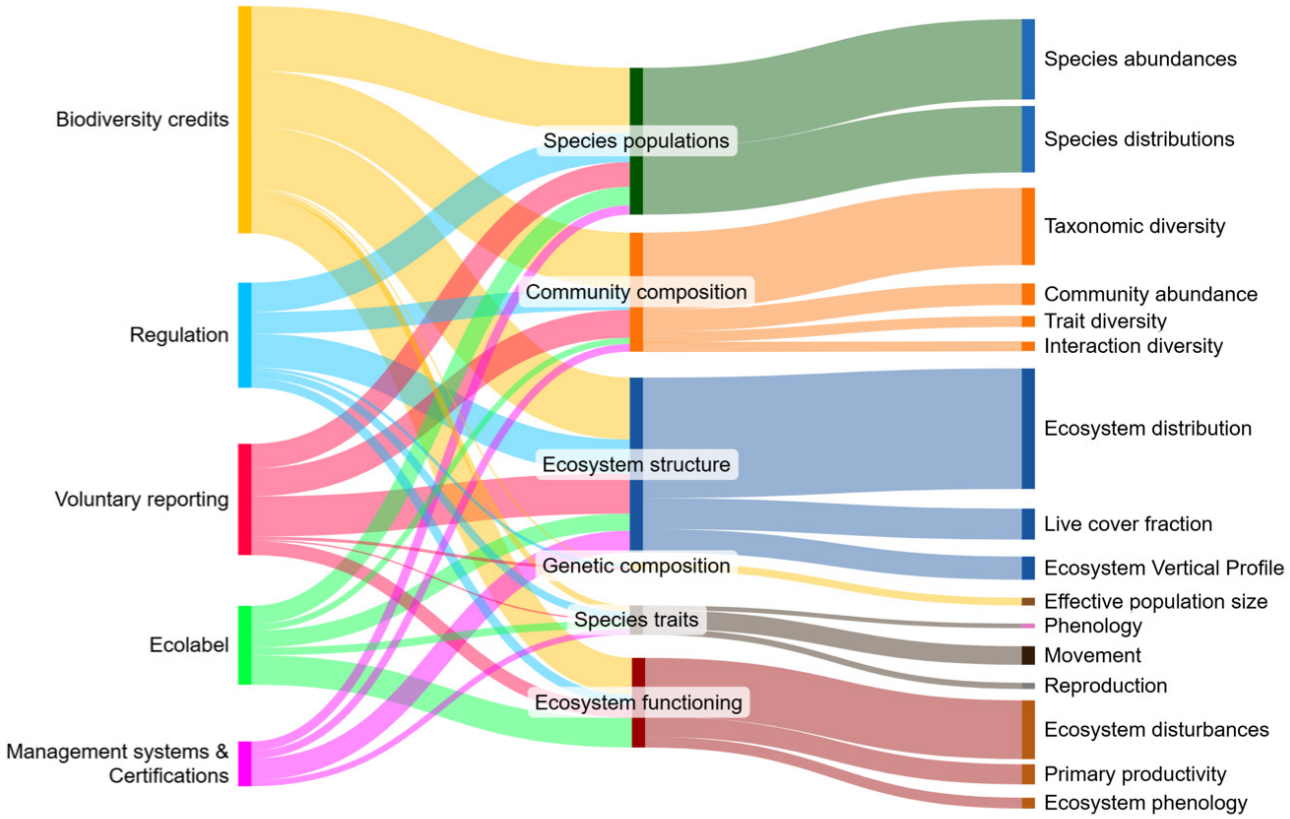


Figure 5. Categories of corporate standards and the types of biodiversity variables that may be generated. Source: own elaboration. Size of flows represent number of disclosure requirements matching a given biodiversity variable.

The most common EBV requested by standards include:

- **Species abundances and distributions, taxonomy diversity** – typically absence/presence data, and less often population size estimates. Corporate standards principally focus only on information on protected species.
- **Ecosystem distribution** – typically focused on ecosystem/habitat conversion versus a baseline.
- **Ecosystem disturbances** – typically focused on proximity/overlap with protected areas, or drivers of disturbance (quantified pressures such as kg pollution or m3 water use, and/or qualitative information).

The remaining EBV classes, such as genetic composition, species traits, and aspects of ecosystem functioning other than disturbances, show a lower uptake in disclosure standards. We do not explore the reasons for this in detail, but for example, it is known that corporate measurement methodologies for genetic diversity are underdeveloped (UNEP-WCMC 2022).

While in certain cases disclosures are readily matched versus a specific biodiversity variable, there are many instances where corporate standards simply require disclosure of "ecosystem condition" variables without further detail or pointing to the System of Environmental Economic Accounting: Ecosystem Accounting standard (UN 2024). In this case, it is assumed that all variables under EBV classes "Species populations", "Ecosystem structure", and "Ecosystem functioning" are applicable, and these correspond to SEEA-EA classes "B1 Compositional state", "B2 Structural state" and "B3 Functional state".

While certain biodiversity variables shown in Figure 5 *may be generated, this does not mean that they are in fact generated* by every company. Corporate standards – especially voluntary standards - often provide considerable room for choice of specific indicators to be used and disclosed. The relatively larger contribution of instruments such as biodiversity credits to the result do not imply higher uptake. The analysis considers where disclosures exist in principle. It does not consider actual uptake – in fact, uptake of e.g. regulatory instruments should be higher by definition (as they are mandatory).

Corporate reporting requires collection of data for individual sites, but also consolidation of data across multiple value chains, recognizing that companies from certain sectors may engage with hundreds of suppliers with multiple sites across the world (Figure 6). This presents a significant practical data collection management challenge, meaning that in practice most companies will collect data for their own operations, while relying on secondary data sources to fill gaps in the value chain (Bromwich et al. 2025, White et al. 2023). It should be noted that explicit use of secondary data is not *required* by any standard – primary data may be used in all cases, but secondary data can also be permitted.

Of the reviewed disclosures, approx. 73% of the requirements from voluntary reporting and 93% from regulations allow the use of secondary data in absence of primary measurements (Figure 7). Thus in these cases, no new data are generated – rather, data from existing corporate-focused tools may be used (see e.g. de Ryck et al. 2024). In contrast, ecolabels, management systems & certifications, as well as biodiversity credit standards specifically require primary data, as these instruments focus on specific sites or products. Again, the voluntary nature means that while such standards may contain primary data, it does not mean that such data are *generated in practice*. Instruments such as ecolabels represent "industry consensus" standards, which focus on best-practices but do not always contain relevant indicators and monitoring systems (Cicek at al. 2024, Hammerl et al. 2023). Lack of outcomes measurement and inadequate data sharing are frequently indeitifed challenges in the context of biodiversity credits (Bull et al. 2013).

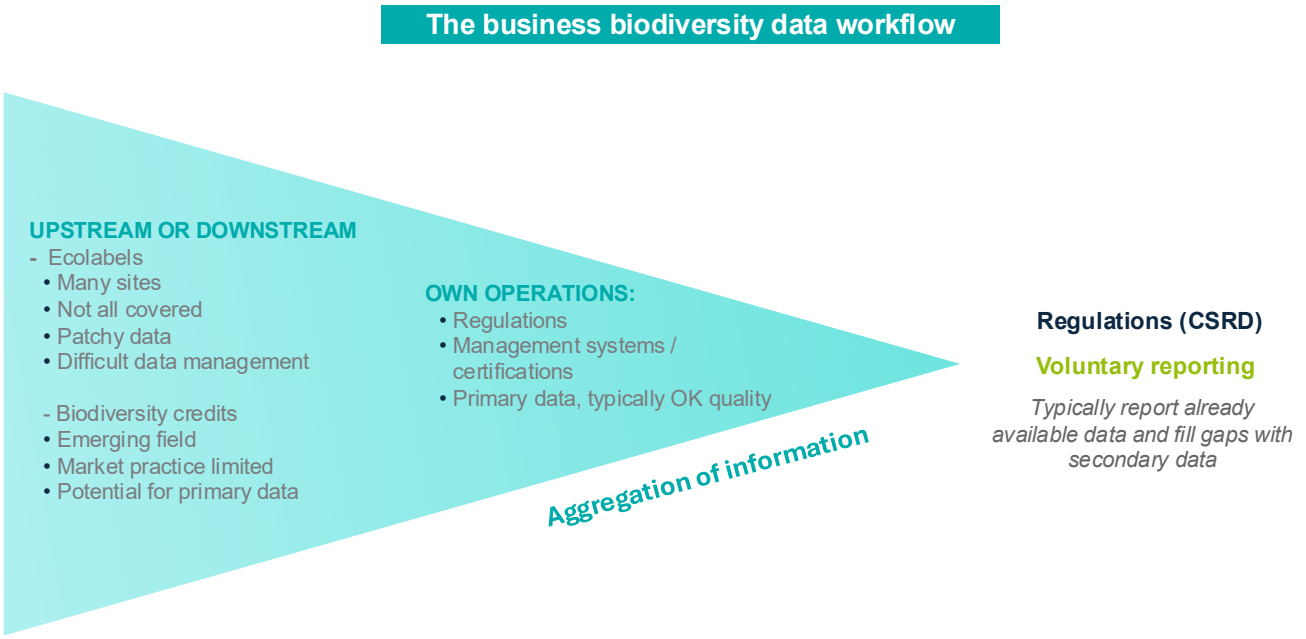


Figure 6: Conceptual representation of the business & biodiversity data workflow, representing the aggregation of information across the value chain and for individual company sites that is ultimately disclosed via regulatory or voluntary standards.

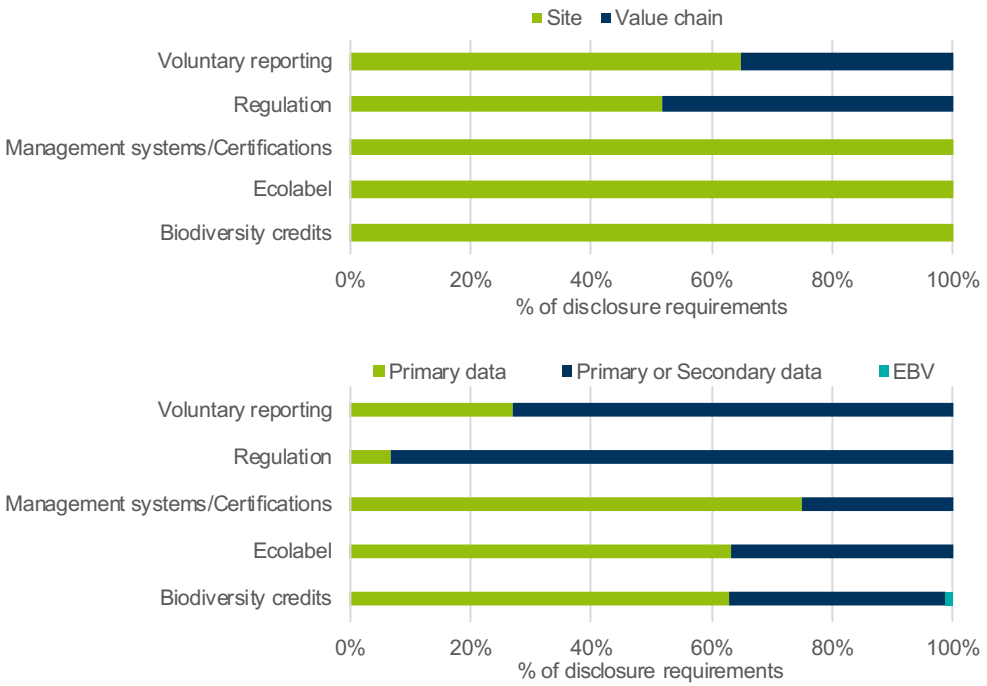


Figure 7: Disclosure requirements reviewed (n = 120) and extent to which they require: Top - site of value chain information; Bottom - measurement of primary data, allow for secondary data use, or explicitly require the disclosure of an Essential Biodiversity Variable.

Among all 120 reviewed disclosures, there is only one case where EBV are specifically mentioned, in the Ecosystem Regeneration Associates (ERA) Brazil biodiversity credit standard, which requires disclosure of Taxonomy diversity, and Ecosystem disturbance mitigation indicators.

2.4 Typology of biodiversity data producers

What types of companies generate biodiversity data? And what types of data? Understanding the biodiversity data value chain is essential for analysing how biodiversity data are collected and shared. This value chain can be conceptualized around a central question: How do companies impact nature[2]? Addressing this question allows for the classification of companies based on the location and nature of their environmental impacts, and by understanding the type of data that is likely to be generated - primary, secondary, site or value-chain related. Using this information, plus previous review of types of companies already sharing biodiversity data, a simplified value chain view is derived (Figure 8a). Based on this, four categories of biodiversity data producers are identified. Each category is elaborated below, and specific best-practice requirements from standards are also presented. The best practice examples presented below do not refer to specific companies, but to regulatory frameworks, voluntary standards, and industry initiatives that facilitate or mandate the generation and sharing of biodiversity data.

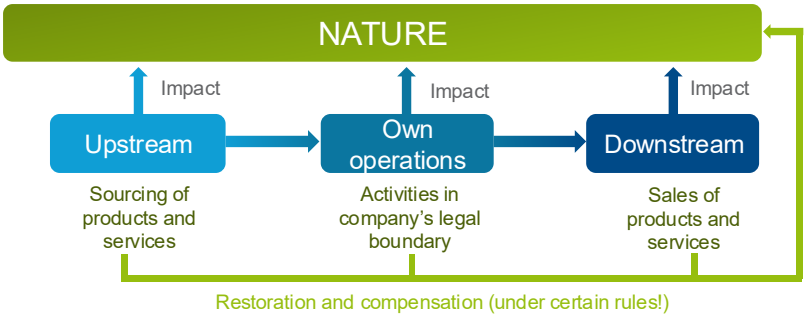


Figure 8a. Simplified corporate value chain and its interface with nature (top)

2.4.1 Companies with large impacts from their own operations

Companies with large impacts from their own operations are typically represented by companies from the primary sector, as well as construction and infrastructure activities, and heavy manufacturing companies which operate facilities with high localized impacts on the environment.

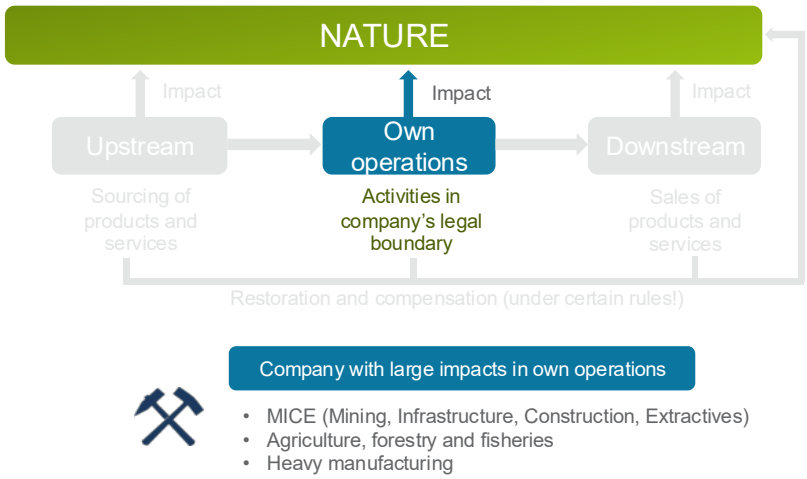


Figure 8b. Simplified corporate value chain focusing on own operations.

2. Note that corporate standards typically refer to both biodiversity impacts *and dependencies*. However, corporate measurement of dependencies is at present poor – e.g. among a review of 816 of the world's largest companies, only 6 (0.7% of the sample) disclose assessment of nature dependencies (World Benchmarking Alliance: Nature Benchmark 2024). Among corporate disclosure standards, only TNFD offers general guidance on dependencies measurement but without reference to specific assessment methods (Paspaldzhiev et al. 2023).

Some best practice examples of standards encouraging biodiversity data generation include:

- Environmental regulations such as the Environmental Impact Assessment (EIA) and Appropriate Assessment frameworks require comprehensive evaluations of species and ecosystem data. These assessments often rely on primary data collection, though the use of secondary data is also acceptable. Such evaluations are essential for understanding the potential ecological impacts of proposed developments and ensuring regulatory compliance.
- The Equator Principles, adopted by nearly 40 major financial institutions across the European Union, encourage the sharing of biodiversity data through platforms like GBIF. These principles guide responsible project financing, particularly for site-specific developments, and align closely with the International Finance Corporation's Performance Standard 6, which emphasizes biodiversity conservation and sustainable resource management.
- In the mining and extractive industries, the International Council on Mining and Metals strongly recommends adherence to the Equator Principles. This endorsement reflects a broader industry commitment to integrating environmental considerations into operational planning and decision-making processes.
- The Aluminium Stewardship Initiative standard further reinforces this approach by requiring detailed assessments of ecosystems, native species, and invasive alien species. This ensures that aluminium production and sourcing practices are conducted in an environmentally responsible manner.
- Voluntary reporting frameworks also play a critical role in promoting transparency and accountability. The GRI, one of the most widely adopted sustainability reporting standards, mandates the disclosure of site-specific information on ecosystems and species. This enables stakeholders to better understand and evaluate the environmental footprint of corporate activities.
- Finally, the SBTN for Zero Land Conversion sets ambitious goals for tracking and minimizing land conversion at company sites. This includes monitoring ecosystem disturbances and supports broader efforts to halt biodiversity loss and protect natural habitats.

2.4.2 Companies with large impacts in the value chain:

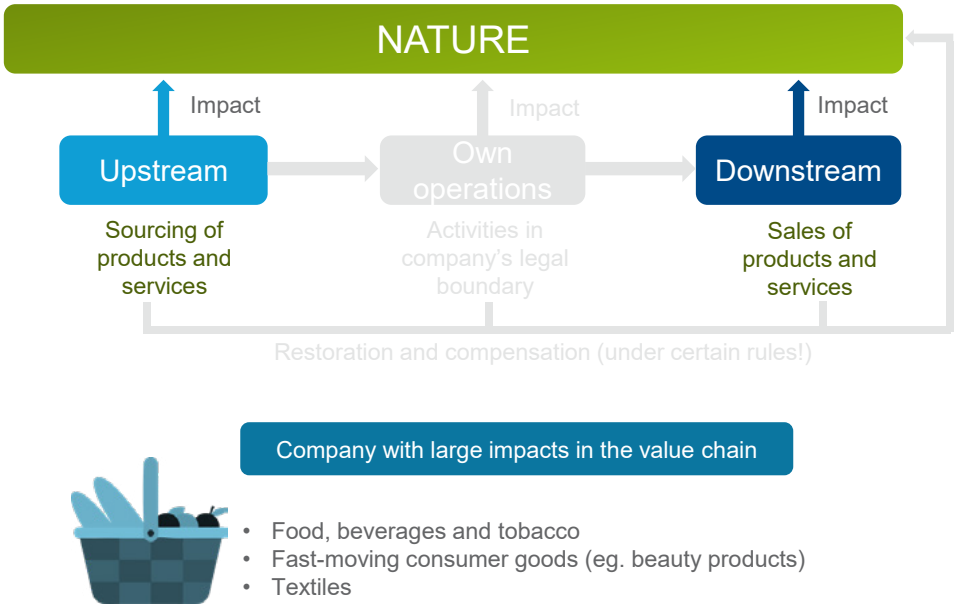


Figure 8c. Simplified corporate value chain focusing the upstream and downstream value chain.

The category of companies with large impacts in the value chain is typically represented by businesses in the consumer goods sector, including food, beverages, tobacco, textiles, and fast-moving consumer goods like beauty products. These companies often have extensive and complex supply chains, where the most significant environmental and social impacts occur upstream in raw material sourcing or downstream in product use and disposal.

Given the complexity of their supply chains and the diffuse nature of their environmental impacts, companies in this category often rely on a range of standards and initiatives to guide biodiversity-related disclosures such as:

- Ecolabels represent another mechanism through which ecosystem and species considerations are integrated into product standards. Many ecolabel schemes require some level of biodiversity-related information. However, a key limitation is that this data are not always systematically recorded or verified, which can undermine the reliability and comparability of such information across products and sectors.
- The CSRD mandates the disclosure of certain information related to ecosystems and species within corporate value chains. Despite this requirement, the regulation does not prescribe a specific format or methodology for reporting, which can lead to inconsistencies in how companies interpret and implement these obligations.
- Voluntary frameworks such as TNFD and the SBTN also require companies to screen for ecosystem and species-related issues across their value chains. These frameworks promote a proactive approach to identifying nature-related risks and opportunities. However, in practice, such assessments are often based on secondary data sources, which may lack the granularity or accuracy needed for robust decision-making.

2.4.3 Companies working towards no-net-loss / nature positive

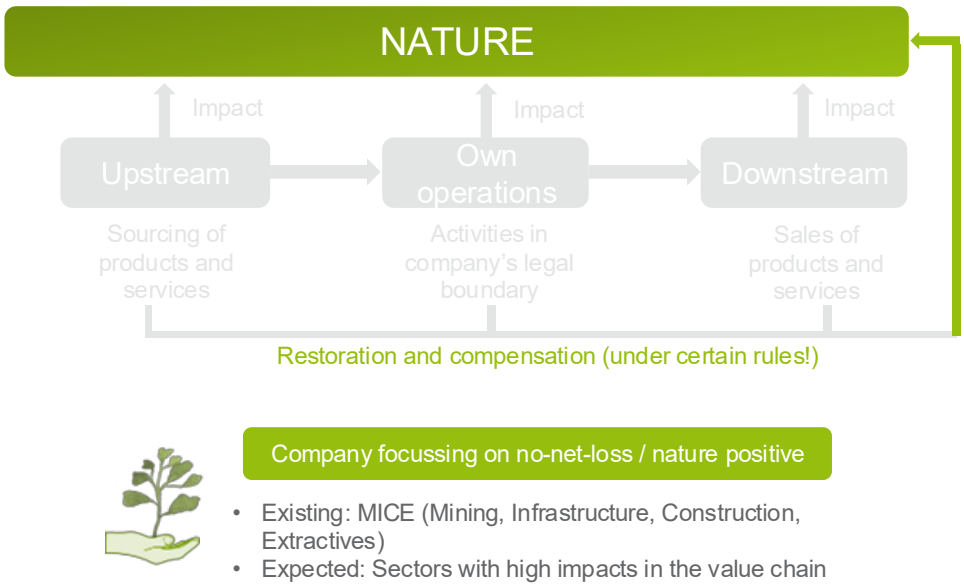


Figure 8d. Simplified corporate value chain focusing companies undertaking restoration.

There is an existing practice of no-net-loss and net gain commitments under the IFC Performance Standard 6 and jurisdictional approaches such as the Biodiversity Net Gain market in the United Kingdom. These companies are primarily concentrated in operationally intensive sectors, yet there is a growing recognition that value chain-driven industries must also play a role, as multiple studies indicate that for many sectors, the bulk of impacts occur outside direct operations (Kulionis et al. 2024). As a result, there is increasing (though still limited) momentum for nature positive strategies also in the value chain, with companies seeking to mitigate biodiversity loss and ecosystem degradation not only at the site level but also throughout their sourcing, production, and distribution networks.

Several emerging standards and initiatives are advancing the accuracy and consistency of biodiversity measurement, particularly in the context of biodiversity crediting and nature-positive outcomes. Examples include:

- The Nature Positive Initiative is an emerging global effort focused on nature restoration and the development of indicators to assess the state of ecosystems and species. While still in its early stages, this initiative aims to provide a framework for measuring progress toward biodiversity recovery and ecological resilience.
- The ERA Brazil standard stands out as the framework, out of the 60 reviewed, that explicitly references EBV when defining its measurement requirements.
- The Wallacea Trust offers a systematic approach to measuring biodiversity gain through a "basket of metrics" model. This methodology emphasizes the evaluation of biodiversity impacts over time, supporting long-term monitoring and adaptive management.
- Similarly, the Verra Sustainable Development Verified Impact Standard Nature Framework includes multiple specific indicators that align with EBV categories, although it does not explicitly reference EBV.
- The BioCarbon Biodiversity Standard employs a multi-criteria model, using a suite of metrics for both species and landscape-level diversity.

Many biodiversity credit standards are currently proliferating and still in the process of establishing themselves. By design, most of these standards require the use of primary data for assessing species and ecosystems, reinforcing the importance of field-based, site-specific information. However, the lack of harmonization across standards presents challenges for comparability and scalability. Encouraging data sharing, through platforms like GBIF, OBIS or national biodiversity databases, for example, could significantly enhance the quality and consistency of biodiversity assessments. Shared data infrastructure would also reduce duplication of effort and support more transparent and credible biodiversity credit markets.

2.4.4 Company enablers

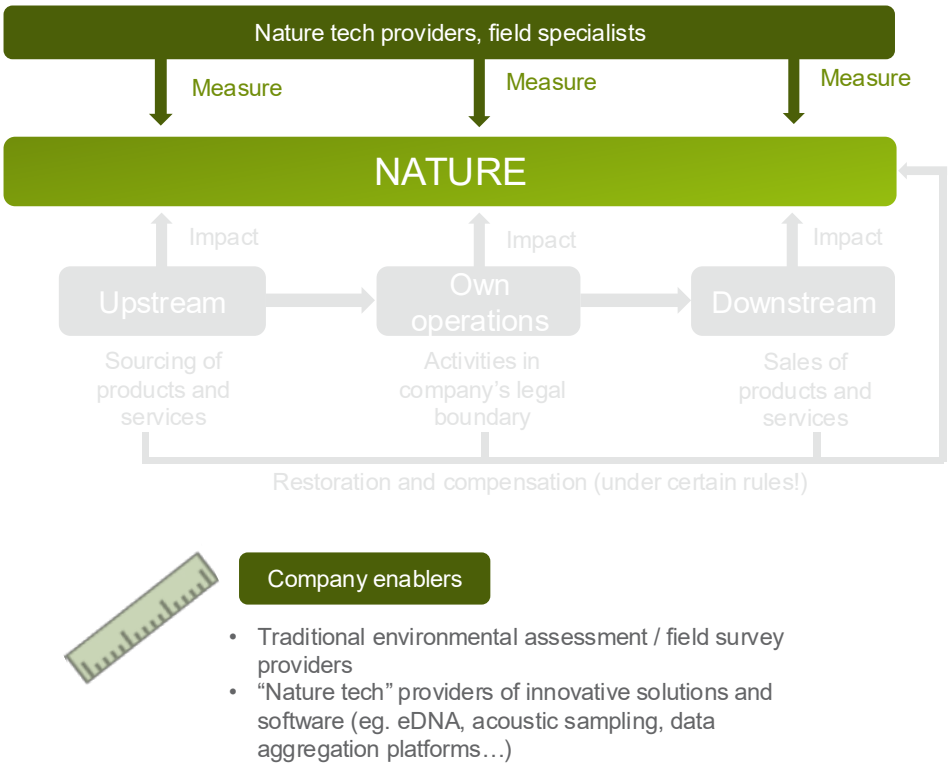
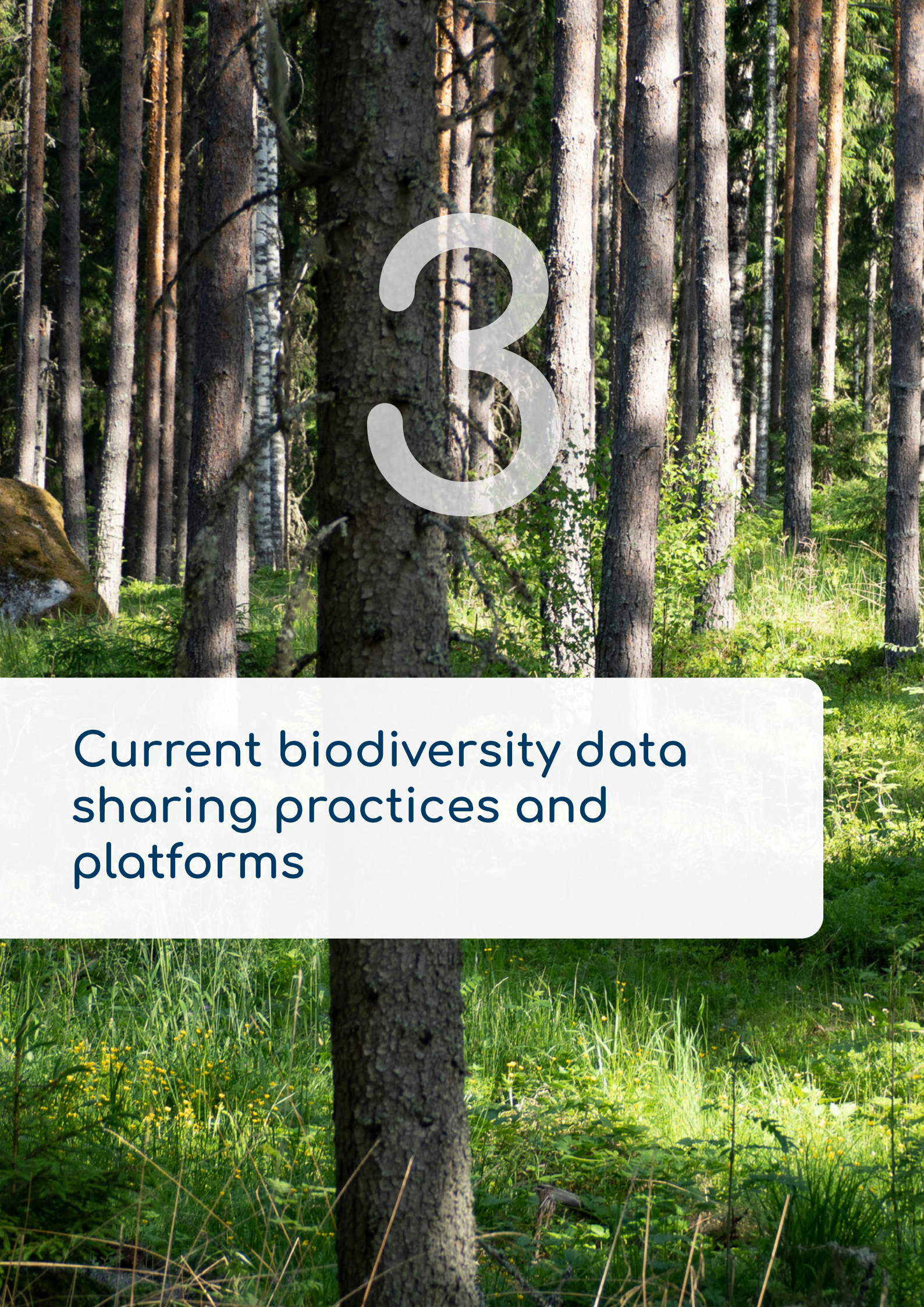


Figure 8e. Simplified corporate value chain focusing on company enablers such as nature tech providers.

"Enables" include companies, ranging from traditional environmental survey firms to innovative "nature tech" providers using tools like eDNA, acoustic monitoring, and data aggregation platforms. Such actors play a key role in generating new biodiversity data as intermediaries between the corporate world and the world of biodiversity science. Figure 1 underscores the importance of consultancy companies, which are the second largest private sector contributor to GBIF.



3

Current biodiversity data sharing practices and platforms

The objective of this step was a summary of state-of-the-art tools, standards, platforms, and infrastructures for creating, sharing, and using biodiversity data according to Findable Accessible Interoperable Reusable (FAIR) principles, with a specific focus on semantic web technologies that enable interoperability between platforms, with the aim to further inform the business outreach activities during the next outreach step. This summary allows to identify actions in the near and long term to ensure adaptation capability of private sector to future policy and technological developments.

Building on earlier Biodiversa+ work, we explored existing biodiversity data sharing platforms such as GBIF platforms in Portugal, Norway, and France, ARISE consortium in the Netherlands, as well as DEPOBIO (France).

Although initial scoping included a review of digital tagging initiatives, such as the Finance for Biodiversity Foundation's announcement at the UN CBD COP16 and the XBRL taxonomy for European Sustainability Reporting Standards (ESRS) E4, these topics were not further explored in this report. Main reason was that we decided that including them was premature because of postponed timelines for mandatory XBRL tagging[3].

3. Following the European Commission's Omnibus initiative and European Financial Reporting Advisory Group's (EFRAG) subsequent simplification of the ESRS framework, the timeline for mandatory XBRL tagging has been postponed. ESMA's consultation outlines a phased implementation, with tagging requirements for large undertakings beginning from the 2026 or 2027 financial year, and full digitisation expected by 2031–2032 (EFRAG 2024). Additionally, the ESRS indicators themselves are still under revision, with EFRAG currently conducting a public consultation on the simplified exposure drafts. Final technical advice to the European Commission is expected by 30 November 2025, and further changes may follow (EFRAG 2025).

3.1 Relevant data sharing infrastructures and practices

A search reveals that there are a wide range of (biodiversity) data sharing platforms and tools available: For example, the TNFD catalogue lists 49 results when searching for "biodiversity", the Biodiversity Knowledge Hub lists almost 20 platforms and organizations, and the Biodiversa+ report on harmonisation and interoperability of datasets across regions and countries lists more than 50 platforms (Basset et al. 2023). Standardization is a common challenge (Figure 9)

However, the state of biodiversity monitoring shows still a very mixed landscape: many older datasets, which are crucially important for analysing long-term trends, are still in JPEG and PDF format and thus not ready for analysis. Further, interoperability issues persist, e.g., between platforms it is still low (Meeus et al. 2022). At the same time, data harmonisation necessary for full interoperability is still not achieved, despite established biodiversity data standards such as Darwin Core (DwC), Access to Biological Collections Data (ABCD), and Network Common Data Format (NetCDF, details for all see section 3.2).

In the past decade, the EBV have been developed to act as a bridge between unprocessed biodiversity data (e.g., species occurrences) and policy-relevant indicators.

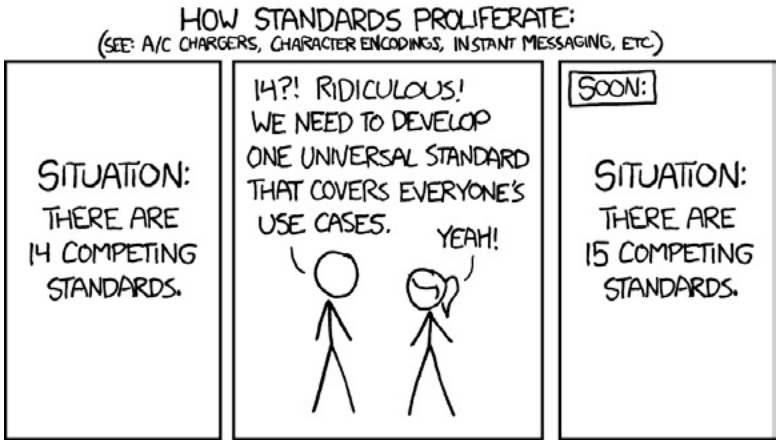


Figure 9. Setting standards is a commonly observed challenge, also in biodiversity data sharing. Source: xkcd, https://xkcd.com/927/, published under CC BY-NC 2.5

General recommendations for biodiversity monitoring expressed in a Biodiversa+ report on strategic biodiversity monitoring (Lipsanen et al. 2024) include the requirements that

- monitoring must meet specific information needs;
- a common monitoring network is essential for mainstreaming biodiversity data collection and sharing efforts
- fully designed and implementable workflows are necessary to improve use of outputs and facilitate uptake by end-users
- each country or sub-national region should promote their own coordination centre
- dataflows between the public and the private sectors need to be identified and defined.

In addition to the above, another detailed list of biodiversity monitoring recommendations (Addink et al. 2022) describes data sharing and practices in detail, but from a research perspective and not from a private sector perspective. This is probably unsurprising, because data sharing platforms have been originally developed as either more bottom-up initiatives from research groups that evolved into sustainable platforms, or as government-driven top-down initiatives to share data.

In this report, we look at the situation from a different angle and focus on the supply-side of data sharing: What do existing platforms offer in terms of documentation, toolsets for automatic data sharing, and access control for published data? The following sections describe in more detail:

- Which relevant data sharing platforms exist and should be investigated as part of this research?
- Which type of biodiversity variables do the platforms support? (technical/semantic/legal interoperability)
- What documentation exists for which target group, and what mechanisms facilitate data sharing for users? (semantic/organizational interoperability)
- What is the legal framework and what control do data owners retain? (legal/organisational interoperability)

Starting from Basset et al. (2023), we investigated the platforms and selected the most promising candidates (see Table 1) for further analysis based on the following set of criteria:

First, given the scope of Biodiversa+, its geographic focus should include Europe. Thus, a platform with a global scope but very little data from Europe, or driven by policymaking outside of Europe, was not to be included.

Second, the platform should include actual what/where/when observational data from the field. In other words, no focus on taxonomic information or natural history collections, but actual species occurrences or habitat ranges in a spatial data format.

Third, the platform should have a clear development activity and active community behind it to guarantee that any problems when using it could be addressed and that it would be adapted to new standards and technologies.

Table 1. Candidate biodiversity data portals for further investigation

Portal	Geographic coverage	Species coverage	Notes
eBird	global	birds	Maintained by Cornell Lab of Ornithology; yearly dataset can be downloaded with CC-BY- from GBIF
Catalogue of Life	global	all species	Maintained by GBIF, Illinois Natural History Survey and Smithsonian; focus on taxonomy
Dryad	global	all research data	Non-profit multi-stakeholder organisations; focus on North American and journal publications
Map of Life	global	all species	project from Yale university; combines more than 500 diverse data sources into one map interface; links to external data sources
TRY Plant Trait DB	global	plants	originally from iDIV (Germany), curated datasets
SeaDataNet	Europe	marine	affiliated with Copernicus, provides access to more than 100 federated repositories
Pangea	global	all earth system	hosted by Alfred Wegener Institute
LifeWatch ERIC metadata	global	all species	EU consortium, broader research infrastructure with mainly metadata catalogue
EEA SDI	Europe	diverse environmental	not focused on biodiversity; less than 600 biodiversity datasets, part of data.europa.eu, documentation available
GBIF	global	all species	the main biodiversity data hub, links to many federated hub/portals/repositories, but also hosts data; focuses on metadata, checklists, occurrences, and sampling events
EMBL-EBI Biodiversity portal	global	All, including genomes	part of life sciences data portal; more focused on samples including genome data from natural history museum collections
GEO BON EBV data portal	Europe	all EBV-related	Key resource for EBV in Europe
OBIS	global	marine	Similar to GBIF though different hosting orgs; uses also the Integrated Publishing Tool
Depobio	France	unspecified	Limited information available on the site about content and formats; since it addresses French legislation, geographic scope is limited
PlutoF	global	all species	integrated tool also for analysis but little recent activity
Movebank	global	movement data	run by Max Planck Institute of Animal behaviour; has supporting materials, and API
CAFF Arctic Biodiversity Data Service	arctic	all	comprehensive options (Geonetwork-based platform)

Based on the three criteria, the main contenders for further investigation were the Group of Earth Observation's Biodiversity Observation Network (**GEO BON**) data portal for EBV, **GBIF**/OBIS, and the European Environmental Agency's (EEA) Spatial Data Infrastructure (**SDI**), because they all are established portals with a European focus, offering contributors to upload data on animal and plant species.

The **GEO BON** data portal is part of the GEO BON initiative (GEO BON's Vision Statement and Goals – GEO BON) and maintained by German Centre for Integrative Biodiversity Research (iDiv) together with partners. It allows free upload and data storage for GEO BON members, which currently are mostly research institutes/universities, with only a handful of private sector "GmbH/LLC/Inc" listed as data providers.

GBIF is an intergovernmental organization established in 2001 to facilitate the free sharing and open access of biodiversity data. According to its guide for private companies, there are currently 59 signatory countries of the GBIF Memorandum of Understanding. GBIF provides a single access point to over one billion global biodiversity data and is the largest biodiversity network available via the Internet. Data accessible through GBIF relates to records of more than 1.6 million species collected over three centuries of exploration of Natural History and includes recent observations by citizens, researchers and automated monitoring programs. Data downloaded through GBIF were used by more than 10,000 scientific articles in international journals. Globally, GBIF has agreements and provide services directly to global policy-making initiatives for the assessment and conservation of biodiversity and the environment, such as the Convention on Biological Diversity, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and GEO BON. GBIF is free in that it asks for no additional costs from contributors. OBIS is "a global open-access data and information clearing-house on marine biodiversity for science, conservation and sustainable development". Thus, it is not a GBIF twin, but quite similar, and in fact they aim to cooperate closely with GBIF; thus, for most evaluation criteria, it is similar enough to GBIF and will not be detailed again below.

The **EEA SDI** provides access to dataset that are relevant for EEA's mandate, to be used mainly by EEA and affiliated partners. Although first and foremost a discovery service for meta data, many of the datasets are publicly available for download. At the time of writing of this report, there were almost 600 datasets under the biodiversity theme.

These were investigated in more detail, with the following subsections covering the dimensions of support for variables and data types, documentation and tool, and legal framework.

3.2 Supported biodiversity variables and formats

This section focuses on two families of established standards in biodiversity: the Darwin Core and the Essential Biodiversity Variables. There is ongoing work to develop additional indices and metrics to describe the state of biodiversity at various granularities effectively. For example, the "State of Nature Metrics" (PDF) by the Nature Positive Initiative aims to measure and track the overall state of nature in a unified way, particularly focusing on biodiversity. Recognizing the complexity of the over 600 existing measurement methods, the draft framework has four universal indicators that could be translated into five case-specific indicators. Following a broad consultation involving over 700 stakeholders and 134 organizations, feedback emphasized the need for more clarity, better alignment with existing standards, and additional practical guidance. A revised metrics will be piloted with corporations and financial institutions in 2025 before being finalized and implemented more widely in 2026. Future efforts will also expand metrics to freshwater and marine ecosystems and explore integration of Traditional Knowledge. However, because of the varying level of maturity of these indicators, we decided to not cover them in more detail.

3.2.1 Darwin Core

An established standard to store and describe biodiversity data is the Darwin Core (DwC) standard, which is based on Dublin Core but focuses on taxa, aims for semantic interoperability by providing clear standards on how to store biodiversity information in a range of data formats (e.g., Resource Description Framework [RDF], and eXtended Markup Language [XML]), and is a widely adopted biodiversity data standard developed to facilitate the sharing and integration of species-related information. Managed by Biodiversity Information Standards (TDWG), it defines a set of standardized terms (e.g., scientificName, eventDate, locationID) used to describe biological observations, specimens, and taxonomic concepts.

DwC is designed to be flexible, interoperable, and machine-readable, enabling global biodiversity platforms such as GBIF, iNaturalist, and OBIS to aggregate and use data efficiently. It is not a data collection protocol but a standardized format that helps ensure biodiversity data can be shared, discovered, and reused across disciplines and systems. The DwC framework is most commonly implemented as a Darwin Core Archive (DwC-A) (see below) and supports different data types such as:

- **Occurrence data** are the most common and provides evidence of a particular species occurring at specific location(s) at specific time(s). Such species occurrence data are the basic building block of biodiversity monitoring: Observations when a particular species was observed at a particular moment in time at a specific place allows a systematic combination of these observations, which in turn allows a wide range of composite variables and indices to be developed.
- **Checklist data** provide a summary or inventory, usually with the dimensions of taxonomy (which species?), geography (where?) and theme (e.g., endangered, invasive, ...)
- **Sampling-event data** are the most structured, in that it follows strict protocols and allows also to determine the absence of a species.

3.2.2 Essential Biodiversity Variables

About a decade ago, a set of Essential Biodiversity Variables were developed by GEO BON, primarily through a foundational paper by Pereira et al. (2013). The EBV were developed in response to the need for a coherent global system to monitor biodiversity change. The goal was to define a set of standardized variables that could support global assessments. They have the following **key characteristics**:

- They represent key dimensions of biodiversity (e.g., genetic, species, ecosystem levels).
- They are derived from primary biodiversity observations (e.g., species occurrences, abundance).
- They are measurable, generalizable across taxa and realms, scalable, and able to detect change over time.
- They are designed to be policy-relevant, while grounded in ecological theory.

They consist of **six main classes**, which have multiple subclasses (compare Figure 10 below and Del Pozo et al. [2023]).

EBVs are distinct from other standards in multiple ways:

- **Functional role**: EBVs are not data standards per se, but a conceptual framework guiding what should be measured to monitor biodiversity change. They operate one level above primary data but below indicators.
- **Integrative**: EBVs pull from multiple data sources (in-situ observations, remote sensing, ecological models).
- **Standardized outputs** for diverse inputs: They help harmonize heterogeneous datasets for consistent tracking and analysis.
- **Policy-bridging role**: Unlike metadata standards (like DwC), EBVs directly support the production of global biodiversity indicators and reports.

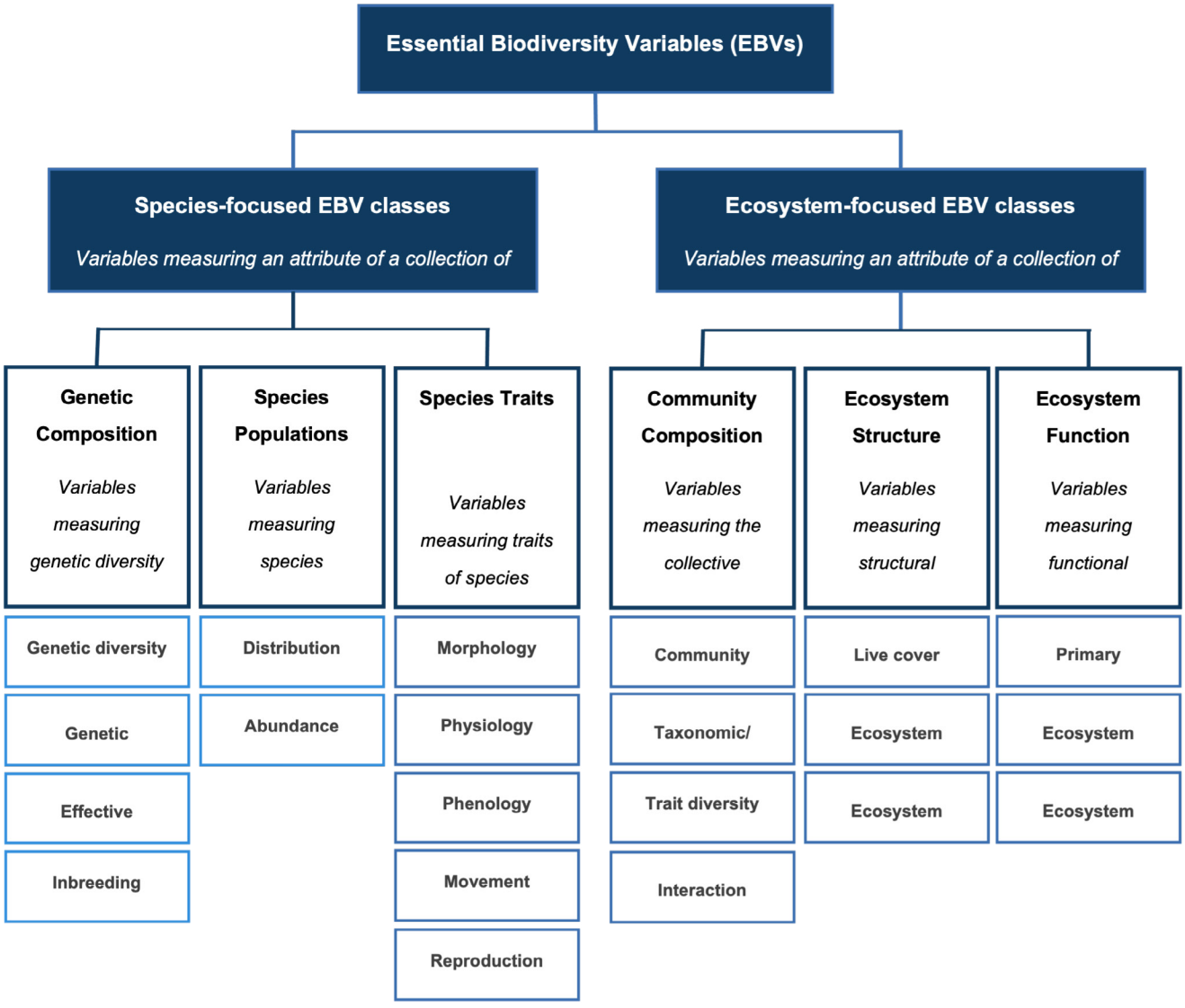


Figure 10. Six classes of Essential Biodiversity Variables (EBVs). Adapted from original source, adding 21 individual EBVs recorded across the six classes. Source: Fernández et al., 2020.

3.2.3 Metadata standards

From a practical point of view, the details of the variables' provenance are less important than their operational definition and how they are described and stored. For describing biodiversity data, several metadata standards are relevant and in use in the biodiversity domain:

- Ecological Metadata Language (EML, an XML standard for describing ecological data)
- ISO19115 on geodata
- Data Catalog Vocabulatory (DCAT, an RDF vocabulary to document data for interoperability)
- Javascript Object Notation for Linked Data (JSON-LD)
- Public Participation in Scientific Research Core (PPSR Core, mainly for citizen science data)

The actual biodiversity data are published mostly either as tab- or comma-delimited text files or in the NetCDF format. The latter is a data format for arrays and self-describing and recommended for EBV, while the former usually is combined with additional files describing the contents in more detail, mostly as Darwin Core Archives. A **Darwin Core Archive (DwC-A)** is ZIP file containing data tables (C/TSV), metadata (EML), and a meta.xml file that maps the structure. Another relevant standard is the ABCD schema/ontology for accessing and sharing biodiversity data. Transformation between data formats is not straightforward and requires substantial knowledge and diligence.

Our systematic evaluation of platforms shows that GBIF usually provides data in DwC-A format and supports the main **core data types: Occurrence** (individual species records), **Taxon** (checklists/classifications), and **Event** (sampling events), each of which can be extended with related data like traits or multimedia. The coverage of GBIF is global coverage and all species, at the moment the most frequent data are occurrence data on birds.

The EBV found on the GEO BON platform require NetCDF for the actual data, while any additional metadata is provided as and EML profile (EBV metadata standard). The datasets on the portal cover the six main classes relatively evenly, but when drilling down to individual EBV, there is a clear focus on ecosystem distribution (25% share) and taxonomic/phylogenetic diversity (21% share), before species occurrence data similar to that on GBIF (16%). The current majority of datasets are about terrestrial ecosystems and species, but the intended scope includes freshwater and marine data, as several available datasets show. There is a wide variety of tools available around GEO BON, but little guidance on where to start or how to commence.

The data available on EEA SDI platform is much more diverse in terms of format and topics than that on GBIF and GEO BON portal. The majority is in vector format (i.e., points, lines, polygons), but about 38% are in raster (grid) format, with a few text data sources (tables). About half of all datasets are in the Shapefile vector format, and the majority of raster datasets is in GeoTIFF. The remaining datasets show a wide variety, from proprietary geodatabases and spreadsheets to open-source formats. A comparison of themes with GBIF and GEO BON portals is difficult, because the grouping by INSPIRE themes does not easily match for example EBV, but the majority is about ecosystems and habitats, with only around 8% being species occurrence datasets.

3.3 Documentation and supporting tools

With the main biodiversity data platforms originating from research communities, widening the user audience to the private sector requires matching documentation. Ideally, the different tasks and objectives of diverse user groups (e.g., researchers, practitioners, government officials, private sector including consultants) are reflected in targeted documentation and tutorials.

For this reason, we examined the scope of readily available documentation, specifically its treatment of data preparation (including conversion), metadata standards, (bulk) uploading, and long-term data management. A further plus are tools, from simple scripts to full software applications, that facilitate and automate the workflow steps of data preprocessing, description, uploading, and management.

GBIF profits from its long existence and wide user community. It has extensive documentation, both on background information like standards and concrete how-to's on specific steps. Further, there are guides for specific domains such as freshwater or specific topics such as georeferencing, and even specific target audiences such as private companies. Supporting tools like the integrated publishing tool walk a user through the entire data publication process, while a validator tool helps to ensure compliance with standards and data quality requirements.

The **GEOBON EBV** data portal has much less documentation for users. While much of the information can be found in more general GEOBON documentation, there is only one document (PDF) on the NetCDF format structure required to store the data.

While the **EEA SDI** does not offer any supporting tools, it has extensive documentation in the form of a Wiki and offers support to register, upload and curate datasets.

3.4 Legal framework and access control

From a legal and security point of view, the questions of licensing (what are the conditions of reusing shared data), liability (who is liable if the shared data are directly or indirectly related to damages), and access control (who may download and use the data) are important to consider, with private sector stakeholders likely to have different requirements than public sector ones.

Concerning **licensing**, GBIF and GEO BON EBV portal require a Creative Commons license, usually CC-BY which allows users "to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator". A CC-BY-NC license restricts this to non-commercial re-use, while CC0, which effectively waives all rights, is also possible. However, a few of the investigated datasets do not seem to have any license.

Concerning **liability**, GBIF requires publishers to comply with the following steps:

- To acknowledge and agree to the Data Publisher Agreement (the English version is valid for legal purposes): The data publisher has the responsibility that data are allowed to publish and that sensitive data are treated according to (local, international) law;
- To be aware of the Data User Agreement, that GBIF data users must agree before using them: GBIF is not liable for the published data;
- To apply for the institution to register with GBIF as a data publisher and request the endorsement of the national node. Application for registration and endorsement is made online with this form.

Concerning **access control**, GBIF allows to set data to private access during upload with the Integrated Publishing Tool, but apart from this, there is no access control beyond simple registration of the user that requires neither checks nor validation. For sensitive data, e.g., on red-listed species, GBIF suggests generalization of the location data Current Best Practices for Generalizing Sensitive Species Occurrence Data.

Different from GBIF, as mentioned in the previous section, the GEO BON EBV portal offers little information on liability or access control. Deducting from the published datasets' metadata, there is neither an agreement on liability nor an option for limiting access to published datasets.

The EEA SDI does not place any a-priori restrictions on licenses, and the diversity described in previous sections extends to licenses as well. Part of the (meta) datasets are publicly available and sharable, and part have various restrictions resulting from their licenses.

3.5 Current barriers to data sharing and future developments

Although private sector data sharing has increased recently on some platforms (notably GBIF), it is still a very small share of the overall shared data (see section 2.1). The underlying reasons are complex and not fully explored yet. Possible explanations are:

- A fundamental mismatch between current platforms - which are about sharing original, detailed data - and regulatory requirements for the private sector, which are more about sharing aggregated information on composite variables. This mismatch is at the level of organizational and legal interoperability.
- More specific mismatches concern lack of required functionality or conflicts with respect to issues like confidentiality, access control, liability, licenses, etc. In other words, a lack of legal interoperability.
- Missing or incomplete documentation that requires specific data handling skills and domain knowledge which private sector companies or third-party consultants may not possess. This would be less problematic with improved semantic and technical interoperability.

In a prior Biodiversa+ report (Heck 2023) based on a first workshop on the use of biodiversity monitoring data in private decision-making lists private sector needs and concerns:

- For SMEs, more easy-to-use biodiversity indicators are needed. It was also raised that KPI can be qualitative, quantitative, or based on direct or indirect pressures on biodiversity.
- Most private sector biodiversity data are at the product or site level.
- Any effort to capture the full diversity of the private sector's characteristics and requirements would require a massive effort (from this our decision to work with profiles and exemplary stories)
- Barriers to using and sharing of biodiversity data are similar to those in the public sector: fragmentation of tools and standards, lack of incentives, enormous scale, unknown or lacking quality, unclear liability

While the emergence of major new biodiversity data platforms appears unlikely in the near term, given that existing platforms are well-established and continue to meet current user needs, there may be room for targeted innovation. A notable exception could be the development of a platform specifically designed to support private sector data sharing. Such a platform could address several critical gaps identified above. However, without strong regulatory incentives or mandates, the success and adoption of such a solution remain uncertain.

There are instructive examples of platforms adapting to evolving demands. For instance, GBIF has recently enhanced its service offering by enabling SQL-based downloads of species occurrence data cubes (Better than the original: New SQL-based service enables download of occurrence data cubes), providing more flexible and powerful access to biodiversity data than previous methods. Similarly, more integrated platforms like the PlutoF Biodiversity Platform (PlutoF Biodiversity Platform) illustrate the potential for holistic data management environments. However, adoption of that platform has stalled in the past years, illustrating the challenges for new infrastructures to take hold.

Depobio also serves as an example of a specialized platform, although its scalability and broader applicability may be limited.

Overall, while a wholesale shift toward new platforms is unlikely, there is clear value in continuing to evolve existing infrastructures and exploring purpose-built solutions for underserved segments, particularly in the context of private sector engagement.

4

Matching opportunities and demand

Informed by the output from the previous steps, we developed a shortlist of companies to engage based on relevance to the guide, prominence of the company, and availability of contacts. The aim was to gather user stories and information on challenges for sharing data, how they were overcome, and the benefits of data sharing. We integrated feedback on the content of this guide in another iteration in the form of written feedback or short calls with key businesses to identify their knowledge about biodiversity data sharing requirements and practices, and their capacity and incentives to implement new practices.

To identify concrete contacts for outreach activities, we started with the information gathered in the Interviews and requests for feedback focused on 1) securing case studies for the report; 2) discussing benefits of sharing data but also challenges & solutions 3) gathering live feedback on the guide to allow refinement for the purposes of the target audience. Given the limited timeline and a focus on quality and depth of elicited information, we limited this activity to 4-6 key business stakeholders.

4.1 Choosing data sharing frontrunners

We define as a “frontrunner” a company that is more active in biodiversity data sharing than the average. It is important to recall here that we focus entirely on data sharing and have not attempted to evaluate any company’s actual biodiversity record,

To reflect the diversity of business engagement in biodiversity data sharing, this report aimed to include at least one frontrunner from each of the four categories defined in Section 2.4:

- Companies with significant biodiversity impacts from their own operations: **TotalEnergies**
- Companies with significant impacts through their value chain: **Barilla**
- Companies working towards no-net-loss or nature-positive strategies: **Holcim**
- Company enablers supporting biodiversity data sharing: **Biotope, Lake Constance Foundation**

This selection was based on relevance, data availability, willingness to participate, and existing professional relationships with the service provider, which facilitated access and dialogue. This review does not aim to promote or showcase the selected companies. Its purpose is to gather insights into the motivations behind biodiversity data sharing, the challenges encountered, and the practical solutions applied by companies.

Although not evenly distributed across all categories, the selected cases offer insights into the motivations, challenges, and solutions encountered by frontrunners in biodiversity data sharing.

4.2 Stories from data sharing frontrunners

The stories below provide first an overview of the interviewed organisation as they present themselves, followed by a summary of the benefits, challenges, and potential solutions they mentioned. The stories have been summarised and edited by us into a similar structure for better comparison, but otherwise we have not changed or modified the content.

4.2.1 Case study 1: Company with impacts from their own operations – TotalEnergies

TotalEnergies is a global integrated energy company that produces and markets energies: oil and biofuels, natural gas and green gases, renewables and electricity. With more than 100,000 employees in 120 countries, the company is committed to provide as many people as possible with energy that is more reliable, more affordable and more sustainable.

TotalEnergies has made commitments to protecting biodiversity, including voluntary exclusion of certain oil and gas exploration or extraction activities across 3.6 million square kilometres, comprising of UNESCO World Natural Heritage sites, as well as Arctic Sea ice areas. TotalEnergies' sustainability ambition is further supported by a commitment to achieve net-zero emissions by 2050. The company is active on GBIF with 82 datasets containing over 52 000 occurrences as of June 2025. Over 70% of the occurrences are of animals and are concentrated in South America and South Africa. The main sampling methods used are field observations and preserved specimens.

Benefits of sharing biodiversity data

- A concrete and measurable commitment requiring low effort and low internal costs.
- Demonstrates transparency and commitment to mitigating impacts on nature.
- Has significant value added for external users. Data usage statistics from GBIF shows that TotalEnergies data has been cited in over 270 scientific publications.
- TotalEnergies does not directly use GBIF data due to the large amounts of data that needs to be handled, but the company benefits indirectly from derivative products using data such as the IUCN Red List.

"Data sharing was seen as a low effort – low reward commitment. Over time we have seen that the value created by our data sharing is much larger than anticipated. We collect this data anyway due to regulatory requirements and internal commitments, yet it has substantial value for academia, where such data collection would be very costly." - Steven Dickinson, Group Biodiversity Specialist & Senior Environment Advisor

Challenges encountered

6. **Internal buy-in** for increased transparency
7. **Concerns Over Sensitive Species Data**: Sharing precise location data for sensitive species poses risks, leading to illegal collection or exploitation.
8. **Data ownership**: In certain jurisdictions, enablers such as consultants, as well as local governments may have a legal claim over the data gathered.
9. **Data processing costs:** Costs incurred for processing data in sharing - appropriate format.
10. **Limited Biodiversity Data Sharing**: TotalEnergies initially viewed biodiversity data sharing as low-reward, leading to underutilization of valuable data collected during environmental assessments and monitoring.

Potential solutions

1. **Incorporating data sharing** as a low-cost, yet impactful measure as part of a wider corporate nature strategy.
2. **Sharing approximate geolocation** is sufficient for most academic use.
3. Incorporating **counterparty data sharing agreements** as part of standard contracting requirements.
4. **Scientific data sharing frameworks** like Darwin Core provide a blueprint for streamlining internal data collection, improving data quality and decision relevance over time with low added cost.
5. **Participation in the Act4Nature Initiative** has helped TotalEnergies set clear biodiversity data commitments, making data sharing more concrete, measurable, and value-driven.

4.2.2 Case study 2 Company with impacts in the value chain – Barilla

Barilla is an Italian food company, established in 1877, known for its high-quality pasta, bakery products, and sauces. With a strong commitment to sustainability, Barilla has launched several initiatives to promote sustainable agriculture and biodiversity, including the Carta del Mulino protocol, which outlines specific cultivation practices to enhance biodiversity and environmental stewardship. As a leader in the food industry, Barilla strives to innovate and improve its practices, ensuring that their products not only meet high quality standards but also contribute positively to the environment and society. Given their reliance on agricultural raw materials, Barilla's most significant environmental and social impacts occur across its value chain, particularly in farming practices, ingredient sourcing, and supplier engagement.

Benefits of sharing biodiversity data

- Enhanced Credibility: Collaborating with institutions like the University of Bologna and WWF ensures that Barilla's biodiversity claims are scientifically validated, increasing trust among consumers and stakeholders.
- Regulatory Compliance: Engaging in biodiversity initiatives helps Barilla anticipate and comply with upcoming regulations, such as the Green Claim Directive, ensuring they meet legal requirements and avoid potential penalties.
- Supplier Engagement: Sharing data fosters stronger relationships with suppliers and farmers, encouraging them to adopt sustainable practices and recognize their contributions to biodiversity.
- Marketing Advantage: Communicating biodiversity efforts through product packaging and sustainability reports enhances Barilla's brand image, appealing to environmentally conscious consumers.

"Our purpose is to continuously provide our customers with relevant information to enhance their awareness and understanding of the biodiversity framework." – Sergio De Pisapia, Sustainable Farming Manager

Challenges encountered

1. **Data Ownership, Collection and Scalability**: Farmers retain ownership of the data collected on their agricultural practices, limiting Barilla's ability to share or utilize this information without explicit consent. Managing data collection across 1,000 to 2,500 farms presents challenges, like ensuring data accuracy and consistency
2. **Complexity of Biodiversity Measurement**: Establishing reliable biodiversity indicators and measuring impact is inherently complex and requires ongoing research and adaptation
3. **Engaging Farmers**: Farmers, as key actors in biodiversity mitigation, may be reluctant to share data due to concerns over privacy and data ownership.

Potential solutions:

1. **Digital Platforms**: Barilla has developed a digital platform (Barilla Farming) that allows farmers to manage their activities and share data voluntarily, facilitating easier data collection and monitoring.
2. **Collaboration with Experts**: Partnering with the University of Bologna and WWF enables Barilla to leverage scientific expertise in biodiversity measurement, ensuring that data collection methods are robust and credible. This collaboration focuses on a three-year study across 40 farms, using entomological and agronomic metrics to assess biodiversity impacts.
3. **Incentivizing Participation**: By demonstrating the benefits of biodiversity practices to farmers and providing evidence of their positive impact, Barilla encourages more suppliers to engage in data sharing and sustainable practices.

4.2.3 Case study 3: Company working toward no-net-loss / nature positive – Holcim.

The Holcim Group, a Swiss multinational company, specializes in manufacturing building materials and operates in approximately 70 countries with around 60,000 employees. It focuses on four business segments: cement, aggregates, ready-mix concrete, and other products, serving as a significant contributor to global infrastructure projects such as roads, dams, and data centres.

Holcim actively seeks to enhance biodiversity by employing a scientific approach that involves local ecosystems and partnerships with stakeholders, aiming for measurable positive impacts by 2030. Their initiatives include using the Biodiversity Indicator and Reporting System (BIRS) to assess and improve biodiversity in their quarries, alongside progressive rehabilitation practices that integrate ecosystem services and community well-being. Holcim shares data on GBIF, with 3 datasets and 347 occurrences of animals in Spain, sampled using direct field observations, as of June 2025.

Benefits of sharing biodiversity data

- Enhanced Transparency: Sharing biodiversity data through platforms like GBIF demonstrates Holcim's commitment to environmental stewardship, showcasing their efforts in biodiversity conservation within mining environments.
- Collaboration with Experts: By engaging with NGOs and scientific communities, Holcim leverages external expertise to improve data quality and biodiversity monitoring, leading to better restoration practices.
- Public Awareness and Education: Sharing data contributes to broader awareness of biodiversity issues, fostering a culture of conservation among stakeholders and the public.

"We have to show that the mining environment is a very good opportunity for some species to find habitats that they don't find in their surroundings." – Pilar Gegúndez, Director of Environmental and Resource Sustainability

Challenges encountered

1. **Data Collection Expertise**: The need for specialized knowledge in biodiversity data collection posed a challenge, as the company had to rely on external experts for accurate data.
2. **Initial Upload Difficulties**: The process of uploading data to GBIF was initially complex and required understanding the specific formatting and requirements of the platform.

Potential solutions:

1. **Collaboration with experts** to guide their data collection and sharing processes, ensuring that the data collected was both accurate and relevant.

2. **Training and Support from GBIF** representatives to better understand the upload process, which simplified future data submissions and improved efficiency.

4.2.4 Case study 4: Biodiversity data sharing enabler – Biotope

Biotope is a consulting company specializing in biodiversity and ecosystem protection based in France. They provide expert services in biodiversity assessment, regulatory studies, training, and environmental communication to businesses, public authorities, NGOs, and communities. As an enabler of biodiversity data sharing and integration, Biotope supports clients in obtaining environmental permits and implementing measures to reduce biodiversity loss. Their work includes ecosystem restoration, biodiversity strategy development linked to CSR, and the design of nature-based solutions. Biotope also delivers training on ecological transition tools and helps organizations effectively communicate environmental and sustainability issues to external stakeholders. The company is an active GBIF contributor with 4 datasets and over 5,000 occurrences from 4 continents, split evenly between animals and plants. Most records are based on direct observations with remote sensing representing the remaining 15% of records.

Benefits of sharing biodiversity data:

- **Compliance with Regulations**: Biotope's data sharing practices are driven by legal requirements in France, ensuring that they meet the obligations set forth by environmental laws and project owners.
- **Enhanced Data Accessibility**: By publishing data on platforms like GBIF, Biotope contributes to a global database that can be utilized by researchers, NGOs, and other stakeholders, promoting transparency and collaboration.
- **Support for Development Projects**: Sharing biodiversity data helps project owners fulfil their environmental impact assessment requirements, facilitating smoother project approvals and compliance with funding conditions from banks.

"One of the main challenges we encounter is ensuring that all stakeholders are aware of the importance of publishing biodiversity data and the regulations that require it." - Cedric Elleboode, Innovation & Customer Engagement Lead

Challenges encountered

1. Data Ownership and Client Agreements: Client permission is essential for publishing data; Biotope can suggest it, but its absence makes data sharing complex.
2. Complex Stakeholder Involvement: The involvement of multiple stakeholders, including general engineering consultancies unfamiliar with biodiversity regulations, demands extra effort to raise awareness about the value of data publication.
3. Sensitive Data Handling: Managing sensitive data on endangered species is challenging, as Biotope must anonymize precise locations before publication to prevent misuse.
4. Technical and Resource Constraints: Linking Biotope's internal database with external platforms like GBIF requires technical investment, including API integration and potential system development, which can be resource intensive.
5. Standardization of Data Collection: Lack of standardized methodologies for data collection and monitoring, especially in long-term projects, leading to inconsistencies in data quality and comparability.

Potential solutions

- Educating clients about the importance of data publication by providing information and emphasizing the legal and ethical implications to motivate them to publish data.
- Providing training and information to stakeholders through workshops or informational sessions to ensure all parties understand the significance of data publication.
- Developing protocols for identifying sensitive species to streamline the process of protecting sensitive data during publication by creating a global reference for these species.
- Creating a direct link between their internal database and external platforms to allow for a more efficient data publication process, reducing manual effort and saving time.
- Using custom software to ensure consistent data collection protocols that capture detailed information beyond just species occurrences.

4.2.5 Case study 5: The link between data sharing and standards – Lake Constance Foundation

The Lake Constance Foundation (LCF), based in Radolfzell, Germany, is a private organization dedicated to environmental protection and nature conservation. Founded in 1994 by six environmental groups, it focuses on sustainability in agriculture, biodiversity, energy transition, and lake conservation. LCF coordinates and participates in projects on regional, national and European level and is a founding member of both the global Living Lakes Network and the national "Netzwerk Lebendige Seen Deutschland". Operating independently of political and administrative affiliations, LCF plays a key role in enabling biodiversity data collection and harmonization. It supports companies in gathering biodiversity-related data, such as habitat quality, soil biodiversity indicators, pesticide use, and explores species monitoring tools. The foundation works closely with standard-setting bodies to align methodologies and facilitate data sharing through joint databases. LCF is co-founder of the sector initiative "Food for Biodiversity".

Benefits of sharing biodiversity data

- Standardization Across the Sector: By working towards harmonization of biodiversity data collection, the food sector can create a unified approach that simplifies compliance for farmers and enhances the quality of data available for decision-making.
- Improved Reporting and Transparency: A joint database with anonymized data can provide valuable insights for stakeholders, including retailers, food producers and consumers, fostering trust and accountability in sustainable practices.
- Enhanced Biodiversity Management: The integration of biodiversity metrics into existing standards can lead to better management practices on farms, ultimately contributing to the conservation of natural habitats and species.

"There is a pressure on the [product sustainability] standards now with the new legislation to deliver data [on biodiversity].. and to report on the performance of certified farms and production. Most of the standards were surprised because they did not have good monitoring systems in place." - Marion Hammerl

Challenges encountered

1. Data Ownership Issues: Auditing companies often retain ownership of the data they collect, leading to reluctance in sharing information with standards and other stakeholders.
2. Complexity of Biodiversity Metrics: Developing standardized biodiversity metrics that are practical for farmers remains complex, especially given the diversity of habitats, the different situation of the farms and their potential to improve.

Potential solutions

1. Negotiating Data Access: Standards are now negotiating with auditing companies to gain access to key data collected during audits, which can then be used for reporting and compliance purposes.

2. Establishing working groups with multiple standards to harmonize metrics for biodiversity data collection, which can be further strengthened by encouraging the use of new technologies such as remote sensing and soil analysis tools to enhance data accuracy. Standardized metrics to reduce negative impacts by better agricultural practises would be a first important step.

4.3 Similarities and differences between the case studies

This section presents a **comparative analysis** of biodiversity data sharing approaches across the five organizations based on the interviews with Barilla, Biotope, Holcim, Bodensee Stiftung, and TotalEnergies summarized in the previous section. The comparison is structured around four core dimensions that were relevant for all interviewees: the value of data sharing for the organisation, the data sharing practices, the obstacles and corresponding solutions (if any), and expectations and actions for future directions.

Table 2. Value of Data Sharing

Organisation	Key drivers	Strategic Values Achieved
TotalEnergies	Act4Nature commitments, scientific and reputational benefits	Sector leadership, academic support, and improved public perception; foundational for broader sustainability aims
Holcim	Supporting restoration and conservation in mining areas	Demonstrates leadership in mining sector, informs ecological sustainability practices
Barilla	Supply chain support, regulatory readiness, brand transparency	Builds farmer trust, ensures compliance with regulations, enhances branding
Biotope	Regulatory compliance, knowledge contribution (esp. in development projects)	Supports environmental screening, enhances credibility of biodiversity assessments
Bodensee Stiftung	Rising retailer/regulator demand for biodiversity information	Potential for transparency and collaboration across food value chains

Table 3. Data Sharing Practices

Organisation	Main Data Types Shared	Tools/Platforms Used	Internal or outsourced collection
TotalEnergies	Species occurrences, oceanographic data, baseline assessments, tools/methods	GBIF, IBAT, PROTEUS, custom tools (e.g., STAR, OceanLeft)	Collected internally and by consultants
Holcim	Plants, birds (geo-tagged photos, vegetation plots)	GBIF (OpenPSD project), iNaturalist (selectively)	Fully subcontracted to academic experts
Barilla	Flower strip extent, species counts (pollinators, etc.)	Barilla Farming App, scientific papers, CircHive research project	Collected via collaboration with universities
Biotope	Species occurrence (plans to share sampling events, checklists)	Depobio (France), GBIF	Data collected by or for clients (often subcontracted)
Bodensee Stiftung	Habitat features, management practices (soil, pesticide use); minimal species data	Individual audit platforms (e.g., Fairtrade, Rainforest Alliance)	Collected by auditors during farm audits

Table 4. Obstacles and Solutions

Organisation	Key Obstacles	Solutions Implemented or Proposed
TotalEnergies	Sensitive species locations, internal sign-off chains, data formatting, GBIF data complexity	Geolocation obfuscation, alignment of internal protocols to GBIF, consultant support, tracking uptake through CC-BY
Holcim	Lack of in-house biodiversity expertise, data and collection protocol complexity	Training, external support (workshops), digitization of old data

Barilla	Data ownership (farmers), scale (1,000+ farms), verification logistics	Digital platform for managing many data contributors (and owners), academic partnerships, remote sensing for KPIs
Biotope	Client approval, sensitive species data, resource-intensive formatting	Geolocation obfuscation, internal automation plans, report on improving data flow
Bodensee Stiftung	Audit firms hold data, no common metrics, limited species monitoring	Push for metric harmonization (via Food for Biodiversity), interest in remote sensing and soil monitoring tech

Table 5. Future Directions

Organization	Planned or Desired Advancements
Barilla	More farmer participation, unified data platforms, scalable biodiversity metrics
Biotope	Automation of GBIF sharing, commercialization of monitoring software, alignment with international standards
Holcim	Cross-sector collaboration, improved standards alignment, continued subcontracting for quality biodiversity data
Bodensee Stiftung	Centralized databases, landscape-level biodiversity insights, stronger pressure for auditor data transparency
TotalEnergies	eDNA expansion, sharing of tools/methods, contribution to sector-wide biodiversity metric development

5

Best practices for effective and efficient biodiversity data sharing

5.1 Synthesis of previous chapters

So far, this report has addressed the critical gap between the increasing amount of biodiversity data collected by the private sector and its limited availability on public platforms for reuse: As businesses face growing requirements from regulations like the CSRD and opportunities from voluntary standards such as those developed by TNFD, the need to collect biodiversity data is rising, potentially increasing the cost for businesses. Sharing collected data might reduce those costs but also present an opportunity for research and monitoring. However, in practice, these data are rarely shared publicly. To respond to this gap, this report will in the following sections provide a guide for the business sector to navigate the complexities of data sharing, demonstrating its alignment with corporate initiatives and the benefits it offers, such as enhanced reputation, regulatory compliance, and contributions to global conservation efforts.

We categorized companies that generate biodiversity data based on where their environmental impacts occur: from their own operations, within their value chain, or through nature-positive initiatives like biodiversity credits. Companies in sectors like mining and construction often have significant impacts in their direct operations and collect site-specific data for EIA and to meet standards like the Equator Principles. Conversely, industries such as food and textiles have major impacts in their upstream supply chains, relying more on secondary data to screen for risks. Another group consists of companies and enablers, like environmental consultants and “nature tech” providers, that generate primary data through restoration projects or advanced monitoring tools.

A fundamental challenge we identified is the mismatch between the needs of the private sector and the functionality of existing biodiversity data platforms like the GBIF. These platforms, originating from a research context, often lack the features businesses require, such as robust access control, handling of confidential information, and user-friendly interfaces for non-experts. Existing data sharing platforms remain geared towards specialists from the public (research) sector, despite many efforts to reduce access barriers especially for the private sector. On the data level, biodiversity data collection and storage required to satisfy research standards might not always be well aligned with regulatory requirements or those from the certification industry. The lack of interoperability is frequently encountered at organizational and legal levels.

Case studies of TotalEnergies, Holcim, Barilla, and Biotope illustrate these dynamics in practice. Their key motivations for sharing data include fulfilling corporate commitments (TotalEnergies), demonstrating leadership in ecological restoration (Holcim), and enhancing supply chain transparency (Barilla). They report common obstacles include navigating data ownership with clients and suppliers, protecting sensitive species information, a lack of in-house technical expertise, and the costs of data processing. Solutions emerging from these frontrunners involve establishing clear data sharing agreements in contracts, generalizing the location of sensitive data, and collaborating with academic experts and specialized consultants to manage data collection and publication. However, the outsourcing of biodiversity data to third parties like consultancies and auditors might create inadvertently an additional barrier: sharing the data publicly might harm their business model. On the other hand, reusing shared data might increase their competitiveness by being able to reduce the labour-intensive tasks of data collection and validation.

5.2 Additional feedback from workshop participants

During the Biodiversa+ workshop held at 22 May 2025 in Barcelona, the authors of this report observed the discussions among private sector participants on the topics of data ownership and data management complexity. Below we summarize the discussions from our perspective. Note that the discussions in the workshop addressed data sharing and data reuse concurrently, which these notes reflect.

5.2.1 Challenges of data ownership

The participating companies in this workshop demonstrate uneven experience with **biodiversity data sharing**, highlighting a range of legal, organizational, and practical barriers that hinder broader participation:

Common Groups of Challenges

- **Legal Barriers**: Issues around data licensing, lack of harmonized legal frameworks, and ambiguity over data rights frequently obstruct data sharing.
- **Organizational Barriers**: The involvement of many actors and stakeholders, e.g., data collectors, clients, and regulators, and multiple platforms creates complexity in decision-making and accountability.
- **Diversity of standards and platforms**: The presence of multiple biodiversity data platforms contributes to confusion and inefficiencies in data dissemination.
- **Capacity and Willingness**: Companies may lack the internal capacity or motivation to prioritize data sharing, especially when not clearly linked to business benefits.

Specific operational issues mentioned

- **Licensing Conflicts**: The growing use of restrictive licenses (e.g., CC-BY-NC) may limit reuse and interoperability and reduce the incentive to share.
- **Uneven Regulatory Landscape**: National differences in data-sharing requirements create an unlevel playing field and disincentivize cross-border cooperation.
- **Unclear Data Ownership**: It is often difficult to identify the responsible party for data ownership, particularly in subcontracted projects or consortia.
- **Unspecified Reuse Rights**: When multiple companies could benefit from the same data, reuse is often blocked by contractual ambiguity or client ownership restrictions.
- **Return on Investment**: There is no clear mechanism for rewarding data producers, i.e., should costs be covered by users, funders, or public institutions?
- **Cost Barriers**: Access to secondary data may be limited by paywalls or embedded in proprietary business models.
- **Update Inconsistencies**: Data are often not updated regularly, reducing their reliability and utility and thus incentive for mutual sharing and reuse.
- **Low Trust in Reuse**: Concerns persist about the quality, provenance, and misuse of shared data.

Proposed Solutions

- **Automation of Publication**: Streamlining data formatting and submission processes would reduce the manual burden and improve consistency.
- **Trusted Intermediaries**: Establishing clear points of contact with legal and technical expertise would help companies navigate licensing and sharing decisions.
- **Legal Harmonization**: Standardizing data-sharing regulations across jurisdictions would remove key legal uncertainties.
- **Default Co-Ownership Models**: Introducing co-ownership frameworks by default could simplify reuse across projects and stakeholders.

These insights complement the in-depth interviews from chapter 4 and suggest that improving biodiversity data sharing among companies requires not just the technical infrastructure, which might already exist within, but also legal clarity, organizational alignment, and trust-building mechanisms.

5.2.2 Challenges of data management complexity

Effective biodiversity data management faces a host of conceptual, technical, and systemic challenges that limit the utility and interoperability of information across sectors and stakeholders. Key issues and emerging solutions are summarized below.

Conceptual Misalignment and Data Purpose

- **Inconsistent Standards Across Domains**: Biodiversity lacks an equivalent to carbon-equivalent metrics used in climate change, which complicates reporting and comparison. Moreover, many existing biodiversity indicators focus on **pressures** rather than the **state of nature**, which limits ecological insight.
- **Ambiguity of Data Purpose**: Biodiversity data are often collected without a clearly defined goal, reducing relevance and reuse potential. Conversely, when data are collected with narrow objectives (e.g., compliance), they may not be applicable to other contexts.
- **Insufficient Data Interpretation**: In many cases, data are collected but **not analysed or interpreted**, leaving their meaning and implications unclear. This disconnection between data generation and use weakens decision support.
- **Data vs. Indicators**: A clear distinction must be made between **original data** and **derived indicators**. The transformation from one to the other requires careful processing, interpretation, and contextualization.

Validation, Usability, and Participation

- **Validation Gaps**: There is limited assurance that the data collected are accurate or meaningful. This includes uncertainty about what is being measured, how it is being recorded, and whether it is fit for purpose. **Auditing by ecologists** or inclusion of biodiversity expertise in compliance assessments could improve data sharing practices that support reliability.
- **Presence-only Bias**: Most biodiversity occurrence data reflect species presence, not absence, introducing **bias** into datasets. **Ecological modelling techniques** (e.g., species distribution models) are recommended to correct for these gaps.
- **Access and Inclusivity**: Current practices are often too **academic or expert-oriented**. To increase engagement: Data collection protocols should be accessible to **civil society and community actors**, not just professionals.
- Analysis should be led by experts, but **data generation should be democratized** through simple tools and frameworks.

System Design and Interoperability

- **Fragmented Reporting Systems**: A multitude of biodiversity reporting frameworks leads to **duplication and inefficiencies**. There is an urgent need for a **single, streamlined system**, though with flexibility to adapt to local or sectoral needs. A standardized **taxonomy of indicators** could help define when generalization is acceptable and when specificity is required.
- **Scale Mismatch**: Biodiversity data and decisions occur at **different spatial and temporal scales**, creating challenges for aggregation and interpretation. Tools need to account for resolution, update frequency, and decision relevance.
- **Uncertainty and Error Handling**: There is no common practice for reporting **uncertainty, error margins, or data accuracy**, despite their critical role in decision-making.
- **Platform and Data Type Fragmentation**: Companies often collect multiple data types (species occurrence, habitat extent, pollution impact), but **no single platform accommodates them all**. Proposed solutions include **linked platforms** that can interoperate across data types and TNFD as a potential **integrative framework** for standardization and coordination.

Governance and Data Ownership

- **Licensing Confusion**: Increasing use of **CC-BY-NC licenses** raises questions about who can reuse the data and under what conditions. It remains unclear who companies can or should pay for licensed secondary use.
- **Data Ownership Ambiguity**: When biodiversity data are collected under contract or via third parties, **ownership is often unclear**, especially if multiple stakeholders stand to benefit from reuse.
- **Archiving and Longevity**: Long-term **data stewardship and funding** are often not secured, putting valuable historical datasets at risk of loss or obsolescence.
- Overall Recommendations for managing data complexity
- Establish minimum **standards and taxonomies** for indicators across scales and uses.
- Develop **validation protocols** and enable **ecologist involvement** in audits.
- Promote **interoperable and modular platforms** that accommodate diverse data types and user roles.
- Encourage **co-designed metrics** that balance scientific rigor with practical usability.
- Integrate error and uncertainty reporting into all biodiversity data pipelines.
- Enable default co-ownership models and clear licensing frameworks to facilitate data reuse.

These actions will help create a more coherent, scalable, and trustworthy biodiversity data ecosystem that can support both corporate and societal sustainability goals.

5.3 Deriving best practices: Share your biodiversity data in 7 safe and easy steps

Step 1: Define Goals and Stakeholders

Begin by clarifying *why* your company will share biodiversity data and with whom. Identify the types of biodiversity information you collect (e.g. species observations, habitat maps, environmental measurements) and potential users (regulators, community groups, scientists, customers). Having clear objectives, e.g. improving sustainability reporting, supporting conservation partnerships, or meeting certification requirements, will guide the process.

Engage internal teams (e.g. sustainability, legal, IT) and external partners (e.g. NGOs, research institutions) early. For example, agriculture firms might share pollinator survey data via farming cooperatives, while mining or energy companies can partner with local universities to handle wildlife monitoring data. Involving stakeholders upfront helps ensure the shared data meets real needs and builds trust for co-ownership of the information.

Step 2: Audit and Prepare Your Data

It is best practice to assume that any biodiversity data collection and sharing will not be a once-only activity, and therefore it is beneficial to invest some time for developing a **data management plan**. A Biodiversa+ guidance document (Goedeseune et al. 2019) offers many useful tips and resources to do that. In any case, to share biodiversity data efficiently it is necessary to create an inventory all biodiversity data held by your organization, noting its source, format, and sensitivity. Clean and standardize data before sharing. Whenever possible, align your internal data model with community standards. For example, use the **Darwin Core (DwC)** schema to organize species occurrence records. Because this widely used standard defines common terms (such as species name, location, date and observer) with the explicit aim to simplify publishing biodiversity records, DwC offers a stable, straightforward and flexible framework for compiling biodiversity data. Every company can still build internal templates or databases that mirror DwC fields (occurrence, taxon, event core tables, etc.), which over time improves data quality with limited additional cost.

Document your data with basic metadata (what, where, when, how collected). Use a less complex metadata standard such as EML or ISO 19115 to describe datasets. For example, if you record bird counts, include location coordinates, sampling methods, and the observer's identity and date in the metadata. Proper metadata are essential to make your data more easily **findable**, **interoperable** and **reusable** by others. If your data are sensitive (e.g. locations of endangered species), consider obfuscating the location by anonymizing or reducing precision before release. Make sure to include this criterion in your choice of platform, i.e., whether it has protocols or mechanisms to protect sensitive data. In all cases, ensure you have permission to publish the data (see Step 3).

Step 3: Resolve Legal and Licensing Issues

Before publishing, clarify who **owns** the data and determine appropriate usage rights. Biodiversity data can involve personal or proprietary rights (e.g. data collected on private land or by contracted experts). Review contracts and ownership with landowners, consultants or farmers, and secure written permission to share data. Embed data-sharing clauses into future contracts or supply agreements to ease this process. Consider adopting a **default co-ownership** approach for joint projects: for instance, data collected on community lands or through joint monitoring programs can be declared co-owned by the company and the community or government, with shared usage rights.

Choose an open license that fits your business and legal context. The most common practice is Creative Commons (CC) licensing. For maximum reusability, use CC-BY (attribution) or CC0 (public domain). If there are concerns about commercial reuse by competitors, CC-BY-NC (non-commercial) is an option. Note that major platforms (like GBIF and the GEO BON EBV portal) require at least a CC-BY or CC-BY-NC license. Always attach a license to each dataset you publish; **avoid "no-license"** situations which create legal uncertainty.

Address liability and compliance. When you register to share data on a platform, you will have to agree to publisher and user terms. For example, GBIF requires publishers to confirm that "data is allowed to publish and that sensitive data is treated according to law". Ensure data shared do not breach national or EU privacy laws (e.g. GDPR for any personal data) or conservation laws. If necessary, consult a legal advisor or use a **data intermediary** (e.g. a trusted NGO or public agency) to vet data and handle legal paperwork.

Step 4: Apply Data Standards and Metadata

Use **community data standards** and vocabularies to ensure semantic and syntactic interoperability. The goal is to make your data **interoperable** with other datasets and tools, following the FAIR principles (Findable, Accessible, Interoperable, Reusable). For species data, **DwC** is the de facto standard. Structure your data into the core DwC tables (typically Occurrence for individual records, Taxon for checklists, or Event for structured surveys). A Darwin Core Archive (DwC-A) is a common file package (a ZIP of CSV files plus metadata) that platforms like GBIF ingest. If you have tabular data on species (even in Excel), use field names that match DwC terms (or map them in the metadata).

For geospatial or environmental grids (e.g. habitat maps, soil measurements), use open formats such as **GeoTIFF** or **NetCDF**. NetCDF is particularly suited for multi-dimensional arrays (common in climate, oceanographic or ecological modelling) and is used by scientific communities for **Essential Biodiversity Variables**. By convention, EBVs on the European GEO BON portal are stored in NetCDF with metadata in EML. If your company collects data that align well with EBV (e.g. annual biomass or population indexes), structuring them in NetCDF can facilitate wider use.

Ideally, you would publish and share your data in both original (e.g., occurrences in DwC-A) and derived (e.g., EBV in NetCDF) forms, as per the recommendations of Del Pozo et al. (2023). If this seems not feasible, you might want to explore partnerships with academic institutions to support you (see also step 6 and 7).

Use controlled vocabularies for consistency: e.g. use official species names (cross-checked with taxonomic registries), standard habitat codes (like EUNIS or CORINE land cover), and ISO country/region codes. This **semantic interoperability** ensures that others can unambiguously understand your data. For example, TDWG maintains lists of DwC terms and vocabularies. Adopting these will avoid confusion (e.g. don't use "home garden" vs "urban green space" in inconsistent ways).

Step 5: Choose a Sharing Platform or Data Space

Identify where to publish your data so it is **accessible** to the target audience. There is no single "biodiversity data space" yet, but there are several mature **platforms and networks**:

- **GBIF (Global Biodiversity Information Facility)**: a global, open-access infrastructure for species occurrence data. GBIF is the world's largest biodiversity data portal and has national nodes (EU countries participate). To publish on GBIF, register your organization (often via a national node), prepare a DwC-A, and upload via the Integrated Publishing Toolkit (IPT). GBIF also provides an automated validator to catch formatting errors. Many companies (and their research partners) use GBIF to share data from field surveys or environmental impact studies.
- **OBIS (Ocean Biodiversity Information System)**: for marine species data, OBIS (also part of IOC/UNESCO) is a GBIF-like network focused on ocean life. If your operations involve marine environments, OBIS is a natural venue (it also accepts Darwin Core data).
- **National/Regional Data Portals**: Some EU countries have their own biodiversity or environmental data platforms, often linked to GBIF. Check if your country (or neighbouring ones) has a national biodiversity data centre or an open data portal. For example, Germany has iNaturalist/GBIF nodes, France has the Inventaire National du Patrimoine Natural, etc. Local portals may have additional support or resources for companies.
- **GEO BON**: this European platform offers a wide range of possible species and ecosystem level indicators to be reported. The EBV are directly policy-relevant and thus promise to have a bigger impact. However, although there are technical guides and many tools available, a simple, easy-to-access introductory step-by-step guideline is not yet available. Thus, contributing to the GEO BON EBV portal requires sufficient technical and domain knowledge.
- **EEA SDI**: While this platform is not geared towards hosting non-EEA-related datasets, it is still a viable option to explore if your biodiversity data does not fit GBIF or GEO BON EBV requirements yet, and converting it is not feasible. EEA offers support on determining whether and how to upload biodiversity data to its SDI.
- **EU and Global Data Spaces**: The EU Digital Strategy promotes sectoral data spaces (federated networks with common rules) for areas like environment and agriculture. While these are still evolving, aligning with EU initiatives (e.g. joining initiatives like the EU Biodiversity Data Space pilot and the development of EU Biodiversity Observation Coordination Centre, EBOCC) can give future pathways. In the meantime, use open standards so that if a European biodiversity data space emerges, your data can plug in easily.

When fragmentation is a concern (multiple similar platforms), pick one primary target platform that best fits your data type (e.g. GBIF for terrestrial, OBIS for marine, GEO BON for vegetation and derived metrics). You can always deposit the same data in more than one system (check licensing and reuse policies to ensure consistency). Using a trusted intermediary, such as partnering with a university or national research institute that already publishes on these platforms, can simplify the process. These intermediaries can act as **data stewards**, helping companies to format, clean, and submit data on their behalf.

Step 6: Publish, Validate, and Maintain Data

Follow a clear publication process. Use platform tools to automate as much as possible: for instance, GBIF's IPT walks you through uploading and mapping your files to DwC terms. After uploading, run any provided **data validators** to catch errors (e.g. missing coordinates, invalid species names). Correct issues and re-upload until clean. Each dataset should include an abstract or description in clear language, so non-experts know what it contains and why it matters.

Once published, your data will receive a DOI or persistent identifier. Record this in your internal records. Update data as needed: if you have ongoing monitoring, plan for periodic uploads (monthly or yearly) and label versions clearly. Encourage data users to cite the DOI. Monitoring metrics (views or downloads on the platform) can be useful metrics for internal reporting and demonstrating impact.

After initial release, consider community engagement: announce your datasets through networks (e.g. GBIF's listserv, LinkedIn sustainability groups, or sector associations). Being open about your data not only fulfils the FAIR principle of *Findability* but also can **unlock new partnerships** (researchers may use your data in studies, enhancing your credibility).

If data are highly sensitive (e.g. precise locations of threatened species), take advantage of platform options for restricted access or data obfuscation. For example, GBIF allows publishers to restrict coordinates to a grid or hide points until user registers. Familiarize yourself with the meaning of coordinates (see Figure 11) and therefore the opportunities and limitations for others to use your biodiversity data (including researchers). Also consider "data trusts" or secure data enclaves (emerging institutional arrangements) if needed, as encouraged by the EU's Data Governance Act.

Figure 11. What the number of digits on your coordinates means. Source: xkdc,https://xkcd.com/2170/, published under CC BY-NC 2.5

Step 7: Build Capacity and Collaboration

Recognize that sharing biodiversity data may be new for your team. Invest in training or hire expertise. This could be a data scientist or GIS specialist who knows the standards, or a consultant with experience in EBV and DwC. Many capacity-building resources exist (GBIF offers how-to guides and workshops). Small companies can join multi-stakeholder forums (e.g. national biodiversity platforms, TNFD Business Forums) to learn best practices.

Use **trusted partnerships** to fill gaps: collaborate with NGOs, universities or even other companies. For instance, a mining company might fund local biologists to handle data collection and publication. In some EU projects, "trusted intermediary" hubs are established (e.g. national academies or Biodiversity Information System agencies) to help companies share data without each company needing deep in-house expertise.

Automate repeatable tasks. Where possible, establish data pipelines: for example, if you conduct annual biodiversity monitoring, automate the export of data from your field database into a DwC-A file, and schedule routine uploads. This reduces manual work and errors. Some private firms are exploring in-house dashboards that format monitoring data for external sharing by default.

Finally, foster an organizational culture of data stewardship. Make clear in policies that biodiversity data are an asset to be shared under agreed terms. Assign roles (e.g. a "data custodian") responsible for coordinating releases. Over time, publishing data can become a routine part of environmental management, similar to how financial data are published in reports under CSRD.

Workflow Summary and Next Steps

In summary, the publication workflow involves (1) **planning** your objectives and stakeholders, (2) **preparing** and standardizing your data, (3) **clearing legal hurdles** (rights, licenses), (4) **adopting standards**, (5) **choosing a platform**, (6) **publishing and validating** the data, and (7) **building capacity** for continuity.

Additional actionable advice is to start small by publishing one dataset to a major platform. Use available templates (e.g. GBIF IPT, CSV templates, EML generator) and checklists[4]. Seek feedback from the platform community forums. Document each step internally so the process becomes repeatable. Over time, accumulating shared data delivers strategic value: improved risk management, stakeholder trust, and compliance with EU sustainability laws.

For further resources, visit the GBIF publisher guides and EU open data portals for practical how-to information. Refer to the Biodiversa+ guidelines and the TNFD recommendations for the latest norms on biodiversity data sharing and disclosure. Engaging with these communities will ensure your company stays current with best practices and contributes to a richer understanding of Europe's biodiversity.

4. A valid question is why this report does not contain a quick-start list of references. The main reason is that documentation of platforms etc. is always evolving and links are likely to have changed soon after publication. Most platforms and organisations guide a first-time visitor to the necessary resources.

6

References & annex

References

Addink W, Kyriakopoulou N, Penev L, Fichtmueller D, Norton B, and Shorthouse D (2022): Best practice manual for findability, re-use and accessibility of infrastructures. Deliverable D1.3 EU Horizon 2020 BiCIKL Project, Grant Agreement No 101007492. https://preprints.arphahub.com/article/107169/

Bakker, Elisabeth and Teske, Donna (2025). Guide to use public biodiversity data in the private sector. Biodiversa+ report. https://doi.org/10.5281/zenodo.16967410

Basset A, Tarantini SO, Eggermont H, Mandon C, Vihervaara P (2023): Report on the harmonisation and interoperability of datasets across regions and countries. Biodiversa+ report D2.2. D2.2-Report-data-interoperability.pdf

Bromwich T, White TB, Bouchez A, Hawkins I, zu Ermgassen S, Bull J, Bartlett H, Bennun L, Biggs E, Booth H and Clark M (2025). Navigating uncertainty in life cycle assessment-based approaches to biodiversity footprinting. *Methods in Ecology and Evolution*.

Bull JW, Suttle KB, Gordon A, Singh NJ and Milner-Gulland EJ (2013). Biodiversity offsets in theory and practice. *Oryx*, 47(3), pp.369-380.

Cicek S, Boone K, Broekema R (2024). State of the art analysis of LCA-based ecolabelling schemes in Europe. Wageningen, Wageningen Economic Research, Report 2024-125. 54 pp

Crona B, Wassénius E, Parlato G, Kashyap S (2024): Doing Business Within Planetary Boundaries. Research brief. Stockholm Resilience Centre (Stockholm University) and the Beijer Institute of Ecological Economics (Royal Swedish Academy of Sciences). Doing Business within Planetary Boundaries

EFRAG. (2024, December 24). Participate in ESMA's consultation on digital tagging of ESRS statements; Accessed on 08.08.2025

EFRAG. (2025, July 31). Press release - EFRAG Shares Revised ESRS Exposure Drafts and Launches 60-Day Public Consultation. Accessed on 08.08.2025

Fernández N, Ferrier S, Navarro LM, Pereira HM (2020). Essential Biodiversity Variables: Integrating In-Situ Observations and Remote Sensing Through Modeling. In: Cavender-Bares J, Gamon JA, Townsend PA (eds) Remote Sensing of Plant Biodiversity. Springer, Cham. https://doi.org/10.1007/978-3-030-33157-3_18

Figueira R, Beja P, Villaverde C, Vega M, Cezón K, Messina T, Archambeau A, Johaadien R, Endresen D & Escobar D (2020): Guidance for private companies to become data publishers through GBIF: Template document to support the internal authorization process to become a GBIF publisher. Copenhagen: GBIF Secretariat. https://docs.gbif.org/private-sector-data-publishing/2.0/en/

Goudeseune L, Le Roux X, Eggermont H, Bishop W, Bléry C, Brosens D, Coupremanne M, Davis R, Hautala H, Heughebaert A, Jacques C, Lee T, Rerig G, Ungvári J. (2019): Guidance document for scientists on data management, open data, and the production of Data Management Plans.BiodivERsA report. 48 pp. DOI : 10.5281/zenodo.3448251

Hammerl M, Tomova K, Paspaldzhiev I, and Vogel A (2023): Review of inclusion of NC & BD criteria in labelling and certification schemes, development of an "Ideal Framework". Horizon Europe project "CircHive'. www.circhive.eu.

Heck A. (2023): Heck, A. (2023) Report of the use of biodiversity monitoring data in private decision making. Biodiversa+ report. https://www.biodiversa.eu/wp-content/uploads/2023/04/D2.4-Use-biodiversity-monitoring-data-private-decision-making.pdf

HUB Ocean. 2024. Tides of Transparency: A First Mapping of Industrial Ocean Data Sharing (Biodiversity). Oslo, HUB Ocean. https://sadataproducts.blob.core.windows.net/huboceandatapublic/HUBOcean_TidesOfTransparency_2024.pdf

IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. https://doi.org/10.5281/zenodo.3831673

Kulionis V, Pfister S and Fernandez J (2024). Biodiversity impact assessment for finance. *Journal of Industrial Ecology*, 28(5), pp.1321-1335.

Lipsanen A, Bresadola M, Basille M, Body G, Naeslund M, Basset A, Silva de Pozo M, Vergnaud L, Tarantini SO, Pulieri M, Hoye TT, Seeber J, Hendriks R, Kallajoki I, Mandon C, Vihervaara P, Brotons L, Tannerfeldt M, Winkler R (2024): Strategic biodiversity monitoring governance document (Phase II): Recommendations to better harmonise biodiversity monitoring schemes at a transnational scale. https://www.biodiversa.eu/wp-content/uploads/2024/07/D2.9-Phase-II-Report.pdf

Meeus, Sofie, Wouter Addink, Donat Agosti, et al. 2022. '*Recommendations for Interoperability among Infrastructures*'. Research Ideas and Outcomes 8 (October): e96180. https://doi.org/10.3897/rio.8.e96180.

Paspaldzhiev I, Hairabedian J, Paunova M, Barreyre J, Tomova K (2023): Review and recommendations for

existing and upcoming corporate NC & BD reporting standards. Horizon Europe project "CircHive'. www.circhive.eu. https://oppla.eu/sites/default/files/2025-05/D3.1.1%2BDisclosures%2BReview_1.pdf

Pereira, H. M., S. Ferrier, M. Walters, et al. 2013. 'Essential Biodiversity Variables'. Science 339 (6117): 277–78. https://doi.org/10.1126/science.1229931.

Del Pozo MS, Body G, Rerig G, Basille M. (2023): Guide on Harmonising Biodiversity Monitoring Protocols across scales. Biodiversa+ report. 60pp.

De Ryck J, Driesen K, Verhelst J, Lammerant J et al. (2024): Assessment of Biodiversity Measurement Approaches for Businesses and Financial Institutions, Update Report 5 on behalf of the EU Business & Biodiversity Platform

Tin YKF, Butt H, Calhoun E, Cierna A, Brooks S (2024): Accountability for Nature: Comparison of Nature-Related Assessment and Disclosure Frameworks and Standards. UNEP Finance Initiative. https://www.unepfi.org/wordpress/wp-content/uploads/2024/01/Accountability-for-Nature.pdf

UN 2024: System of Environmental Economic Accounting – Ecosystem Accounting. Statistical Papers Series F No.124, Department of Economic and Social Affairs. ISBN 978-92-1-259183-4

UNEP-WCMC, Capitals Coalition, Arcadis, ICF, WCMC Europe (2022): Recommendations for a standard on corporate biodiversity measurement and valuation, Aligning accounting approaches for nature.

White TB, Mukherjee N, Petrovan SO and Sutherland WJ (2023): Identifying opportunities to deliver effective and efficient outcomes from business-biodiversity action. *Environmental Science & Policy*, 140, pp.221-231.

Annex: Biodiversity corporate standards

NB: We have verified the links as of August 2025. Depending on the host, especially specific links to documents might be subject to change after publication of this report.

Standard	Link
Aboriginal Carbon Foundation	https://www.abcfoundation.org.au/
BASF Agricultural Solutions	https://www.basf.com/global/en/who-we-are/sustainability/we-produce-safely-and-efficiently/environmental-protection/biodiversity-and-ecosystems
Carbon Neutral	https://www.carbonneutral.com/pdfs/The_CarbonNeutral_Protocol_Feb_2024.pdf
Climate Action Company	https://www.climateactionco.com/biodiversity-credits#:~:text=Biodiversity%20credits%20provide%20financial%20backing,a%20quantified%20increase%20in%20biodiversity
CreditNature	https://creditnature.com/
EarthAcre	https://www.earthacre.com/
Ekos	https://www.ekos.co.nz/
Yale University	https://biodiversitycredits.yale.edu/
Gold Standard Biodiversity Framework Methodology	https://www.goldstandard.org/news/frameworks-for-biodiversity-conservation-and-restoration
National University of Colombia (UNAL)	https://unal.edu.co/en/internationalization/the-university-in-the-world
Oceanfarmr	https://www.oceanfarmr.com/
Organization for Biodiversity Certificates	https://www.obiocert.com/
Qarlbo Biodiversity	https://www.qarlbo.com/investments/biodiversity
recelio	https://recelio.org/making-biodiversity-investable-with-dynamic-biodiversity-tokens/
RESTORE	https://restorebiodiversity.eu/en/
Single Earth	https://www.single.earth/
Terrain NRM	https://terrain.org.au/what-we-do/biodiversity/biodiversity-credits/
ValueNature	https://valuenature.earth/
VNV Advisory Services	https://vnv.earth/
Demeter	https://demeter.net/about/demeter-brand/
Naturland	https://www.naturland.de/en/
FairTrade HL	https://www.fairtrade.net/en/why-fairtrade/how-we-do-it/standards/who-we-have-standards-for/hired-labour-standard.html
Europe Soya	https://www.donausoja.org/wp-content/uploads/2024/01/Europe-Soya-Guidelines_entire-document.pdf
ASC Feed	https://asc-aqua.org/wp-content/uploads/2023/04/ASC-Feed-Standard_v1.01.pdf
FSC Finland	https://connect.fsc.org/document-centre/documents/resource/296
PEFC	https://cdn.pefc.org/pefc.org/media/2024-01/3b74333a-909e-44e7-9c5c-da08e63d95bb/b5b7c94e-e317-5449-ab9b-cf4bb21f1943.pdf

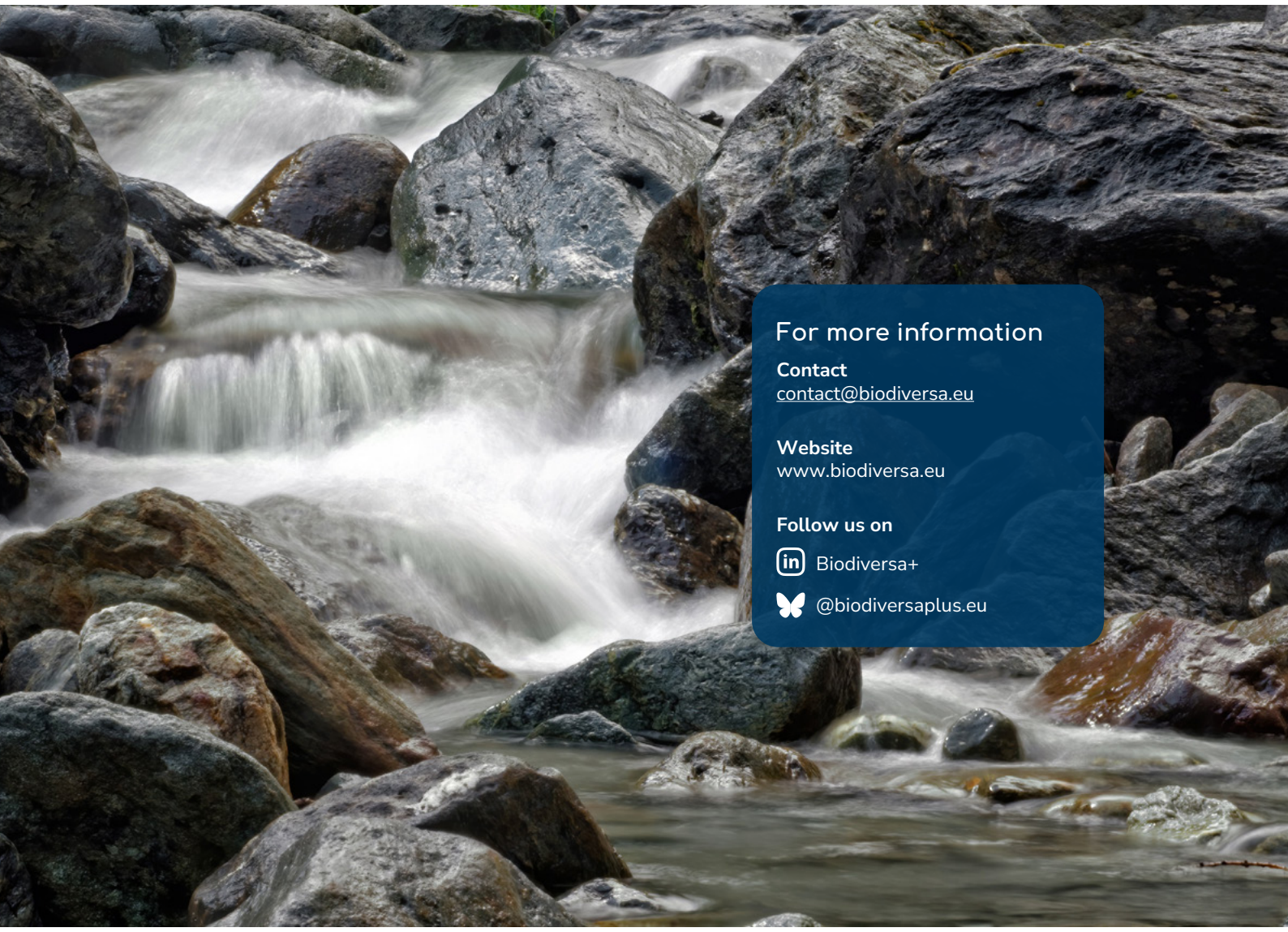
BCI	https://bettercotton.org/wp-content/uploads/2023/04/Better-Cotton-PC-v.3.0.pdf
OekoTex Organic Cotton	https://www.oeko-tex.com/importedmedia/downloadfiles/OEKO-TEX_ORGANIC_COTTON_Standard_EN_DE.pdf
GOTS	https://global-standard.org/images/resource-library/documents/standard-and-manual/GOTS_7.0__SIGNED_.pdf
Blue Angels	https://produktinfo.blauer-engel.de/uploads/criteriafile/en/DE-UZ%2030a-202401-en-criteria-V2.pdf
FairTrade Textile	https://www.fairtrade.net/en/why-fairtrade/how-we-do-it/standards/who-we-have-standards-for/textile-standard.html
EU Ecolabel Textile	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02014D0350-20201201
BREEAM	https://breeam.com/
ISO 14001	https://www.iso.org/standard/60857.html
3Bee	https://www.3bee.com/en/business/il-monitoraggio/?srsltid=AfmBOor8K4-AqJnao6r6bTeI1pNyouqWc4wjJ8YqphBRmqZVmBFsPaHD
BioCarbon Standard Biodiversity Standard	https://biocarbonstandard.com/wp-content/uploads/BCR_Biodiversity_Methodological_Document.pdf
BIOTA NEXUS	https://biota.land/wp-content/uploads/2024/08/BiotaValidationProtocol.pdf
Bluebell Index	https://bluebellindex.com/unlocking-the-power-of-biodiversity-credits-a-sustainable-path-to-conservation-and-profit/
BMV Global	https://bmv.global/wp-content/uploads/2023/11/241024-Resumo-Executivo-BMV_v4-1.pdf
Botanic Gardens Conservation International	https://www.bgci.org/our-work/saving-plants/tree-conservation/
Cercarbono	https://isbm.savimbo.com/baseline-assessment
Earthly x South Downs National Park Authority	https://www.southdowns.gov.uk/renature-credits/nature-based-solutions-portfolio/voluntary-credits/
ERA Brazil	https://www.erabrazil.com/_files/ugd/744597_fa6b4b04b3894893b25c2df-5b2e1c3e0.pdf
Hula Earth x Planted	https://hula.earth/solutions/credits/
GreenCollar NaturePlus™	https://naturepluscredits.com/wp-content/uploads/2023/10/NaturePlus-Biodiversity-claims-knowledge-paper.pdf
International Carbon Registry	https://www.carbonregistry.com/blog/icr-pilot-biodiversity-program
InvestConservation®	https://investconservation.com/
LIFE Institute	https://lifeinstituteglobal.org/wp-content/uploads/2024/10/LIFE-BB-IN-CS-4.0-R3-EN_Standard-1.pdf
Nat5	https://www.nat5.bio/wp-content/uploads/2024/05/aOCP-Metodologia-para-Creditos-de-Biodiversidad-por-Conservacion-de-Especies-V1.0.pdf
Nature and People Foundation Urban Biodiversity Standard	https://natureandpeople.org/wp-content/uploads/2025/01/Urban-Biodiversity-Standard-NP-Jan-2025-.pdf
Niue Ocean Wide Trust	https://niueoceanwide.com/
Open Earth Foundation Ocean Program	https://zenodo.org/records/10182712
Plan Vivo PV Nature	https://www.planvivo.org/Handlers/Download.ashx?IDMF=6504e4df-fa6f-4529-9945-767b5c8252e0
PlanetaryX	https://drive.google.com/file/d/13UoBpa6wq76-sz-DCiC9F1qdoqxqzQRL/view

Savimbo	https://isbm.savimbo.com/baseline-assessment/indicator-species-selection
SeaTrees	https://cdn.prod.website-files.com/65ae9262fbf418e225c9e4f0/670c7f39b51d09dfb319915a_SeaTrees_Marine%20Restoration_Mangrove_June2024_v1b.docx.pdf
Social Carbon	https://static1.squarespace.com/static/6161c89d030b89374bec0b70/t/67a39e8132edb27be59f16d4/1738776201196/Nature_Stewardship_Framework_vPublic-Consultation.pdf
Landbanking group	https://www.thelandbankinggroup.com/solutions/conservation
South Pole EcoAustralia	https://www.southpole.com/sustainability-solutions/ecoaustralia-frequently-asked-questions
Swedish University of Agricultural Sciences	https://stud.epsilon.slu.se/20216/1/hernblom_c_20240628.pdf
Terrascape	https://terrascape.earth/wp-content/uploads/2024/01/Terrascape-Protocol-for-Nature-Credits.pdf
Terrasos	https://www.terrasos.co/wp-content/uploads/20-protocol-for-issuing-voluntary-biodiversity-credits-beta-english.pdf
Verra SD VISta Nature Framework SDVM002	https://verra.org/wp-content/uploads/2023/09/SD-VISta-Nature-Framework-v0.1-for-Public-Consultation.pdf
Wallacea Trust	https://wallaceatrust.org/wp-content/uploads/2022/12/Biodiversity-credit-methodology-V3.pdf
WCS HIFOR	https://www.nature.com/articles/s41467-020-19493-3 https://hifor.org/Portals/15/adam/Resources/qYDB5VIN_U-qQiAv3pEotQ/DocumentOrLink/WCS_HIFOR_Biodiversity.pdf
Wilderlands	https://wilderlands.earth/how-it-works/
Global GAP - biodiversity addon	https://www.globalgap.org/what-we-offer/solutions/biodiversity
EU Organic	https://eur-lex.europa.eu/eli/reg_del/2021/1691/oj/eng
ROC	https://regenorganic.org/wp-content/uploads/2020/10/ROC_Soil_Sampling_Guidelines.pdf
Rainforest Alliance	https://www.rainforest-alliance.org/wp-content/uploads/2022/06/SA-S-SD-1-V1.3-2020-Sustainable-Agriculture-Standard-Farm-Requirements_Rainforest-Alliance.pdf
Fair Trade SPO	https://www.fairtrade.net/en/why-fairtrade/how-we-do-it/standards/who-we-have-standards-for/standards-for-small-scale-producer-organisations.html
Global GAP - all farm base	https://documents.globalgap.org/documents/190201_GG_IFA_CPCC_CC_V5_2_en.pdf
QS Fruit, vegetables and potatoes	https://www.q-s.de/services/files/downloadcenter/l-erzeugung-ogk/vora-bveroeffentlichung/leitfaden/englisch/Guideline_QS-GAP_Production_FVP_01.01.2024.pdf
ASC Salmon	https://asc-aqua.org/wp-content/uploads/2024/05/ASC-STD-010-Salmon-Standard-V-1.4.1-May-2024.pdf
MSC	https://www.msc.org/docs/default-source/default-document-library/for-business/program-documents/fisheries-program-documents/msc-fisheries-standard-v3-0.pdf?sfvrsn=53623a3_31
FSC - Brazil	https://connect.fsc.org/document-center/documents/4692255b-8826-46de-9dff-8892b619be49
EU Taxonomy: Substantial contribution	https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en
EU Taxonomy: Do not significant harm	https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

EMAS	https://www.business-biodiversity.eu/bausteine.net/f/10054/EMASandbiodiversityguidance2023.pdf?fd=0
International Council of Mining and Metals	https://www.icmm.com/website/publications/pdfs/environmental-stewardship/2015/guidance_biodiversity-baseline-data.pdf
Equator Principles	https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf
Aluminium Stewardship Initiative	https://aluminium-stewardship.org/wp-content/uploads/2023/04/ASI-Performance-Standard-Guidance-V3.1-April-2023.pdf
ESRS E4: Biodiversity and Ecosystems	https://www.efrag.org/sites/default/files/sites/webpublishing/SiteAssets/11%20Draft%20ESRS%20E4%20Biodiversity%20and%20ecosystems%20November%202022.pdf
Sustainable Finance Disclosure Regulation (SFDR), Annex 1	https://ec.europa.eu/finance/docs/level-2-measures/C_2022_1931_1_EN_annexe_acte_autonome_part1_v6.pdf
Environmental Impact Assessment (EIA) Directive	https://eur-lex.europa.eu/eli/dir/2011/92/oj/eng
Appropriate Assessment (to Habitat's Directive)	https://environment.ec.europa.eu/topics/nature-and-biodiversity/habitats-directive_en
TNFD	https://tnfd.global/publication/additional-guidance-on-assessment-of-nature-related-issues-the-leap-approach/
SBTN	https://sciencebasedtargetsnetwork.org/wp-content/uploads/2023/05/Technical-Guidance-2023-Step2-Prioritize-v1.pdf https://sciencebasedtargetsnetwork.org/wp-content/uploads/2024/07/Technical-Guidance-2024-Step3-Freshwater-v1-1.pdf https://sciencebasedtargetsnetwork.org/wp-content/uploads/2024/09/Technical-Guidance-2024-Step3-Land-v1.pdf
CDP Climate, Section C15 (Biodiversity)	https://guidance.cdp.net/en/guidance?cid=46&ctype=theme&idtype=ThemeID-&incchild=1&microsite=0&otype=Guidance&tags=TAG-13071%2CTAG-605%2CTAG-599
GRI 101: Biodiversity	https://www.globalreporting.org/search/?query=GRI+101%3a+Biodiversity
Nature Positive Initiative	https://www.naturepositive.org/app/uploads/2025/02/Draft-State-of-Nature-Metrics-for-Piloting_170125.pdf
IFC Performance Standards on Environmental and Social Sustainability	https://www.ifc.org/content/dam/ifc/doc/mgrt/ifc-performance-standards.pdf

biodiversa+
European Biodiversity Partnership

EUROPEAN PARTNERSHIP



For more information

Contact
contact@biodiversa.eu

Website
www.biodiversa.eu

Follow us on

Biodiversa+

@biodiversaplus.eu

Co-funded by
the European Union