



D3.1.1: Review and recommendations for existing and upcoming corporate NC & BD reporting standards

**Part of D3.1: Living review and recommendations for
mainstreaming BD in ESG (1st version)**

Deliverable title:	Review and recommendations for existing and upcoming corporate NC & BD reporting standards Part of: Living review and recommendations for mainstreaming BD in ESG (1 st version)
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Citation:	Paspaldzhiev, I., Hairabedian, J., Paunova, M., Barreyre, J., Tomova, K. (2023). Review and recommendations for existing and upcoming corporate NC & BD reporting standards.
Deliverable number:	D3.1.1: Part of D3.1
Work package:	WP3
Lead partner:	denkstatt
Due date of deliverable:	31 st of November 2023
Submission date:	Date
Dissemination Level	Public
Reviewed by	Joël Houdet (Biodiversity Footprint Company), Tuija Lankia (LUKE), Erika Winquist (LUKE)

Version	Date	Modified by	Modification reasons
Draft 1	15.11.2023	Ivan Paspaldzhiev, Jordan Hairabedian	First version
Review 1	17.11.2023	Joel Houdet	Integration of BF and NCA concepts
Review 2	20.11.2023	Tuija Lankia (LUKE)	Clarification of text
Review 3	22.11.2023	Erika Winquist (LUKE)	Clarification of text, formatting, alignment with other deliverables

Draft 2	22.11.2023	Ivan Paspaldzhiev	Addressing comments from reviewers
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List of Abbreviations	Definition
AR	Application Requirements (under ESRS)
BD	Biodiversity
BF	Biodiversity footprint
CDP	Carbon Disclosure Project
CSRD	Corporate Sustainability Reporting Directive
DEC	Dissemination - Exploitation - Communication
EFRAG	European Financial Reporting Advisory Group
ES	Ecosystem services
ESRS	European Sustainability Reporting Standards
GRI	Global Reporting Initiative
IRO	Impact, risk, and opportunity management (under ESRS 2: General Disclosures)
MDR	Minimum Disclosure Requirements (under ESRS 2: General Disclosures)
NC	Natural capital
NCA	Natural capital accounting
SBM	Strategy and Business Model (under ESRS 2: General Disclosures)
SBTN	Science-Based Targets for Nature
SEEA-EA	System of Environmental Economic Accounting: Ecosystem Accounting
SFDR	Sustainable Finance Disclosure Regulation
TCFD	Task-Force for Climate-Related Financial Disclosures
TNFD	Task-Force for Nature-Related Financial Disclosures
WP	Work Package

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Goal of Task 3.1

The purpose of Task 3.1 is to review the landscape of current and upcoming ESG market practice around biodiversity (BD) and natural capital (NC) in order to inform data (WP1) and method (WP2) needs and steer project development. This work consists of three strands:

- Task 3.1.1: Corporate disclosure standards – focusing on ESRS reporting requirements under the EU CSRD and links to voluntary and mandatory standards.
- Task 3.1.2: Certification and labelling – focusing on ecolabels and management systems & their incorporation of biodiversity criteria.
- Task 3.1.3: Financial sector practice – focusing on the EU Taxonomy and the actual reporting practice of companies falling under the CSRD.

The overarching goal of Task 3.1 is to identify what data (WP1) and methods (WP2) are required for biodiversity management and how biodiversity footprinting (BF) and natural capital accounting (NCA) can be used to improve biodiversity management in ESG.

The work under Task 3.1 is a living review that will be hosted on-line on the project website (WP5) for public feedback and updated once per reporting period.

This document covers Task 3.1.1, while Tasks 3.1.2 and 3.1.3 are available as separate documents, together making up Deliverable 3.1.

Goal of Task 3.1.1

The purpose of Task 3.1.1 is to Review existing and upcoming corporate natural capital and biodiversity reporting standards and provide recommendations for alignment with natural capital accounting (NCA) and biodiversity footprinting (BF) concepts.

The first iteration of the “living review” for Task 3.1.1 (November 2023) covers alignment of the European Sustainability Reporting Standards (ESRS) with voluntary and mandatory reporting standards on biodiversity.

On 5th of January 2023, the EU Corporate Sustainability Reporting Directive (CSRD) entered into force, requiring all large companies and all listed companies (except for micro-enterprises) to disclose information on a range of ESG topics, including biodiversity. Companies subject to CSRD will have to report following the European Sustainability Reporting Standards (ESRS), adopted as of 31st of July 2023. The CSRD aims to ensure that investors and other stakeholders have access to information necessary to assess business impact on people and the environment, and to assess risks and opportunities from ESG issues (including biodiversity). The ESRS do not prescribe specific methodologies for reporting but rather leaves the possibility for companies to use voluntary reporting frameworks to prepare their disclosures (in addition to pointing to certain frameworks in its Application Requirements as a voluntary option). CSRD aims to reduce reporting costs for companies in the medium to long term by harmonizing the ESG-related information that is required.

In the shorter term, a range of mature and newly emerging voluntary reporting frameworks have or are incorporating biodiversity into their disclosure requirements. 2024 is the first year in which companies will need to report under the CSRD¹ and there is still no established market practice on the application of the ESRS. Neither is there established practice on the application of voluntary and mandatory reporting standards for biodiversity. This presents a challenge for companies needing to report under the ESRS as they will need to navigate both the new requirements on the CSRD, as well as the new requirements of multiple reporting standards.

One of the aims of Task 3.1.1 is to provide guidance on how voluntary and mandatory reporting standards can be used to prepare disclosures under ESRS. The review is focused on:

¹ For the first two years of reporting, companies may omit disclosures related to biodiversity (ESRS E4). Moreover, for the first year of reporting, they may omit anticipated financial effects disclosure related to non-climate environmental issues (including biodiversity).

- **ESRS E4 - Biodiversity**
- Linked disclosures from **ESRS 2 - General Disclosures on Strategy and Business Models (SBM-3)**.
- Linked disclosures from **ESRS 2 – General Disclosures on Impact, Risk and Opportunity management (IRO-1)**.
- Linked disclosures from **ESRS 2 – General Disclosures Minimum Disclosure Requirements (MDR)** for Policies, Actions and Targets (**MDR-P, MDR-A, MDR-T**).

The review aims to establish the overlaps between biodiversity disclosure requirements under CSRD (above) and mostly voluntary, as well as mandatory reporting standards. The standards that are currently covered by the review are briefly summarized below.

- **Task-Force for Nature-Related Financial Disclosures (TNFD)**. TNFD provides a set of disclosure recommendations and guidance for organizations to report and act on nature-related dependencies, impacts, risks and opportunities. TNFD disclosure is divided into 4 pillars – *Governance, Strategy, Risk & impact management, and Metrics & targets* – and 14 recommended disclosures across these pillars. Our review is based on TNFD Version 1.0 (September 2023).
- **Science-Based Targets for Nature (SBTN)**. SBTN is an initiative aimed at helping organizations, governments, and other entities set scientifically rigorous and measurable targets to address the loss of biodiversity and ecosystem degradation. SBTN guidance is composed of 5 steps: *Assess / Prioritize / Measure, Set & Disclose / Act / Track*, and aims to provide guidance for *Land, Water, Oceans and Biodiversity* target setting. Currently, Steps 1 and 2 of SBTN (*Assess and Prioritize*) are publicly available, as is Step 3 (*Measure, Set & Disclose* – covering target setting) for Land and Water. Our review is based on October 2023 versions of SBTN - Steps 1 and 2 (Version 1), Step 3: Freshwater (Version 1), Step 3: Land (Version 0.3).
- **Global Reporting Initiative (GRI) 304: Biodiversity**. The GRI Standards are a set of guidelines used for sustainability reporting, enabling organizations to transparently report their economic, environmental, and social performance to stakeholders. GRI's guidelines are widely recognized and used, making it one of the most employed frameworks for sustainability reporting worldwide. GRI Standard 304 is the topic-specific standard for Biodiversity. The current version of the Standard from 2016 is being updated. Our review is based on the Exposure Draft from 28th of February 2023. The revised Standard is expected Q4 2023.
- **Carbon Disclosure Project (CDP)**. CDP disclosures are a set of specific questions and data requests for organizations designed to collect information on a wide range of environmental and sustainability topics. Since 2022, CDP includes disclosures on biodiversity as part of its climate change questionnaire. The expectation is for biodiversity to feature more prominently in CDP questionnaires in the future. Our review is based on the 2023 version of the CDP questionnaire for climate change (July 2023), focusing on biodiversity-related questions (C15 section).
- **Sustainable Finance Disclosure Regulation (SFDR)**: the CSRD aims to support the information needs of financial market participants subject to the Sustainable Finance Disclosure Regulation (EU) 2019/2088 (SFDR). It integrates in its framework the mandatory and voluntary biodiversity indicators that investors may ask to comply with this regulation (principal adverse impacts, tables 1 and 2 of annex 1).

The review aims to establish the potential to align corporate reporting with natural capital accounting (NCA) and biodiversity footprinting (BF) concepts. As a starting point, we define BF and NCA as:

- **Biodiversity footprint (BF)** - the impact of business activities on global biodiversity, measured in terms of biodiversity change as a result of production and consumption of particular goods and services². It can be negative or positive.
- **Natural Capital Accounting (NCA)** - the process of compiling consistent, comparable and regularly produced data using an accounting approach on natural capital and the flow of services generated in physical and monetary terms³.

² IEEP (2021). Biodiversity footprints in policy- and decision making. <https://ieep.eu/wp-content/uploads/2022/12/Biodiversity-Footprint-Report-IEEP.pdf>.

³ Lammerant (2019). NCAVES – State of play of business accounting and reporting on ecosystems. https://seea.un.org/sites/seea.un.org/files/background_paper_release_for_unseeaforum.pdf.

In simple terms, BF applies any time biodiversity-related data is disclosed at a single point in time. NCA is applied when data needs to be consistently reported and changes tracked over time. For a broader discussion around the current state of corporate biodiversity measurement and accounting, see Figure 1 and reference therein.

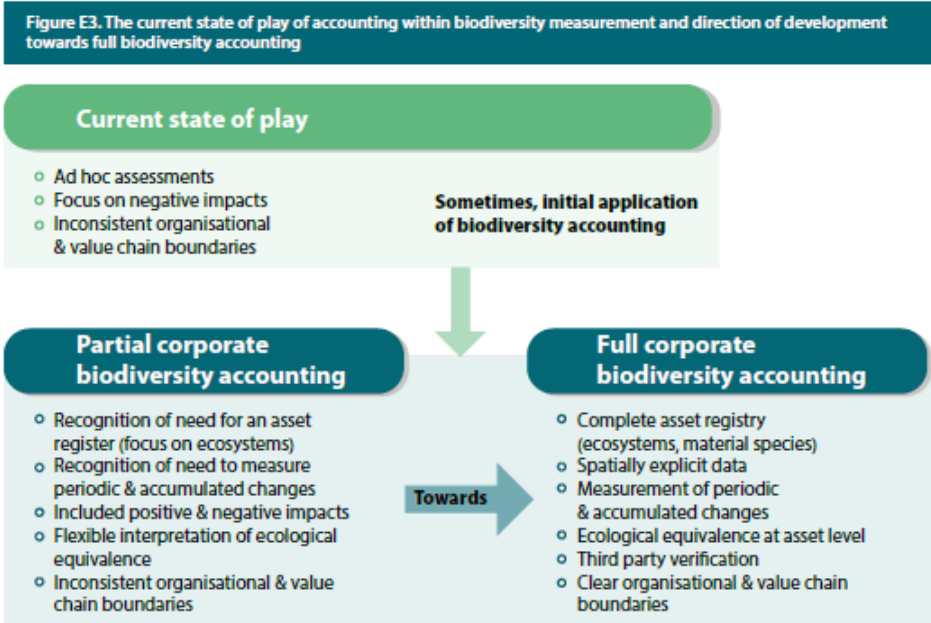


Figure 1: Current state of play of accounting within biodiversity measurement and direction of development towards full biodiversity accounting. Source: UNEP-WCMC, Capitals Coalition, Arcadis, ICF, WCMC Europe (2022) Recommendations for a standard on corporate biodiversity measurement and valuation, Aligning accounting approaches for nature (ALIGN)

Match between ESRS and other standards

The following review considers the match between ESRS E4: Biodiversity disclosure requirements (core text + application requirements where relevant), plus linked disclosures in ESRS 2: General Disclosures. It has been performed at the individual disclosure level. The content below is a summary of the review.

Subsequent sections present the results for each ESRS E4 disclosure category (incl. links to ESRS 2: General Disclosures) and elaborates whether disclosure is mandatory (irrespective of double materiality assessment⁴), mandatory if biodiversity is a material topic for the organization, or if disclosure is voluntary. We further note potential links between disclosure requirements and use of BF and NCA principles.

Table 1: Summary of voluntary reporting standards for biodiversity and their match with ESRS. Disclosure-level match is presented in subsequent sections.

ESRS code	Disclosure category	Disclosure title	TNFD	SBTN	CDP	GRI	SFDR	
E4-1	Strategy and business model	Transition plan and consideration of biodiversity and ecosystems in strategy and business model	Governance A, B, C Strategy B, C Risk & Impact Management A, C Metrics & Targets C	Step 3 Steps 4 and 5		304-6		
ESRS 2: SBM-3		Material impacts, risks and opportunities and their interaction with strategy and business model	Strategy A, B, C, D Metrics & Targets B	Steps 1 and 2		304-1, 304-2, 304-3	Indicators #7 of Table 1 and #10, #14 of Table 2 in Annex 1	
ESRS 2: IRO-1	Impact, risk, and opportunity management	Description of the process to identify and assess material impacts, risks, and opportunities	Risk & Impact Management A, C Governance C Strategy C, D		C15.1 C15.3 C15.4a	304-1, 304-2, 304-3, 304-4, 304-5, 304-6, 304-7		
E4-2		Policies related to biodiversity and ecosystems	Risk & Impact Management B Governance A and B Strategy B	Step 4 and 5	C15.5	GRI 3-3 304- 4, 304-5, 304-6, 304-7 GRI 411, GRI 413	Indicators #11, #12, and #15 of Table 2 in Annex 1	
➔ ESRS 2: MDR-P								
E4-3		Actions and resources related to biodiversity and ecosystems	Strategy B Governance C Metrics & Targets A					
➔ ESRS 2: MDR-A								
E4-4	Metrics & targets	Targets related to biodiversity and ecosystems	Metrics & Targets: C	Steps 1 and 2 Step 3 (Land and Freshwater)		304-5, 304-6		
➔ ESRS 2: MDR-T								
E4-5		Impact metrics related to biodiversity and ecosystems change	Metrics & Targets: B	Steps 1 and 2	C15.6	304-1, 304-2,		

⁴ In ESRS, double materiality is a key concept determining whether sustainability information needs to be disclosed by an organization. In brief, double materiality is the union (in mathematical terms, i.e. union of two sets, not intersection) of impact materiality (relevance of sustainability information stemming from the company's actual or potential effects on people and environment) and financial materiality (relevance of sustainability information from actual or potential financial effects on the undertaking). For thorough elaboration, please refer to ESRS 1: General Disclosures.

						304-3, 304-5	
E4-6		Anticipated financial effects from material biodiversity and ecosystem-related risks and opportunities	Metrics & Targets: A				

The full version of Table 1 at the individual disclosure level will be made available as a web-based public resource on the project website as part of the project DEC activities (WP5). Subsequent tables throughout this document present disclosure-level content for each ESRS E4 Disclosure category.

An Excel-based version is available upon request.

Transition plan and consideration of biodiversity and ecosystems in strategy and business model (ESRS E4-1), ESRS 2 IRO-1 and ESRS 2 SBM-3

ESRS E4-1 requires that companies disclose information on the resilience of their business model to nature-related risks and opportunities, including how this analysis has been conducted, their approach to material Impacts, Risks and Opportunities (IRO) identification, and any Transition plan in place. ESRS E4-1 links to General Disclosures under ESRS 2, specifically for Impacts, Risks and Opportunities management (IRO-1) and Strategy and Business Models (SBM-3). These links are also presented herein. Table 2 summarizes the review of voluntary standards versus ESRS requirements, and the potential linkages with BF and NCA.

Link to standards

Disclosure for resilience of strategy and business model to biodiversity and ecosystems-related issues is mandatory in ESRS (if biodiversity has been determined as material in the double materiality analysis) and includes disclosure on how the analysis has been conducted for which TNFD provides a broad framework under Strategy C, including for use of scenario analysis, which is implied in the ESRS requirement to consider multiple time horizons. ESRS requires disclosure on stakeholder involvement as part of resilience assessment which TNFD includes under Governance C. Taking TNFD's climate-related counterpart TCFD as a comparison, the 2023 TCFD Status Report⁵ shows that out of 1365 reviewed major companies globally, only 11% disclose information on the resilience of their strategy to climate change. Given that TCFD is a more established initiative (launched in 2015, while TNFD was launched in September 2023), and the amount of larger awareness and corporate resources available for climate versus nature-related business issues, we can assume that uptake for TNFD recommendations for resilience of strategy and business model to biodiversity and ecosystems-related issues would be challenging.

Transition planning information is voluntary in ESRS E4 – TNFD includes disclosure on whether a transition plan is in place under Strategy B, with reference to Metrics & Targets C (organisation's targets and goals) & disclosure on management oversight under Governance A and B. TNFD does not provide guidance on transition planning (such as aligning the plan with GBF or other policy goals) – only requires disclosure of whether such is in place. TNFD states that a priority for the next phase of the standard is to develop further guidance for transition plan development and target setting. GRI 304 similarly does not provide guidance, only requires disclosure of presence/absence and contextual information for understanding the plan (goals, target years and indicators, etc.).

The SBTN standard provides methodologies for target setting for three drivers of biodiversity loss – land use, water use, and water pollution. SBTN's land use guidance is focused on no conversion of ecosystems, reducing land use intensity, and landscape engagement. SBTN's water pollution guidance includes only nutrient pollution, which is relevant for agricultural companies but excludes other water pollutants such as chemicals and plastics. Both standards cover issues

⁵ TCFD, 2023: Task Force on Climate-related Financial Disclosures 2023 Status Report. Available at: <https://www.fsb.org/wp-content/uploads/P121023-2.pdf>

geared most strongly to agriculture and downstream sectors that utilize agricultural products (e.g. food industry). A recent study by the Finance for Biodiversity Foundation⁶ evaluating impacts of companies in the MSCI World Index shows that the food, beverages & tobacco industry is the highest impacting sector, followed by the materials industry - together comprising 39% of impacts in the index, for which SBTN target setting methods are most applicable. The remaining 61% however are a diverse range of companies from industries such as energy, utilities, pharma, and automobile components, which are not as well served by current disclosure frameworks. ESRS E4-1 application requirements further allow referring to targets from the EU Biodiversity Strategy 2030 – whether specific guidance exists for companies to develop transition plans in line with these targets is a potential area for further work.

Companies need to further disclose information on the interaction of material impacts, risks, and opportunities (IRO) with their strategy and business model, incl. financial effects. In addition, a list of material sites for own operations is required (ESRS-2, SBM-3). TNFD requires disclosure of IRO within Strategy A, and interaction with business model (resilience) within Strategy C. Material sites are disclosed under TNFD Strategy D, with reference to relevant metrics under Metrics & Targets B, and companies can further refer to GRI 304-1, 304-2, 304-3 for disclosure on location, drivers of biodiversity loss, and state of nature. Within ESRS-2, IRO-1, companies need to disclose their methodology for assessing IRO, which supports their disclosure under SBM-3. While SBM-3 requires only disclosure for own operations, IRO-1 requires information on whether these issues have been assessed in the value chain – voluntary standards also require disclosure in the value chain. SBTN's Steps 1 and 2 and TNFD's LEAP approach can support the assessment of impacts and related risks in the so-called double materiality assessment, which is also relevant for CDP. ESRS E4-1 IRO-1 Application Requirements specifically refer to TNFD LEAP as a voluntary approach that can be utilized by companies. According to CDP, only 30% of companies reporting in 2023 disclose any information on their biodiversity impacts in the value chain, demonstrating that corporate understanding of value chain impact assessment is still limited⁷.

Dependencies are not covered by any voluntary standard apart from TNFD which provides broad guidance but lacks reference to more specific assessment methods (as opposed to referencing SBTN for impacts). ESRS disclosure on any consultations with affected stakeholders in the value chain is required, for which TNFD's Risk Management A disclosure is applicable, and for which GRI provides more concrete guidance under 304-6 (describe impacts), 304-7 (access and benefit sharing under Nagoya Protocol), as well as GRI 411 and 413 for indigenous people and local communities. Taking TCFD as a comparison⁵, only 25% of companies analyzed for 2023 report on how climate is integrated into overall risk management. Given the maturity of TCFD vs the newly-released TNFD, companies may face similar difficulties in integrating nature-related issues into risk management.

Link to biodiversity footprinting and natural capital accounting

Since ESRS IRO-1 and SBM-3 require disclosure of information on both pressures and state of nature in the value chain, BF and NCA are applicable approaches. BF methods can be used to assess footprints in the value chain. NCA is relevant where BF information needs to be consistently reported and changes tracked over time (i.e. changes in pressures and the state of nature). Both approaches will need to be applied at different levels of granularity – from the site-level, through value chains, and up to a whole-company and financial portfolio levels. The application of NCA is of particular relevance for transition planning and target setting, as companies will need to report on quantifiable targets and progress against targets. As of time of writing, the development of these approaches and their potential linking to ESRS disclosure is a work in progress under WP2 of this project.

⁶ Finance for Biodiversity Foundation (2023): Briefing paper – Top 10 biodiversity-impact ranking of company industries. Available at: https://www.financeforbiodiversity.org/wp-content/uploads/Top10_biodiversity-impact_ranking.pdf

⁷ <https://cdn.cdp.net/cdp-production/cms/reports/documents/000/006/918/original/CDP-Supply-Chain-Report-2022.pdf>

Table 2: Match between ESRS E4-1, ESRS 2 IRO-1 and ESRS 2 SBM-3 : Resilience of strategy and business model with voluntary frameworks. **Yellow = partial match, orange = guidance expected but not yet available.**

Disclosure	Paragraphs	Mandatory nature	Link to standards	Link to BF or NCA
Resilience of strategy and business model to biodiversity and ecosystems-related physical, transition and systemic risks and opportunities (including scope, assumptions, time horizons, results, stakeholder involvement)	E4-1, §13	Mandatory if material	TNFD Strategy C (resilience of strategy under different scenarios) TNFD Governance C (human rights policies, stakeholder engagement)	BF and NCA: inputs from assessment of impacts and dependencies would be used to assess resilience.
Material impacts, risks and opportunities and how they interact with its strategy and business model (incl. financial effects).	E4-1, §14, referring to ESRS 2, SBM-3, §48	Mandatory	TNFD Strategy A (Description of risks, impacts, dependencies, opportunities over short-medium and long-term) TNFD Strategy B (Effects on business model, value chain, strategy and financial planning, as well as any transition plans or analysis in place) TNFD Strategy C (resilience of strategy under different scenarios) SBTN Steps 1 and 2 (impacts)	BF: assessment of material impacts NCA: Assessment of material dependencies
Transition plan with respect to GBF, EU Biodiversity Strategy 2030, and planetary boundaries Details on the transition plan – how strategy and business model will be adjusted in the value chain, funding (revenues, Capex), use of offsets, management approval, metrics for tracking progress, challenges, and limitations.	E4-1, §15 E4-1, AR 1	Voluntary	TNFD Strategy B (any transition plans or analysis in place) TNFD Metrics & Targets C (targets and goals) TNFD Governance A (board oversight) TNFD Governance B (Management's role) SBTN Step 3 (Land and Water) SBTN Step 4 and 5 (Act and Track) GRI 304-6 (halting and reversing loss of biodiversity)	NCA: can be used for tracking performance over time.
List of material sites in own operations, specifying: <ul style="list-style-type: none"> - Activities negatively affecting biodiversity-sensitive areas - Breakdown of sites by impacts and dependencies identified and ecological status of areas (with reference to an ecosystem baseline level) - Presence of land degradation, desertification, or soil sealing impacts Presence of operations that affect threatened species	ESRS E4 SBM-3, §16	Mandatory if material	TNFD Strategy D (Locations of assets and/or activities in the organisation's direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations). TNFD Metrics & Targets B (Metrics used by the organization, incl. specifics for land degradation, soil sealing, threatened species, etc...) SBTN Step 1a (pressures incl. land use), Step 1b (use of biodiversity variables for state of nature prioritization) GRI 304-1 (location of sites with most significant impacts), 304-2 (Direct drivers of biodiversity loss), 304-3 (state of biodiversity)	BF: establishing sites with material impacts NCA: Accounting for ecological status and threatened species; establishing sites with material dependencies

			SFDR (Indicators #7 of Table 1 and #10, #14 of Table 2 in Annex 1)	
Whether and how impacts, dependencies, transition, physical, systemic risks, and opportunities have been assessed, in the value chain	ESRS E4 IRO-1, §17 ESRS 2, IRO-1, §53	Mandatory	<p>TNFD Risk & Impact Management A (process for impacts, dependencies, risks covered, full value chain)</p> <p>SBTN Steps 1 and 2 (impacts only, mandatory at country/subnational scale)</p> <p>CDP (C15.3) Assessment of the impacts and dependencies of the value chain on biodiversity</p> <p>GRI 304-1-a (explain determination sites with most significant impact for own operations and suppliers), 304-2 (Context on standards, methods, etc. for direct drivers of biodiversity loss)</p>	<p>BF: assessment of material impacts in the value chain</p> <p>BF: assessment of impacts and dependencies</p> <p>NCA: Tracking of impacts and dependencies in the value chain over time .Linking company ecosystem use provision to natural assets (dependencies).</p>
<p>Whether and how consultations have been conducted on shared use of biological resources and ecosystems with communities</p> <ul style="list-style-type: none"> - Whether specific sites or raw materials production/sourcing locations have negative impacts on communities. - How communities have been involved in materiality assessment <p>For own operations where impacts on ecosystem services of relevance to communities exist, how impacts may be avoided/minimized/mitigated.</p>	ESRS E4 IRO-1, §17e ESRS 2, IRO-1, §53	Mandatory	<p>TNFD Governance C (human rights policies, stakeholder engagement)</p> <p>GRI 304-6-d (describe how it addresses the negative impacts of the transition to halt and reverse the loss of biodiversity on workers and local communities.)</p> <p>GRI 304-7 (Access and benefit-sharing under Nagoya Protocol)</p> <p>GRI 411: Indigenous Peoples and GRI 413: Local communities</p>	
Use of scenario analysis	ESRS E4 IRO-1, §18	Voluntary	Strategy: C: Describe the resilience of the organization's strategy to nature-related risks and opportunities, taking into consideration different scenarios.	
Sites in or near biodiversity-sensitive areas, whether activities negatively affect said areas.	ESRS E4 IRO-1, §19	Mandatory	<p>TNFD Strategy D (Locations of assets and/or activities in the organisation's direct operations and, where possible, upstream and downstream value chain(s) that meet the criteria for priority locations).</p> <p>SBTN Step 1b (use of biodiversity variables for state of nature prioritization)</p> <p>CDP (C15.4a) Activities in the reporting year located in or near to biodiversity -sensitive areas.</p>	<p>BF: Establishing impact drivers potentially negatively affecting areas</p> <p>NCA: Accounting for sites in/near protected areas, change in state of ecosystem over time tor demonstrating if/if not activities negatively impact areas</p>

			GRI 304-1 (locations), 304-2 (impact drivers), 304-3 (ecosystem condition vs baseline incl. for species), 304-4 (impact on ecosystem services)	
Process to identify, assess and prioritize risks and opportunities that may or may not have financial effects	Additional requisite information from ESRS 2, IRO-1, §53	Mandatory	TNFD Risk & Impact Management A (process for impacts, dependencies, risks covered, full value chain) TNFD Risk & Impact Management C (How processes for identifying, assessing and managing nature-related risks are integrated into the overall risk management).	

Policies related to biodiversity and ecosystems (ESRS E4-2 & ESRS 2 MDR-P)

ESRS E4-2 requires that companies disclose information on the policies in place to manage material impacts, risks, dependencies, and opportunities linked to biodiversity and ecosystems. Mandatory disclosures include policies regarding operational sites, as well as the value chain, while Application Requirements add voluntary detail on what policies may contain. Table 3 summarizes the review of voluntary and mandatory standards versus ESRS requirements, and the potential linkages with BF and NCA.

Link to standards

ESRS E4-2 refers to the Minimum Disclosure Requirements from ESRS 2: General Disclosures which require a description of the policies in place for material impacts, risks, dependencies and opportunities, incl. consideration of third-party standards and key stakeholders, with specific mandatory disclosure for policies around deforestation and sustainable agriculture and use of ecosystems. The reasons for not having adopted policies should be disclosed otherwise. TNFD's disclosure Strategy B covers policies relating to these material topics, Governance A and B cover the role of the company board and management, and Governance C covers processes for stakeholder engagement regarding material topics. Material topic management is also covered by GRI3-3: Management of material topics, which can be supplemented with biodiversity-specific disclosures from GRI 304-5 (impact management), 304-6 (halting biodiversity loss), 304-7 (access & benefit sharing), as well as GRI 411 and 413 for matters relating to indigenous peoples and local communities. TNFD provides broad disclosure guidelines, while GRI offers more details on impacts management, and it is expected that SBTN Step 4 (Act) disclosures will also cover in more detail impacts management policies – both GRI and SBTN only cover impacts; there is yet no reviewed standard supplemental to TNFD that covers management of nature dependencies.

ESRS E4-2 Application Requirements provide voluntary guidelines on what additional information can be included regarding policy disclosure, specifically:

- Addressing raw materials and procurement from suppliers that cannot demonstrate contribution to significant conversion of protected areas / key biodiversity areas, incl. reference to 3rd party standards. The currently reviewed voluntary disclosure standards do not include references to specific 3rd party standards for raw materials sustainability. The ongoing work under CircHive Task 3.1.2 reviewing product labels and the extent to which they include biodiversity (Part of D3.1) may be relevant input.
- Specific reference to whether and how the mitigation hierarchy is applied (E4-2, AR16).
- Specific reference to monitoring and reporting of biodiversity status and gains or losses for raw materials originating from ecosystems managed to maintain or enhance conditions of biodiversity.
- Specific reference to verifiable/certifiable standards following ISO guidance on accreditation and verification or the EU regulation on Conformity Assessment, or the ISEAL Code of Good Practice⁸. The ongoing CircHive work for standardization under WP5 may be relevant input.

Link to biodiversity footprinting and natural capital accounting

ESRS E4-2, §23 includes mandatory disclosure on whether and how policies relate to production, sourcing or consumption from ecosystems that are managed to maintain or enhance conditions for biodiversity by *regular monitoring and reporting of biodiversity status and gains or losses*. In addition, Application Requirement 12 includes the same requirement but

⁸ 3rd party standards conforming with the Code can be looked up here: <https://www.isealliance.org/iseal-community-members>

voluntary for disclosure regarding raw materials. GRI 304-3 includes a similar requirement for reporting of gains and losses versus a baseline for the company's own operations, as well as ecosystem condition disclosure for supplier activities. These requirements specifically lend themselves to natural capital accounting.

Table 3: Match between ESRS E4-2: Policies related to biodiversity and ecosystems with voluntary frameworks. **Yellow = partial match**, **orange = guidance expected but not yet available**.

Disclosure	Paragraphs	Mandatory nature	Link to standards	Link to BF or NCA
Description of policies to manage material impacts, risks, dependencies, and opportunities – contents, scope, senior decision makers, consideration of third party standards and key stakeholders.	E4-2, §22 (-> ESRS-2, MDR-P)	Mandatory if material	<p>TNFD Strategy B (IRO, links to business model and strategy, incl. policies to manage)</p> <p>TNFD Governance A and B (board oversight, management's role), Governance C (consideration of stakeholders)</p> <p>GRI 3-3: Management of material topics + specific information from:</p> <ul style="list-style-type: none"> - GRI 304-5 (management of impacts) - 304-6 (halting biodiversity loss) - 304-7 (access and benefit sharing) - GRI 411 (Indigenous peoples) - GRI 413 (Local communities) <p>SBTN Step 4 (Act)</p>	
<p>Whether and how policies relate to:</p> <ul style="list-style-type: none"> - Material impacts and dependencies - Raw materials traceability for impacts in the value chain - Production, sourcing or consumption from ecosystems that are managed to maintain or enhance conditions for biodiversity by regular monitoring and reporting of biodiversity status and gains or losses - Social consequences of biodiversity and ecosystem-related impacts 	E4-2, §23	Mandatory if material	<p>TNFD Strategy B</p> <p>GRI 3-3 (management of material topics), 304-5 (management of impacts, incl. traceability), 304-6 (targets)</p> <p>+ specific information on impacts from:</p> <ul style="list-style-type: none"> - GRI 304-3-a, 304-3-b (reporting of gains and losses vs baseline for own operations), - GRI 304-3-c (ecosystem condition for supplier activities) <p>+ specific information on social consequences from:</p> <ul style="list-style-type: none"> - GRI 304-4 (social consequences - impact on ecosystem services for other beneficiaries) - GRI 304-7 (access and benefits sharing) - GRI 411 and 413 (indigenous people, local communities) 	NCA: Monitoring and reporting of biodiversity status and reporting of gains and losses

			SBTN Step 4 and 5 (Act and Track)	
<p>Whether policies have been adopted for:</p> <ul style="list-style-type: none"> - Biodiversity and ecosystems protection covering operational sites owned, leased, managed in or near protected area or biodiversity-sensitive area outside protected areas - Deforestation - Policies or practices for sustainable land or agriculture, sustainable oceans and seas 	E4-2, §24	Mandatory if material	<p>TNFD Strategy B</p> <p>GRI3-3: Management of material topics.</p> <p>GRI 304-5-b: report percentage of sites reported with management plans</p> <p>SFDR Indicators #11, #12, and #15 of Table 2 in Annex 1</p>	
<p>How policies refer to:</p> <ul style="list-style-type: none"> - Production, sourcing, or consumption of raw materials - Limiting procurement from suppliers that cannot demonstrate that they are not contributing to significant conversion of protected areas or key biodiversity areas - Recognized standards or third-party certifications overseen by regulators - Raw materials originating from ecosystems that have been managed to maintain or enhance conditions for biodiversity, as demonstrated by regular monitoring and reporting of biodiversity status and gains or losses 	E4-2, AR 12	Voluntary	<p>TNFD Strategy B</p> <p>GRI3-3: Management of material topics.</p> <p>GRI 304-5-b: report percentage of sites reported with management plans</p> <p>GRI 304-3-a, 304-3-b (reporting of gains and losses vs baseline for own operations), GRI 304-3-c (ecosystem condition for supplier activities)</p>	NCA: Monitoring and reporting of biodiversity status and reporting of gains and losses
<p>How policy enables:</p> <ul style="list-style-type: none"> - Avoiding negative impacts in own operations and upstream/downstream value chain - Reduce and minimize negative impacts that cannot be avoided - Restore and rehabilitate degraded ecosystems where impacts cannot be completely avoided and/or minimized - Mitigating contribution to material biodiversity loss drivers 	E4-2, AR 16	Voluntary	<p>TNFD Strategy B</p> <p>GRI3-3: Management of material topics.</p> <p>GRI 304-5-b: report percentage of sites reported with management plans</p>	
<p>How policy refers to third party standards of conduct that are:</p> <ul style="list-style-type: none"> - Objective and achievable - Developed or maintained through process of ongoing and balanced stakeholder consultation - Encourages step-wise approach and continuous improvement, requires targets and milestones - Verifiable or certifiable, compliant with ISO guidance on accreditation and verification procedures or Article 5(2) of Regulation (EC) No 765/2008 - Conform to ISEAL Code of Good Practice 	E4-2, AR 17	Voluntary	<p>TNFD Strategy B</p> <p>GRI3-3: Management of material topics.</p> <p>GRI 304-5-b: report percentage of sites reported with management plans</p>	

Actions and resources related to biodiversity and ecosystems (ESRS E4-3 & ESRS 2 MDR-A)

ESRS E4-3 requires mandatory disclosure of information on the actions in place related to biodiversity and ecosystems, incl. specific details on said actions and allocation of financial resources. Voluntary disclosures include details on the involvement of stakeholders and whether & how they are affected by actions, as well as whether actions may have negative impacts on biodiversity and ecosystems. Table 4 summarizes the review of voluntary standards versus ESRS requirements, and the potential linkages with BF and NCA.

Link to voluntary standards

Minimum Disclosure Requirements (ESRS 2, MDR-A, §67-68) include a list of key actions & details on actions (scope, time horizons, quantitative and qualitative tracking of progress), as well as the dedicated current and future financial resources dedicated to said actions (and any contingencies on financial support or enabling policy environment & market developments). The reasons for not having adopted actions should be disclosed otherwise. TNFD's Strategy B disclosure includes information on strategy, key actions and planning relating to impacts, risks and opportunities management, and companies can further refer to TNFD disclosure Metrics & Targets A for disclosing specific KPIs for progress. In addition, companies must disclose the use of biodiversity offsets (inc. their costs), and voluntarily disclose application of mitigation hierarchy. The same TNFD disclosures apply. Disclosure on incorporation of ILK and nature-based solutions is required, and can be linked to TNFD Strategy B, as well as Governance C (human rights policies & stakeholder engagement). Voluntary disclosures are likewise covered by TNFD Strategy B and Governance C.

Link to biodiversity footprinting and natural capital accounting

NCA and BF may be applicable for tracking the progress of specific actions over time, but contingent on the type of action.

Table 4: Match between ESRS E4-3: Actions and resources related to biodiversity and ecosystems.

Yellow = partial match, orange = guidance expected but not yet available.

Disclosure	Paragraphs	Mandatory nature	Link to standards	Link to BF or NCA
Key actions and resources in relation to biodiversity and ecosystems (list, scope, time horizons, progress, and results – quantitative and qualitative)	E4-3, §27 (→ESRS 2, MDR-A, §68)	Mandatory if material	TNFD Strategy B (strategy, key actions, planning with regard to IRO)	NCA and BF: tracking of progress over time
Current and future financial and other resources allocated to the action plan, contingency of plan on specific preconditions (financial support, public policy, market developments)	E4-3, §27 (→ESRS 2, MDR-A, §69)	Mandatory if material	TNFD Metrics & Targets A (KPIs)	
Application of mitigation hierarchy with regard to actions	E4-3, §28, (a)	Voluntary	CDP 15.5 (scope) GRI 304-5, 304-6, 304-7	NCA: Corporate BD accounting
Use of biodiversity offsets, KPIs used, direct and indirect costs of offsets	E4-3, §28, (b)	Mandatory if material	GRI 3-3: Management of material topics	NCA: Corporate BD accounting
Incorporation of indigenous knowledge and nature-based solutions into biodiversity and ecosystems-related action	E4-3, §28, (c)	Mandatory if material	TNFD Governance C (human rights policies, stakeholder engagement)	

			GRI 304-6-d (negative impacts on workers and communities), 411 (indigenous people), 413 (local communities)	
Whether and how key stakeholders are involved, how they are positively or negatively impacts by actions	E4-3, AR 20	Voluntary	TNFD Strategy B TNFD Governance C	
Need for appropriate consultations and need to respect decisions of affected communities		Voluntary	TNFD Strategy B TNFD Governance C	
Whether key actions may induce significant negative impacts on biodiversity and ecosystems		Voluntary	TNFD Strategy B	
Whether actions are one-time or systematic initiatives, whether they are individual actions or part of collective action, additional information about projects, sponsors, and other participants.		Voluntary	TNFD Strategy B	

Targets related to biodiversity and ecosystems (ESRS E4-4 & ESRS 2 MDR-T)

ESRS E4-4 requires mandatory disclosure on any targets in place with regards to biodiversity and ecosystems, including specific information on target formulation and how they link to policy objectives and key actions. Table 5 summarizes the review of voluntary standards versus ESRS requirements, and the potential linkages with BF and NCA.

Link to voluntary standards

Minimum Disclosure Requirements for Targets (ESRS 2, MDR-T, §79) include specific information on presence of measurable, outcome-oriented, and time-bound targets on biodiversity and ecosystems, incl. links with policy objectives, target scope, baseline and target years, methods used and whether targets are based on conclusive scientific evidence, what role stakeholder engagement plays & how progress is monitored and reviewed. Companies have the option to disclose if no targets are set (ESRS 2, MDR-T, §79, (a)) but must disclose whether effectiveness of policies and actions about material IRO are tracked (incl. levels of ambition and indicators for evaluating progress).

Article E4-4, §32, gives specific information that must be disclosed, which is also requested by TNFD Metrics & Targets C and GRI 304-6 (halting and reversing biodiversity loss. SBTN Step 3: Set Targets provides methods for addressing land and water-related pressure targets. Table 6 summarizes the alignment of available SBTN target requirements with the information requested in ESRS E4-4.

As elaborated above for *Transition plan and consideration of biodiversity and ecosystems in strategy and business model (ESRS E4-1)*, *ESRS 2 IRO-1 and ESRS 2 SBM-3*, SBTN target setting methods for Land and Water are currently broadly applicable primarily for companies in land-intensive sectors such as agriculture, and adjacent downstream sectors such as food & beverages, or other sectors with high demand of land-based commodities.

According to CDP⁹, of companies disclosing to CDP Forests in 2022, only 36% have a no-deforestation or no-ecosystem conversion policy in place, and only 13% of companies have commitments that are aligned with good practice under the Accountability Framework Initiative. Major challenges include insufficient traceability (77% of reporting companies) or monitoring systems (74% of reporting companies) in the supply chain. Under ESRS, deforestation policy is one of the mandatory disclosures under *E4-2: Policies related to biodiversity and ecosystems* (paragraph §24) that is also relevant for SFDR, though transition planning is voluntary (*ESRS E4-1, §15*).

⁹ “CDP and Accountability Framework Initiative (2022). From commitments to action at scale: critical steps to achieve deforestation-free supply chains”

Link to biodiversity footprinting and natural capital accounting

The ESRS requires disclosure on quantitative target setting in the value chain, implying that impacts will need to be measured, for which biodiversity footprint is an applicable tool. What is more, consistency regarding baselines and tracking of progress over time must be ensured, for which natural capital accounting is the applicable methodology.

Table 5: Match between ESRS E4-4: Targets related to biodiversity and ecosystems. **Yellow = partial match, orange = guidance expected but not yet available.**

Disclosure	Paragraphs	Mandatory nature	Link to standards	Link to BF or NCA
<p>Measurable, outcome-oriented and time-bound targets on material sustainability matters. For each target, the following information is needed:</p> <ul style="list-style-type: none"> - the relationship of the target to the policy objectives; - the defined target level (absolute or relative) and the unit in which it is measured; - the scope of the target (supply chain, operations, geographical scope, etc.) - the baseline value and base year; - the period (including milestones or interim targets); - the methodologies and significant assumptions used; - whether targets are based on conclusive scientific evidence; - alignment with national, EU or international policy goals - stakeholder involvement; - any changes in targets, metrics or methodologies; - monitoring and review of the metrics used, progress check, and an analysis of trends or significant changes; 	ESRS 2, MDR-T, §80	Mandatory if material	<p>SBTN Steps 1 and 2</p> <p>SBTN Step 3: Set Targets for Land and Water</p> <p>TNFD Metrics & Targets: C (targets and goals & performance)</p> <p>GRI 304-6 (Halting and reversing biodiversity loss)</p>	<p>BF: quantification of impacts</p> <p>NCA: tracking of progress over time versus a baseline</p>
If no targets are set, explain if, and when those will be set or why there is no plan to set such targets.	ESRS 2, MDR-T, §81, (a)	Voluntary	GRI 304-5 Management of biodiversity-related impacts	
Disclose whether it tracks the effectiveness of its policies and actions in relation to the material sustainability-related impact, risk and opportunity, and the defined level of ambition and any qualitative or quantitative indicators it uses to evaluate progress;	ESRS 2, MDR-T, §81, (b)	Mandatory if material	<p>GRI General Disclosures 2-4 Restatement of information</p> <p>GRI Foundation 1-6 Reasons for omission.</p>	<p>BF: quantification of impacts</p> <p>NCA: tracking of progress over time versus a baseline</p>
<p>Include information about:</p> <ul style="list-style-type: none"> - ecological thresholds and allocations of impacts applied when setting targets; - the methodology used; - responsibility allocation; - whether or not the thresholds are entity-specific and if so, how they were determined; - alignment with the Kunming-Montreal Global Biodiversity Framework, EU Biodiversity Strategy for 2030 and other national policies and legislations; - link between targets and identified impacts, dependencies, risks and opportunities in its 	E4-4, §32	Mandatory if material		<p>BF: quantification of impacts</p> <p>NCA: tracking of progress over time versus a baseline</p>

operations and upstream and downstream value chain; - geographical scope; - usage or not of biodiversity offsets; - link with the mitigation hierarchy;				
If targets address shortcomings related to the Substantial Contribution criteria of the EU Taxonomy;	E4-4, AR 22	Voluntary		

Table 6: Alignment of SBTN Step 3 Land and Water target setting methods with ESRS disclosure requirements.

ESRS requirements	Paragraphs	Mandatory nature	SBTN Step 3: Land	SBTN Step 3: Water
Relationship of the target to the policy objectives	E4-4, §31 (→ ESRS 2, MDR-T, §80 (a)) E4-4, §32, (a, c)	Mandatory if material	SBTN Target setting is required if a given nature loss pressure is determined as material in Steps 1 and 2. Steps 1 and 2 are applicable methodologies for determining of material impacts on nature as part of ESRS E4-1 mandatory disclosures for Strategy and Business Model's interactions with nature (ESRS 2, SBM-3, §48) and Impact, Risks and Opportunities management (E4-1, §17 → ESRS 2, IRO-1, §53).	
Defined target level (absolute or relative) and the unit in which it is measured	E4-4, §31 (→ ESRS 2, MDR-T, §80 (b))	Mandatory if material	<ul style="list-style-type: none"> - Target 1: No conversion - absolute (reduce conversion to zero) - Target 2: Land footprint reduction - absolute (ha) or intensity (ha/kg agri product). Intensity targets are not required to lead to absolute reductions (unlike SBTi for climate) but must be stated also in absolute terms. - Target 3: Landscape engagement – absolute. Coverage of a part of land impact with relevant initiatives is required. 	SBTN water targets require an absolute decrease in water consumption or water pollution relative to a baseline, measured in m3 volume or mg/m3 concentration terms.
Scope of the target (supply chain, operations, geographical scope, etc.)	E4-4, §31 (→ ESRS 2, MDR-T, §80 (c)) E4-4, §32, (d)	Mandatory if material	Target setting is required and methods are available for operations and upstream supply chain. Target setting methods for downstream supply chain are planned for the future.	
Baseline value and base year	E4-4, §31 (→ ESRS 2, MDR-T, §80 (d))	Mandatory if material	<ul style="list-style-type: none"> - Target 1: No conversion - companies must use cut-off dates no later than 2020 as the reference for assessing conversion of natural ecosystems (forests and non-forests). Where other cut-off dates earlier than 2020 exist, companies must use those earlier dates (e.g., sectoral and regional cut-off dates). Cut-off dates should align with existing sectoral or regional cut-off dates where they exist. - Target 2: Land footprint reduction - The choice of base year must be no earlier than 2015. Does not need to align with the cut-off date for target - Target 3: Landscape engagement - not applicable. 	The baseline is defined as the average water usage in m3 or pollution in mg/m3 for the last 5 years of activity. If a site has existed for less than 5 years -> averages for the full available time period are needed.
Time period for which applicable	E4-4, §31 (→ ESRS 2, MDR-T, §80, (e))	Mandatory if material	<ul style="list-style-type: none"> - Target 1: No conversion - 2025 for site owners/operators and producers. For sourcing - 2025 for "core natural lands", 2027 (interim) and 2030 for "all natural lands". - Target 2: Land footprint reduction - minimum 5 years and maximum 10 years from base year. Long-term targets to 2050 are encouraged but not required. - Target 3: Landscape engagement - Not explicit, presumed 2030 (p.67 of standard) 	Companies must submit their targets with a target year of 5 years from the date that the target is submitted.
Scientific basis, alignment with national, EU, or international policy goals	E4-4, §31 (→ ESRS 2, MDR-T, §80 (f, g))	Mandatory if material	<ul style="list-style-type: none"> - Target 1: No conversion - aligned with Accountability Framework and SBTi FLAG - Target 2: Land footprint reduction - based on IPCC SSP1 scenario from SR1.5degC, requiring 200 Mha decrease in cropland and pasture area by 2030 and 500 Mha by 2050, 	The method is based on research and data by Hogeboom

	E4-4, §32, (b)		<p>to conserve biodiversity while delivering SDGs incl SDG2 for zero hunger.</p> <ul style="list-style-type: none"> - Target 3: Landscape engagement - aligned with guidelines of ISEAL and CDP Forests. <p>Standard claims to be based on conclusive scientific evidence supported by multiple research and NGO organisations.</p> <p>Alignment with GBF is claimed, alignment with EU Biodiversity Strategy is inconclusive.</p>	<p>et al 2020¹⁰ and McDowell et al 2020¹¹. SBTN claims to support achievement of Global Biodiversity Framework goals.</p> <p>Standard claims to be based on conclusive scientific evidence supported by multiple research and NGO organisations.</p> <p>Alignment with EU Biodiversity Strategy is inconclusive.</p>
Stakeholder involvement	E4-4, §31 (→ ESRS 2, MDR-T, §80 (h))	Mandatory if material	<ul style="list-style-type: none"> - Target 1: Implicitly for setting cut-off dates for no conversion (should align with existing sectoral and regional cut-off dates where they exist). Brief recommendations for considering land rights, indigenous rights, FPIC are given, with reference to an SBTN stakeholder engagement guidance. - Target 2: Not explicitly mentioned. - Target 3: Required – landscape engagement initiatives need to have a core stakeholder engagement component. 	Step 3.1 requires that stakeholders are consulted in selecting the target modelling approach.
Consideration of Ecological thresholds + whether they are entity-specific and how responsibility is allocated to the company	E4-4, §32, (a)	Mandatory if material	<ul style="list-style-type: none"> - Target 1: zero conversion of “natural land” is the threshold - Target 2: reduction of land footprint is based on a threshold derived from IPCC SSP1 - Target 3: not applicable 	The method is based on environmental flow requirements (water quantity) and N & P thresholds derived from scientific literature. Researching locally relevant thresholds with relevant stakeholders is a requirement.
Allocation to mitigation hierarchy, use of offsets	E4-4, §32, (e, f)	Mandatory if material	<ul style="list-style-type: none"> - Target 1: Avoidance - Target 2: Minimisation - Target 3: Avoidance and/or minimisation 	Minimisation

Impact metrics related to biodiversity and ecosystems change (ESRS E4-5)

ESRS E4-5 requires mandatory disclosure on impacts metrics that focus primarily on changes in biodiversity or ecosystem extent and state. Table 7 summarizes the review of voluntary standards versus ESRS requirements, and the potential linkages with BF and NCA.

Link to voluntary standards

Mandatory disclosure includes company sites in or near biodiversity-sensitive areas (E4-5, §35), which are covered by disclosure in GRI 304-1, and can be relevant pressure and state of nature metrics under SBTN Step 1 and 2. Sites in or

¹⁰ Hogeboom, R.J., De Bruin, D., Schyns, J.F., Krol, M.S. and Hoekstra, A.Y., 2020. Capping human water footprints in the world's river basins. *Earth's Future*, 8(2), p.e2019EF001363.

¹¹ McDowell, R.W., Noble, A., Pletnyakov, P. and Mosley, L.M., 2021. Global database of diffuse riverine nitrogen and phosphorus loads and yields. *Geoscience Data Journal*, 8(2), pp.132-143.

near biodiversity-sensitive areas are also required under TNFD's LEAP approach and can be disclosed under TNFD Metrics & Targets B.

Mandatory disclosure also includes relevant metrics for land/freshwater/sea use change. ESRS E4-5 presents several voluntary options, specifically ecosystem extent and condition metrics (E4-5, §41) that are also present in GRI 304-2 and can be relevant pressure and state of nature metrics under SBTN Step 1 and 2, and TNFD LEAP.

Companies can voluntarily cross-reference relevant metrics from other ESRS environmental disclosures (GHG emissions, Pollution to air, water, and soil; Marine resources; Waste generation), for which GRI has corresponding disclosure standards, and which are relevant under SBTN Step 1 and 2 and TNFD's Metrics & Targets B. Invasive species reporting is also voluntary.

All disclosure under ESRS E4-5 covers company own operations only, though value chain reporting is required in other parts of ESRS E4 and specifically for Impacts, Risks and Opportunities management (ESRS 2, IRO-1).

Link to biodiversity footprinting and natural capital accounting

Biodiversity footprinting and natural capital accounting are specifically relevant for ESRS E4-5. An asset inventory for operational sites in or near protected areas is mandatory, and biodiversity footprinting using life-cycle assessment is a voluntary option. Disclosure of ecosystem change over time is also mandatory, necessitating natural capital accounting, with multiple voluntary metrics that lend themselves to NCA.

Table 7: Match between ESRS E4-5: Impact metrics related to biodiversity and ecosystems change.

Yellow = partial match, orange = guidance expected but not yet available.

Disclosure	Paragraphs	Mandatory nature	Link to voluntary standards	Link to BF or NCA
If located in or near biodiversity-sensitive areas (protected areas), the number and area (in ha) of sites owned, leased, or managed shall be reported.	E4-5, §35	Mandatory if material	SBTN Steps 1 and 2 (pressure metrics for land, state of nature metrics with regard to biodiversity) TNFD Metrics & Targets: B GRI 304-1	NCA: asset inventory with regard to protected areas incl. extent
If there are material impacts with regards to land-use change, or impacts on the extent and condition of ecosystems, their land-use based on a Life Cycle Assessment may be disclosed.	E4-5, §36	Voluntary	SBTN Steps 1 and 2 (pressure and state of nature metrics) TNFD Metrics & Targets: B GRI 304-2-c	BF: use of LCA/BF for assessment of land/ecosystem use impacts NCA: Consistent accounting over time
If land use change, freshwater-use change and/or sea-use change are identified, relevant metrics shall be disclosed <i>for own operations (E4-5, §37)</i>	E4-5, §38	Voluntary	SBTN Steps 1 and 2 (pressure and state of nature metrics) TNFD Metrics & Targets: B GRI 304-2	
If land use change, freshwater-use change and/or sea-use change are identified, relevant metrics shall be disclosed, the undertaking may disclose: <ul style="list-style-type: none">- conversion over time of land cover;- changes over time in the management of ecosystems;- changes in the spatial configuration of the landscape;- changes in ecosystem structural connectivity;- the functional connectivity <i>for own operations (E4-5, §37)</i>	E4-5, §38	Voluntary		

Report on risks and metrics used to manage the spread of invasive species, if there is accidental or voluntary introduction of invasive alien species; <i>for own operations</i> (E4-5, §37). The organisation may disclose: <ul style="list-style-type: none"> - Number of invasive alien species; - Area covered by invasive alien species; 	E4-5, §39 E4-5, AR 32	Voluntary	SBTN Steps 1 and 2 (pressure and state of nature on biodiversity metrics), Step 1b TNFD Metrics & Targets: B GRI 304-5	NCA: invasive species abundance or coverage
If there are material impacts on species, relevant metrics related to the topics below may be reported <i>for own operations</i> (E4-5, §37): <ul style="list-style-type: none"> - GHG emissions, Pollution to air, water and soil; Marine resources; Waste generation (ESRS E1, E2, E3, E6) - Population size; range within specific ecosystems as well as extinction risk; - changes in the number of individuals of a within a specific area; - the threat status of species and how activities/pressures may affect the threat status; - changes in the relevant habitat for a threatened species; 	E4-5, §40	Voluntary	SBTN Steps 1 and 2 (pressure and state of nature metrics), Step 1b TNFD Metrics & Targets: B CDP C15.6 (biodiversity indicators to monitor performance) GRI 304-1; 304-2; 304-3	BF: pressure metrics under ESRS E1, E2, E3, E6 NCA: species accounts, habitat accounts
If the undertaking identified material impacts related to ecosystems, it may disclose <i>for own operations</i> (E4-5, §37): <ul style="list-style-type: none"> - metrics that measure area coverage of a particular ecosystem; - metrics that measure ecosystem condition <ul style="list-style-type: none"> o quality relative to a reference state o multiple species within an ecosystem (e.g. species richness and abundance) o structural components of condition such as habitat connectivity; 	E4-5, §41	Voluntary	SBTN Steps 1 and 2 (pressure and state of nature metrics), Step 1b TNFD Metrics & Targets: B GRI 304-3	NCA: ecosystem extent and condition accounts
Disclose in units of area (e.g., m2 or ha) using EMAS: <ul style="list-style-type: none"> - Total use of land area; - Total sealed area; - Nature-oriented area on site; - Nature-oriented area off site; 	E4-5, AR 34	Voluntary	SBTN Steps 1 and 2 (pressure and state of nature metrics) TNFD Metrics & Targets: B	NCA: ecosystem extent accounts

Anticipated financial effects from material biodiversity and ecosystem-related risks and opportunities (ESRS E4-6)

ESRS E4-6 requires mandatory disclosure on the anticipated financial effects of material nature-related issues on the company's performance. Table 8 summarizes the review of voluntary standards versus ESRS requirements, and the potential linkages with BF and NCA. Disclosure under ESRS E4-6 is in addition to the information on current financial effects, financial position, financial performance, and cash flows under ESRS 2 SBM-3 §48 (d) (*Material impacts, risks, and opportunities and how they interact with its strategy and business model (incl. financial effects)*).

Link to voluntary standards

In ESRS, companies must report financial effects due to material risks from nature-related impacts and dependencies, as well as opportunities under short, medium, and long-term time horizons. Risk metrics are covered by TNFD Metrics & Targets A. The requirement for time horizons can be met with scenario analysis, which is part of TNFD's Strategy C (resilience of the organization's strategy) disclosure.

Link to biodiversity footprinting and natural capital accounting

Potential tracking of risks from dependencies may be achieved via ecosystem service accounts using natural capital accounting.

Table 8: Match between ESRS E4-6: Anticipated financial effects from material biodiversity and ecosystem-related risks and opportunities. **Yellow = partial match**, **orange = guidance expected but not yet available**.

Disclosure	Paragraphs	Mandatory nature	Link to voluntary standards	Link to BF or NCA
Disclose its anticipated financial effects of material biodiversity and ecosystem-related risks and opportunities	E4-6, §42 and ESRS 2 SBM-3 §48 d	Mandatory for ESRS 2 SBM-3 and mandatory if material for E4-6	TNFD Metrics & Targets A.	NCA: tracking of risks related to dependencies using ecosystem service accounts
Report a quantification of the potential financial effects in monetary terms or where impracticable, qualitative information	E4-6, §45, (a)	Mandatory if material		
Provide a description of the effects considered, the related impacts and dependencies and time horizons	E4-6, §45 (b)	Mandatory if material		
Provide the critical assumptions used in the estimate, sources and level of uncertainty	E4-6, §45,(c)	Mandatory if material		
Description of related products and services at risk, how time horizons are defined, financial amounts are estimated and critical assumptions made	E4-6, AR 39	Voluntary		

Tools and methods recommended by standards (link to WP2)

The CSRD introduces significant reporting requirements for companies. Most of them are not used to biodiversity disclosures. That is why identifying existing tools and methods can guide corporates in the compliance exercise. Indeed, an increasing number of tools and methods related to biodiversity and ecosystems surged in the last years, alongside new voluntary and mandatory reporting frameworks on biodiversity, of which this review covers SBTN, TNFD, SFDR, GRI, CDP. This section maps the ESRS E4 disclosure requirements with the EFRAG's recommendations on tools and methods from relevant standards (ESRS E4, November 2022 version).

This section aims to inform WP2 by considering what existing recommended guidance may incorporate or be aligned with BF and NCA principles.

Transition plan (E4-1)

E4-1 recommends companies to "improve and, ultimately" align their transition plan with to three different frameworks:

- An international agreement-based framework: **Kunming-Montreal Global Biodiversity Framework**. It may be the less operational framework for companies, dealing with States actions mostly. However, target 15 deals with encouraging companies to assess impacts and dependencies on biodiversity. **Sustainable Development Goals** are also mentioned in assessment requirement 3 as useful for biodiversity transition plan, with specific references to SDG 2 (hunger and food security), 6 (water and sanitation), 14 (oceans, seas and marine resources) and 15 (terrestrial ecosystems and biodiversity loss).
- An EU policy-based framework: **EU Biodiversity Strategy for 2030**. Assessment requirement 2 recommends companies disclosing a transition plan to align on targets from this framework.
- A research center-based framework: the **planetary boundaries framework**. The approach was determined by the Stockholm Resilience Centre in 2009. It presents a set of nine planetary boundaries (including biosphere integrity, land system and freshwater change) within which humanity can continue to develop and thrive for generations to come. Businesses can get inspiration from associated biodiversity-related control variables to

build its transition plan: genetic diversity, functional integrity, area of forested land, human induced disturbance of blue water flow, human induced disturbance of water available to plants...

In November 2022, EFRAG recommended the transition plan to be mandatory for specific sectors provided by the **TNFD**: Agriculture and Farming, Forestry, Construction and Engineering, Oil and Gas – from Midstream and Downstream, Energy Production and Utilities, Water and Waste Services, Food and Beverages, Paper and Wood Products, Building materials, Chemical products, Coal Mining, Mining and metals, Oil and Gas – Upstream and Services, Pharma and biotechnology, Textiles, Accessories, Footwear and Jewellery, Tobacco, and Transportation. Therefore, those sectors may consider more closely following E4-1 recommendations even if most of it is voluntary in CSRD final version.

Description of the processes to identify and assess material biodiversity and ecosystem-related impacts, risks and opportunities (ESRS 2 IRO-1)

According to EFRAG, "in the absence of a yet to be established global set of relevant scenarios and following the principle-based approach as defined within this [draft] Standard, the undertaking may refer to the guidance provided by **TNFD**" to comply with ESRS 2 IRO-1 linked to biodiversity and ecosystems. If TNFD is not directly mentioned in the final version of ESRS 2 IRO-1 linked to E4, the **LEAP approach** is recommended: Locate (paragraph AR 7), Evaluate (paragraph AR 8) and Assess (paragraph AR 9).

In terms of tools and methods, when conducting the materiality assessment, EFRAG recommends undertakings to refer to the Tools Catalogue provided by TNFD¹².

EFRAG stated specific tools and methods to support compliance for this disclosure requirement:

- **ENCORE**: this free tool allows "exploration of future scenarios in terms of the potential impacts and dependencies of activities on biodiversity". It can serve as a screening of impacts and dependencies from production processes mapped with Global Industry Classification Standard (GICS) classification, including a four-level hierarchical structure with 11 sectors, 24 industry groups, 68 industries and 157 sub-industries.
- **WWF Risk Filter Suite**: this tool is free, web-based, and spatially explicit for corporate- and portfolio-level screening, prioritizing issues on impacts and dependencies. It includes the Water Risk Filter and Biodiversity Risk Filter.
- **IPBES**, "Methodological Assessment Report on Scenarios and Models of Biodiversity and Ecosystem Services", 2016: focusing on scenarios analysis, this guide can specifically support compliance with paragraph 18.

Policies related to biodiversity and ecosystems (E4-2)

EFRAG recommends companies to explain how policies are connected to and in alignment with the **Post-2020 Global Biodiversity Framework** and the **EU Biodiversity Strategy for 2030**.

Moreover, assessment requirement 13 states that the undertaking may disclose connections and alignment with other global goals and agreements such as the **SDGs** 2, 6, 14 and 15 or any other well established global convention related to biodiversity and ecosystems."

Actions and resources related to biodiversity and ecosystems (E4-3)

When disclosing under paragraph 28 (b) regarding biodiversity offsets, EFRAG recommends undertakings to refer to "the **BBOP Principles on Biodiversity Offsets**" (2018), "**IUCN Policy on Biodiversity Offsets**" (2016), and "Guidance on achieving no net loss or net gain of biodiversity and ecosystem services" (2020, EU document, **IEEP**).

¹² <https://tnfd.global/learning-tools/tools-catalogue/>

Targets related to biodiversity and ecosystems (E4-4)

Two methods can be used according to EFRAG to answer biodiversity targets requirements:

- **SBTN**: building on the momentum of the SBTi, the SBTN is working to enable companies and cities to set targets for climate and nature. It can be assumed that the resources provided by this framework, including other methods and tools, are relevant too: SBTN onboarding support for companies¹³.
- **SDPI**: the Sustainable Development Performance Indicators (SDPI) produced by UNRISD measure, in an authentic way, the sustainability performance of economic entities, including both for-profit enterprises and social and solidarity economy organizations.

Moreover, “any other guidance with a scientifically acknowledged methodology that allows the setting of science-based targets by identifying ecological thresholds and, if applicable, entity-specific allocations” is recommended.

Impact metrics related to biodiversity and ecosystems change (E4-5)

When identifying relevant impact metrics, EFRAG recommends the undertakings to refer to the biodiversity and ecosystems-related indicators listed for the **SDG**, **IPBES** Assessment Report 2019 and the Report on biodiversity measurement approaches developed by the **Business for Biodiversity Platform**.

Moreover, some methods are recommended to comply with specific datapoints:

- Paragraph 36: “with regard to life cycle assessment for land-use, the undertaking may refer to the “Land-use related environmental indicators for Life Cycle Assessment” by the **Joint Research Center**” (AR 31).
- Paragraph 33: “with regard to metrics on the extent and condition of ecosystems, useful guidance can be found in the work of the United Nations System of Environmental Economic Accounting Ecosystem Accounting (**UN SEEA EA**)” (AR33).
- Paragraphs 33 a-d: “the undertaking may disclose in units of area (e.g., m2 or ha) on land-use using guidance provided by the Eco-Management and Audit Scheme (**EMAS**)” (AR34).

Table 9: Match between ESRS E4 disclosure requirements with tools and methods referenced in EFRAG guidelines. [Links with biodiversity footprinting or natural capital accounting.](#)

ESRS code	Disclosure category	Disclosure title	Recommended tools and methods by EFRAG
E4-1	Strategy	Transition plan	Kunming-Montreal Global Biodiversity Framework Sustainable Development Goals EU Biodiversity Strategy for 2030 Planetary boundaries framework TNFD
ESRS 2: SBM-3		Strategy and business model	
ESRS 2: IRO-1	Impacts, risks, and opportunities	Double materiality assessment	TNFD and associated resources IPBES, “Methodological Assessment Report on Scenarios and Models of Biodiversity and Ecosystem Services”, 2016 WWF Risk Filter Suite ENCORE
E4-2		Policies	Kunming-Montreal Global Biodiversity Framework EU Biodiversity Strategy for 2030 SDG
E4-3		Actions and resources	BBOP, IUCN, IEEP (on biodiversity offsets)
E4-4		Targets	SBTN

¹³ <https://sciencebasedtargetsnetwork.org/resources/>

			SDPI
E4-5	Metrics and targets	Impact metrics	SDG IPBES Business for Biodiversity Platform Joint Research Center UN SEEA EA EMAS
E4-6		Anticipated financial effects	

Data sources recommended by standards (link to WP1)

A similar approach to the previous section is followed here to identify data sources that corporates could use to align with ESRS E4 voluntary and mandatory requirements.

This section aims to inform WP1 by considering what existing recommended data sources may be considered for development of the work in the project going forward.

Transition plan (E4-1)

EFRAG refers to the **EU Nature Restoration Plan** as an example to suggest targets that would be part of the transition plan. Some of them could be easily translated in a corporate environment such as:

- The risk and use of chemical pesticides is reduced by 50%, and the use of more hazardous pesticides is reduced by 50%
- At least 25% of agricultural land is under organic farming management, and the uptake of agro-ecological practices is significantly increased.

Such targets can inform the data setting for biodiversity targets.

Description of the processes to identify and assess material biodiversity and ecosystem-related impacts, risks and opportunities (ESRS 2 IRO-1)

Across all double materiality steps, EFRAG recommends the use of **ENCORE**.

Datasets can also be found in the Tools Catalogue provided by **TNFD**¹². Then, some specific ones are mentioned in EFRAG's application requirements, mapping the first three steps of the LEAP approach, recommended by TNFD:

Locate

The following databases support the alignment towards the first pillar of the LEAP approach:

- The **Protected Planet database**, a source of data on protected areas and other effective area-based conservation measures (OECMs), the Natura 2000 network of protected areas
- The Common Database on Designated Areas (**CDDA**) as the official source of protected area information from European countries to the World Database of Protected Areas (WDPA)
- The **Global Biodiversity Information Systems**
- The **Ocean Data Viewer**

- The tool “**Trase**” on deforestation risk to assess raw materials
- The tool “**Bioscope**” to assess the impact drivers of biodiversity change for raw materials and to address the materiality of impact drivers of biodiversity change by raw material.

Evaluate and assess

Regarding the steps 2 and 3 of the LEAP approach, the following databases are recommended:

- **WWF Risk Filter Suite**
- **Key Biodiversity Areas**
- **IUCN Red List of Species**
- The **Living Planet Database**
- The **International Waterbird Census Database**
- National, European or international specialized databases (for example **Global Forest Watch**)

Other databases

Furthermore, EFRAG recommends the use of:

- The **Globio model**: “allows trends in biodiversity and ecosystem services to be modelled under future socio-economic development scenarios, as well as different policy interventions”.
- The **EXIOBASE**: “a global, detailed Multi-Regional Environmentally Extended Supply-Use Table (MR-SUT) and Input-Output Table (MR-IOT). The MR-IOT that can be used for the analysis of the environmental impacts associated with the final consumption of product groups”.

Policies related to biodiversity and ecosystems (E4-2)

When it comes to biodiversity and ecosystem protection policy covering operational sites owned, leased, or managed in or near a biodiversity sensitive area, EFRAG precises that “protected area” means designated areas in the European Environment Agency’s Common Database on Designated Areas (**CDDA**).

Targets related to biodiversity and ecosystems (E4-4)

EFRAG recommends the use of **SBTN** when it comes to target setting. Therefore, it can be assumed that the resources provided by this framework, including data, are relevant too: SBTN onboarding support for companies¹³.

Impact metrics related to biodiversity and ecosystems change (E4-5)

EFRAG states that the baseline is necessary to inform impact assessment and management planning, as well as monitoring and adaptive management. The undertaking may refer to the work in “Good Practices for the Collection of Biodiversity Baseline Data” (**Gullison, 2015**) for baseline creation, and in particular the checklist available on page 18.

Moreover, assessment requirement 28 precises the following: “data or mechanisms used should be supported by well-established organisations and updated over time. Robust modelled data and expert judgment can be used where data gaps exist. The methodology shall be sufficiently detailed to allow for meaningful comparison of impacts and mitigation activities over time. Information gathering processes and definitions must be systematically applied. This enables a meaningful review of the undertaking’s performance over time and helps internal and peer comparison”.

Table 10: Match between ESRS E4 disclosure requirements with data sources referenced in EFRAG guidelines. [Links with biodiversity footprinting or natural capital accounting.](#)

ESRS code	Disclosure category	Disclosure title	Recommended data sources by EFRAG
E4-1	Strategy	Transition plan	EU Nature Restoration Plan
ESRS 2: SBM-3		Strategy and business model	
ESRS 2: IRO-1	Impacts, risks, and opportunities	Double materiality assessment	ENCORE TNFD and associated resources Protected Planet database Common Database on Designated Areas Global Biodiversity Information Systems Ocean Data Viewer Trase Bioscope WWF Risk Filter Suite Key Biodiversity Areas IUCN Red List of Species Global Forest Watch Living Planet Database International Waterbird Census Database GLOBIO EXIOBASE
E4-2		Policies	CDDA
E4-3		Actions and resources	
E4-4		Targets	SBTN
E4-5	Metrics and targets	Impact metrics	Gullison, 2015 : Good Practices for the Collection of Biodiversity Baseline Data¹⁴
E4-6		Anticipated financial effects	

Summary of ESRS requirements and links to BF and NCA (link to WP2)

This section summarizes the potential for using BF and NCA criteria to support corporate disclosures under the European Sustainability Reporting Standards. It aims to inform the development of WP2, considering how the project outputs may be used to improve corporate reporting. The ESRS include mandatory reporting requirements for companies which have biodiversity as a material topic. The following major themes emerge as opportunities to incorporate BF and NCA principles for corporate reporting:

- Using NCA for developing inventories of material operational sites that negatively affect biodiversity and/or are in or close to protected areas. Disclosing area of sites is mandatory. Ecosystem quality indicators are voluntary.
- Material impacts for own operations and in the value chain need to be established, for which BF is a relevant approach.

¹⁴ Gullison, R.E., J. Hardner, S. Anstee, M. Meyer. 2015. Good Practices for the Collection of Biodiversity Baseline Data. Prepared for the Multilateral Financing Institutions Biodiversity Working Group

- Material dependencies in the value chain need to be tracked, for which ecosystem service accounting using NCA can be used.
- Performance over time needs to be tracked. E4-2, §23 specifically refers to *regular monitoring and reporting of biodiversity status and gains and losses* which can be achieved via NCA. Performance tracking is also relevant for nature transition plans (currently voluntary).

Table 11: Reporting requirements under the EU Sustainability Reporting Standards for Biodiversity (ESRS E4, incl. links to other ESRS). **Green = mandatory disclosure**; **Orange = mandatory disclosure if material**; **Blue = voluntary requirement**.

Reporting requirements with links to BF or NCA		Reference to ESRS	Link to biodiversity footprinting	Link to natural capital accounting
Strategy	Resilience of strategy and business model to biodiversity and ecosystems-related physical, transition and systemic risks and opportunities	E4-1, §13	Inputs from assessment of impacts and dependencies would be used to assess resilience.	
	Transition plan with respect to GBF, EU Biodiversity Strategy 2030, and planetary boundaries	E4-1, §15 E4-1, AR1	Metrics and tools used to measure progress	Tracking of performance versus targets over time
	Material impacts, dependencies, risks, whether and how they have been assessed in the value chain, and how they interact with its strategy and business model	E4-1 → ESRS 2, SBM-3, §48 ESRS E4 IRO-1, §17 and ESRS 2, IRO-1, §53	Assessment of material impacts in the value chain	Linking company ecosystem service dependency to natural assets
	List of material sites in own operations negatively affecting biodiversity Sites in or near biodiversity-sensitive areas and whether activities negatively affect said areas	ESRS E4 SBM-3, §16 ESRS E4 IRO-1, §19	Establishing sites with material impacts	Accounting over time and space for ecosystem extent and condition, threatened species Linking company ecosystem service dependency to natural assets
Policies	Policies relating to production, and raw materials sourcing or consumption from ecosystems that are managed to maintain or enhance conditions for biodiversity by <i>regular monitoring and reporting of biodiversity status and gains or losses</i>	E4-2, §23 E4-2, AR 12		Monitoring and reporting of biodiversity status and reporting of gains and losses
Actions	Key actions in relation to biodiversity and ecosystems	E4-3, §27 (→ ESRS 2, MDR-A, §67)	Assessment and tracking of progress over time for key actions	
Targets	Presence/absence of measurable, outcome-oriented and time-bound targets on material sustainability matters	ESRS 2, MDR-T, §79 ESRS 2, MDR-T, §80, (b)	Quantification of impacts	Tracking of progress over time versus a baseline
	Tracking of effectiveness of policies and actions	E4-4, §32		
Metrics	If located in or near biodiversity-sensitive areas (protected areas), the number and area (in ha) of sites owned, leased, or managed shall be reported.	E4-5, §35		Asset inventory with regard to protected areas incl. extent
	If there are material impacts with regards to land-use change, or impacts on the extent and condition of ecosystems, their land-use based on a Life Cycle Assessment may be disclosed.	E4-5, §36	Use of LCA for assessment of land use impacts	Consistent accounting over time.

	If the undertaking has concluded that it directly contributes to the impact drivers of land use change, freshwater-use change and/or sea-use change, it shall report relevant metrics.	E4-5, §38	Use of BF methods for reporting metrics.	Reporting of changes over time is required.
	Report on risks and metrics used to manage the spread of invasive species. The organization may disclose 1) number of invasive alien species; 2) area covered by invasive alien species	E4-5, §39 E4-5, AR 32		Tracking invasive species abundance or coverage
	<p>If there are material impacts on species, the organization can report <i>for own operations</i>:</p> <ul style="list-style-type: none"> - GHG emissions, Pollution to air, water and soil; Marine resources; Waste generation - Population size; range within specific ecosystems as well as extinction risk; - changes in the number of individuals of a within a specific area; - the threat status of species and how activities/pressures may affect the threat status; - changes in the relevant habitat for a threatened species; 	E4-5, §40 ESRS E1, E2, E3, E6	Pressure metrics under ESRS E1, E2, E3, E6 (climate change, pollution, water use, circular economy)	Species accounts, habitat accounts
	<p>If the undertaking identified material impacts related to ecosystems, it may disclose <i>for own operations</i>:</p> <ul style="list-style-type: none"> - metrics that measure area coverage of a particular ecosystem; - metrics that measure ecosystem condition <ul style="list-style-type: none"> o quality relative to a reference state o multiple species within an ecosystem (e.g. species richness and abundance) o structural components of condition such as habitat connectivity; 	E4-5, §41	Assessment of ecosystem state and condition	Tracking of ecosystem extent and condition accounts over time

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Co-funded by
the European Union



UK Research
and Innovation

This work was co-funded by UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee.

Project funded by



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
**State Secretariat for Education,
Research and Innovation SERI**