Additional sector guidance
Forestry, pulp and paper

June 2024
Version 1.0

SICS® industries:
Forestry management (RR-FM)
Pulp and paper products (RR-PP)
Building products and furnishings (CG-BF)

tnfd.global

Taskforce on Nature-related Financial Disclosures

Contents

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1. Introduction

1.1. The purpose of this guidance

In September 2023, the TNFD published its recommendations for disclosure of nature-related issues and supporting implementation guidance. This document provides sector-specific additional guidance for the forestry, pulp and paper sector, covering:

- The assessment of nature-related issues using the TNFD's LEAP approach (Section 2); and
- The disclosure of sector-specific metrics in line with the TNFD's recommended approach to metrics (Section 3).

The TNFD's Guidance on the identification and assessment of nature-related issues: The LEAP approach is designed as an iterative process – across business locations and business lines – in line with established risk management processes and corporate reporting cycles. Organisations may choose to start with a narrow scope for a LEAP assessment, and gradually expand the scope of the assessment as they gain experience and insight.

The TNFD recognises that there can be significant differences across sectors for corporates applying the LEAP approach. It has published this additional guidance with significant input from a range of knowledge partners and market participants, to help forestry, pulp and paper sector participants apply the LEAP approach to their context. The overall structure of the LEAP approach is set out in Figure 1. This guidance follows that structure and Table 1 sets out the elements of LEAP for which this document provides additional guidance.

The Taskforce also recognises that investors and other stakeholders require quantitative information to compare performance and nature-related issues within sectors. To facilitate that sector-level analysis, this guidance also includes:

- Guidance on the application of the core global disclosure indicators and metrics to the forestry, pulp and paper sector (Section 3.1); and
- Core and additional sector disclosure indicators and metrics (Sections 3.2 and 3.3).

Figure 2 provides an overview of the TNFD disclosure measurement architecture and where indicators and metrics are listed in the TNFD recommendations and relevant sector guidance.

Figure 1: The TNFD approach for identification and assessment of nature-related issues – LEAP

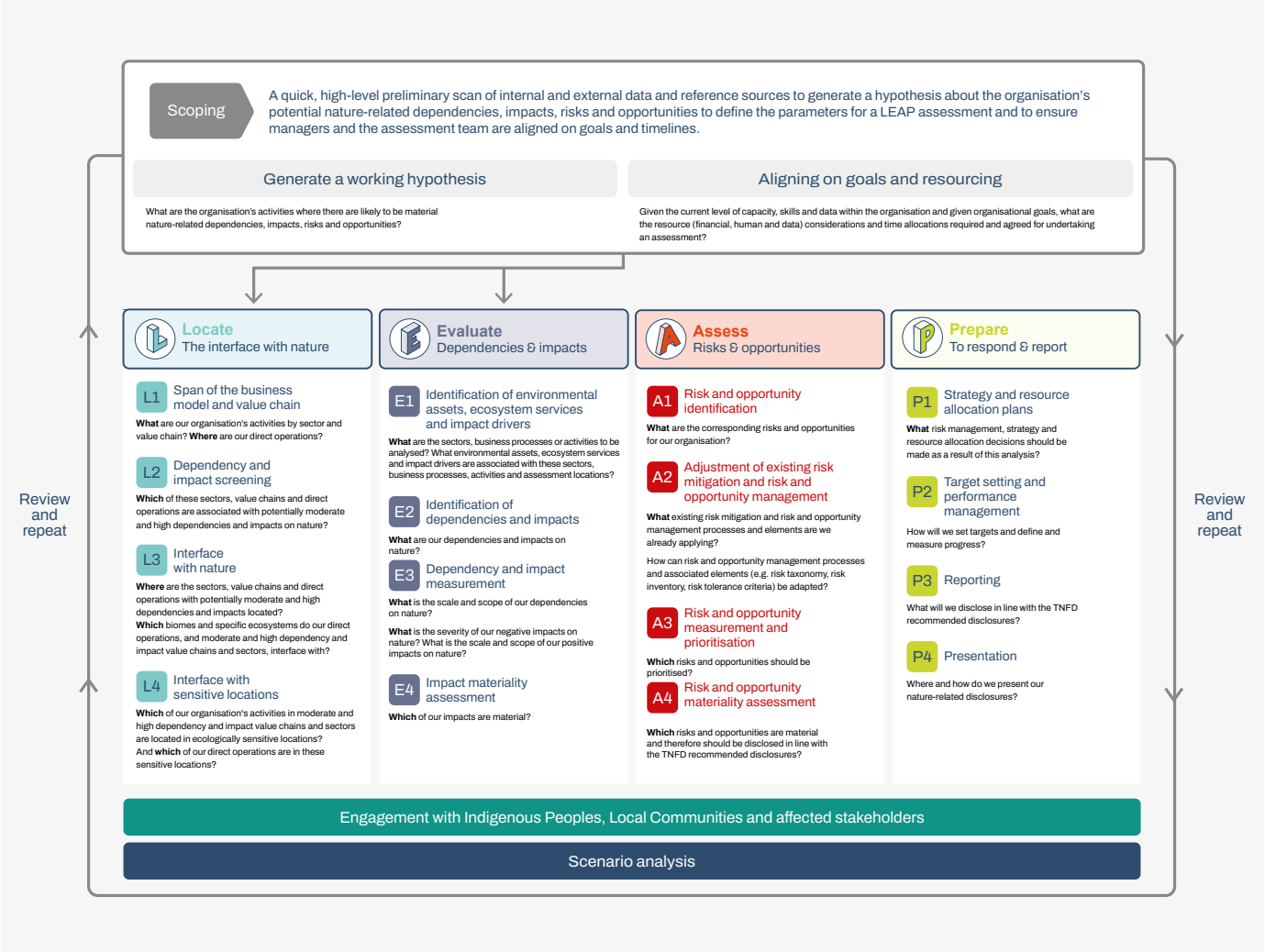
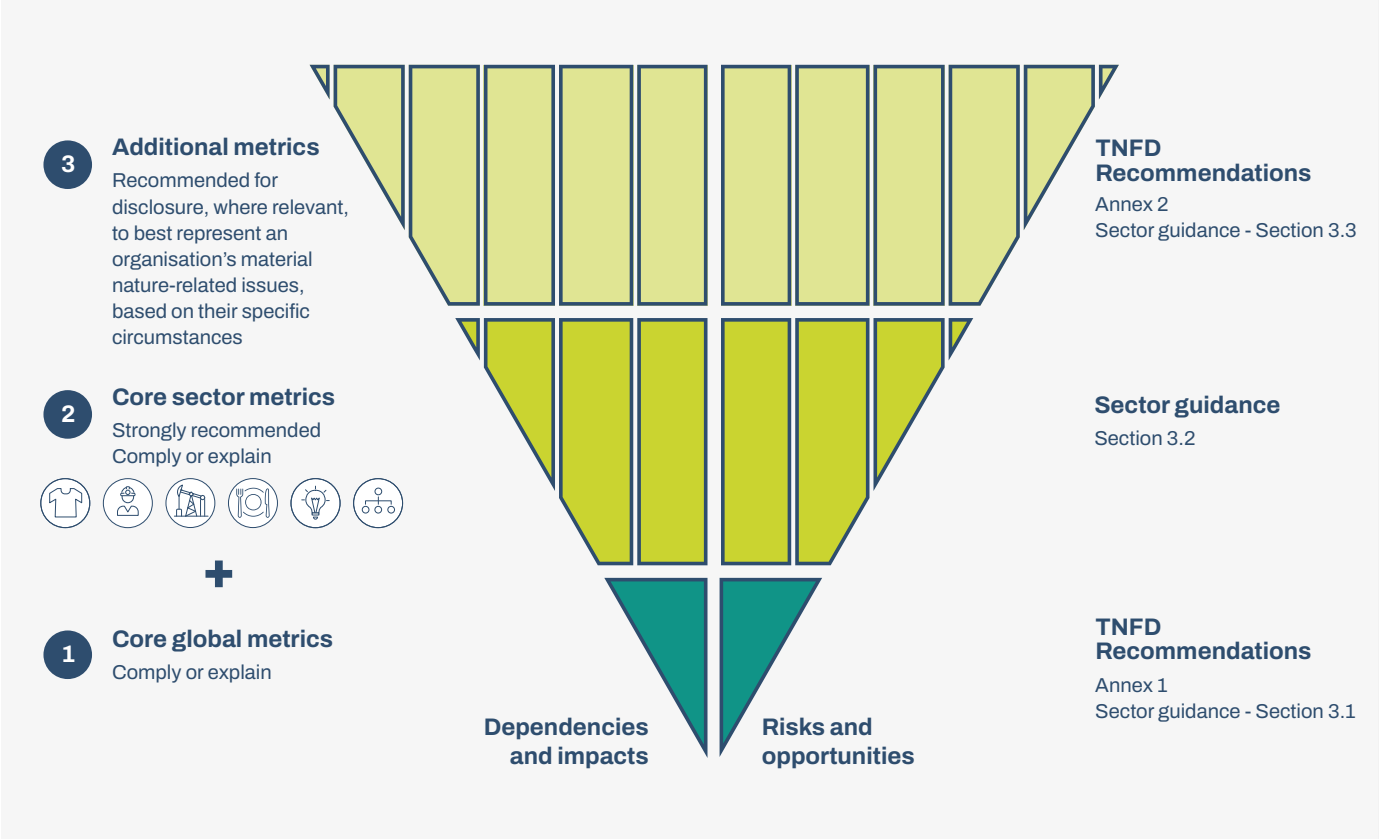


Figure 2: TNFD disclosure metrics architecture signposted to metrics lists



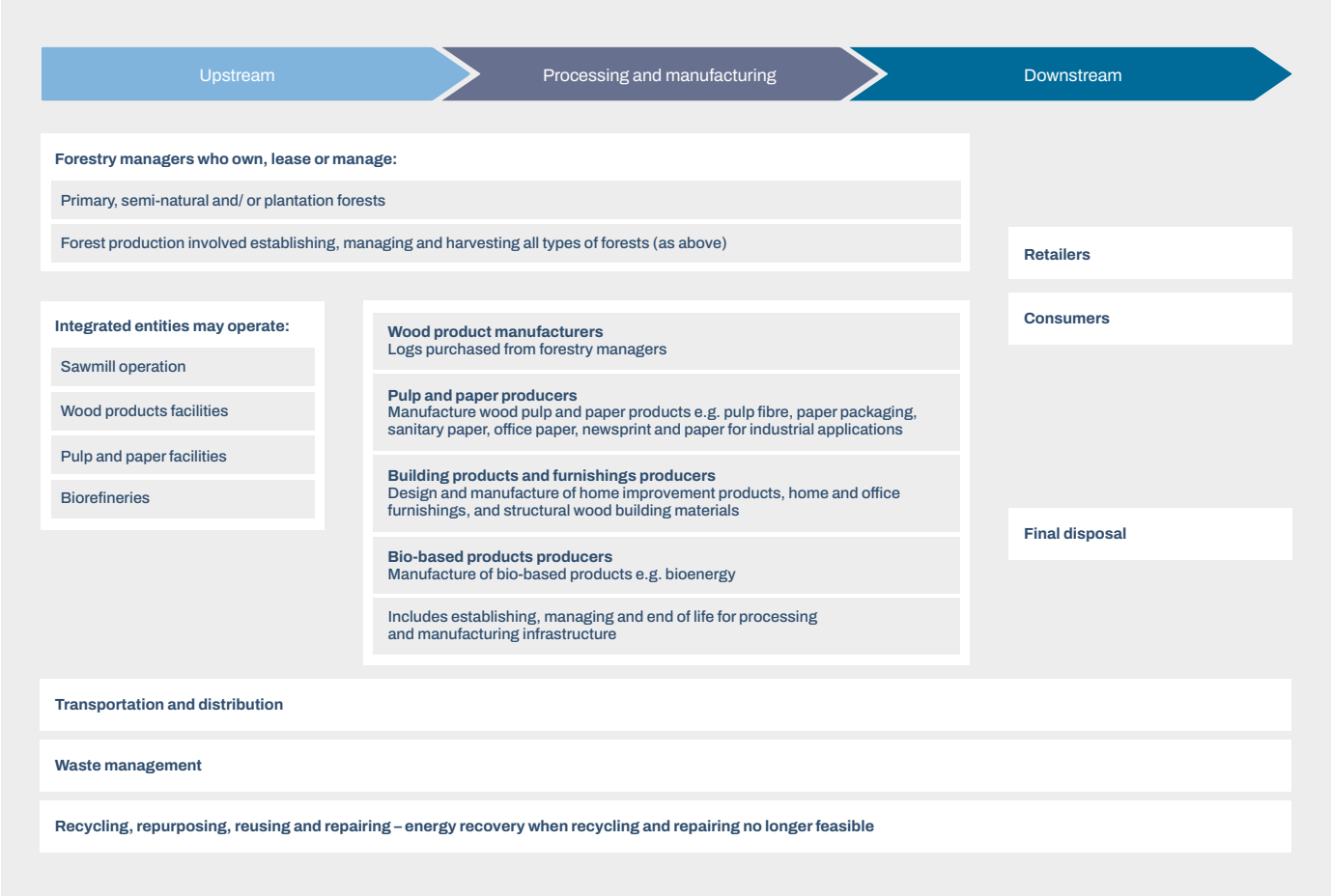
The guidance in Section 3 on the application of the TNFD core global metrics for this sector, as well as the core and additional sector metrics, expand on the disclosure indicators and metrics outlined in Annexes 1 and 2 of the TNFD recommendations. The TNFD has incorporated and sought to build on existing industry standards and disclosure metrics wherever possible to build on current data collection and reporting practices and minimise additional assessment and reporting costs.

1.2. Audience for this guidance

This guidance covers the value chain of forest products, with a major focus on organisations in the Sustainable Industry Classification System® (SICS®) developed by the Sustainability Accounting Standards Board (SASB) Forestry Management, Pulp and Paper Products, and Building Products and Furnishings industries (Figure 3).[1] For simplicity, all organisations in either or all of the forestry management, pulp and paper products, and building products and furnishings industries (Box 1) are referred to as 'forestry, pulp and paper sector organisations' in this guidance. Note that issues highlighted in this guidance are relevant for all actors operating in the forest products value chain.

1 SASB (2018) SASB's Sustainable Industry Classification System (SICS).

Figure 3: Typical business activities in the value chain of the forestry, pulp and paper sector



Box 1: SICS® industries in the scope of this guidance document

Forestry Management (RR-FM)	Forestry Management industry entities own or manage natural and planted forestry lands and timber tracts or operate non-retail tree nurseries and rubber plantations. The industry conducts operations on lands that can be entity-owned or leased from public or private landowners. Entities typically sell timber to wood products manufacturers, pulp and paper producers, energy producers, and a variety of other customers. Although some integrated entities also may operate sawmills, wood products facilities, or pulp and paper facilities, sustainability issues arising from these activities are addressed in the Building Products and Furnishings (CG-BP) and Pulp and Paper Products (RR-PP) industries.[2]
Pulp and Paper Products (RR-PP)	Pulp and Paper Products industry entities manufacture a range of wood pulp and paper products, including pulp fibre, paper packaging and sanitary paper, office paper, newsprint, and paper for industrial applications. Entities in the industry typically function as business-to-business entities and may have operations in multiple countries. Although some integrated entities own or manage timber tracts and are engaged in forest management, sustainability issues arising from these activities are addressed in the Forestry Management (RR-FM) industry.
Building Products and Furnishings (CG-BF)	The Building Products and Furnishings industry comprises companies involved in the design and manufacturing of home improvement products, home and office furnishings, and structural wood building materials. Companies typically sell their products through distribution channels to retail stores or through independent or company-owned dealerships.

The examples provided in this guidance for the forestry, pulp and paper sector are intended to be illustrative. They are not exhaustive, universally applicable or recommended by the TNFD as examples of measures for all entities within the industry. Each company's context, location and nature-related interactions are unique. The TNFD encourages all companies to consult additional relevant sources, including scientific references and relevant industry standards or best practice guides, and conduct thorough assessments to identify and assess nature-related dependencies, impacts, risks and opportunities specific to their operations and value chains. This guidance aims to support, not replace, a tailored assessment, which will be necessary for each entity.

2 Note that rubber plantations are not covered by this guidance

This guidance is a supplement to the TNFD's Guidance on the identification and assessment of nature-related issues: The LEAP approach and should be read in conjunction with that guidance.

Table 1: Areas of LEAP with additional guidance for the forestry, pulp and paper sector in this guidance document

Scoping	✓

L1		E1	✓	A1	✓	P1	✓
L2	✓	E2	✓	A2	✓	P2	✓
L3	✓	E3	✓	A3		P3	
L4	✓	E4		A4		P4	

2. Sector-specific LEAP assessment guidance

2.1. Scoping a LEAP assessment

Working hypothesis generation:

What are the organisation's activities where there are likely material nature-related dependencies, impacts, risks and opportunities?

Goals and resourcing alignment:

Given the current level of capacity, skills and data within the organisation and given organisational goals, what are the resource (financial, human and data) considerations and time allocations required and agreed for undertaking an assessment?

Table 2 provides additional questions that can be used by forestry, pulp and paper sector organisations to help scope their nature-related assessment using the LEAP approach.

This scoping section primarily focuses on the upstream parts of the value chain as organisations operating further downstream in the value chain can refer to the TNFD's Guidance on the identification and assessment of nature-related issues: The LEAP approach.

Table 2: Questions for forestry, pulp and paper sector organisations to help scope a LEAP assessment

Direct operations	• Which forests are affected by forest management practices carried out by other parties? • Where is your organisation responsible for/influential in forest management practices carried out by other parties, such as contractors? • What is your forest (e.g. primary, semi-natural or plantation) and industry type? Consider how that will result in materially different assessment outcomes and impacts on nature.
Upstream	• What is the right level of granularity for assessing, and/or assets associated with, forest products sourced from areas where there are likely to be material nature-related dependencies, impacts, risks and opportunities?
Downstream	No additional sector-specific questions

Upstream considerations

Different land tenure arrangements exist in the forestry sector that may affect how an organisation considers its responsibility for, or leverage over, potential impacts on nature and the dependencies, risks and opportunities to which it may be exposed. The TNFD recommends taking an inclusive approach to these considerations when scoping a LEAP assessment. Box 2 provides an illustrative example.

Box 2: Defining direct operations and upstream according to types of control

Organisation A owns both private forestlands and long-term forest leases. It also purchases timber from other landowners within a larger mosaic of forestlands. These include protected areas and areas owned and controlled by other stakeholders and rightsholders, including government and Indigenous Peoples and Local Communities. Organisation A also has a joint venture with an Indigenous group, in which they have rights to harvest timber on land controlled by their partner in exchange for a 50% share in the net revenue.

When defining the scope of its LEAP assessment, Organisation A considers its private forestlands to be under direct operational control. In this case, long-term forest concessions that are leased from the government (where the organisation owns and controls the standing timber and is responsible for land stewardship) are considered capital leases and therefore also under direct operational control.

Timber sales or joint ventures in which the organisation has the rights to harvest timber from lands controlled by another entity are considered operating leases. These are therefore defined as part of the organisation's upstream value chain. Their inclusion within the LEAP assessment depends on whether these locations are likely to create material dependencies, impacts, risks or opportunities for the organisation.

No additional guidance on scoping is provided for forestry, pulp and paper sector organisations with operations further downstream in the forest products value chain, such as manufacturers.

Forestry, pulp and paper sector organisations may find it useful to refer to the following resources for additional guidance and data when scoping their assessment:

- The Greenhouse Gas (GHG) Protocol: A corporate accounting and reporting standard (2001) provides a description of different types of control that a company could have;
- Technical guidance for Science Based Targets for Nature – Step 1 (2023) can help to identify what may be relevant to include in the scope of your company's assessment;
- GHG protocol dealing with leases can help with the identification of leased assets and their potential inclusion in the scope of your company's assessment;

- Geospatial asset location data for direct operations, direct procurement and/or for suppliers (where available);
- Forest management or product certification databases that list the locations of suppliers' operations as well as chain of custody certificates; and
- Local or regional conservation management plans or strategies that specify land management objectives to be considered when assessing nature-related issues.

When scoping an assessment, the LEAP assessment team should use these datasets to conduct a basic scan of the organisation's activities to help inform and create a working hypothesis, rather than to conduct a deeper analysis. The team will return to these datasets in the Locate phase to undertake a more detailed analysis.

2.2. Locate the organisation's interface with nature

This section provides additional guidance to help forestry, pulp and paper sector organisations with the Locate phase of the LEAP approach.

L1 L1: Span of the business model and value chain

Guiding questions:

What are our organisation's activities by sector, value chain and geography? Where are our direct operations?

Refer to the Scoping section in this document for additional sector-specific information.

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

L2 L2: Dependency and impact screening

Guiding question:

Which of these sectors, value chains and direct operations are associated with potentially moderate and high dependencies and impacts on nature?

Figures 4a, 4b, 5a, and 5b below present examples of ecosystem services that are common dependencies and impact drivers for forestry and paper sector organisations. This table can be used to help screen an organisation's value chain stages for potentially moderate and high dependencies on nature.

Figure 4a: Materiality ratings of ecosystem services the forestry and paper sector typically depends on (based on 2018-2023 version of ENCORE)

Stages of the value chain	Bioremidiation	Climate regulation	Filtration	Flood & storm protection	Ground water	Mass stabilisation and erosion control	Surface water	Water flow maintenance	Water quality	Fibres and other materials	Pollination	Soil quality	Diseases/pest control
Forest production	M	VH	VL	H	VH	H	VH	H	NA	VH	H	H	H
Processing & manufacturing	VL	VL	VL	M	H	L	M	M	L	H	NA	NA	NA

Key: Very High (VH) High (H) Medium (M) Very Low (VL) Low (L) Not Applicable (NA)

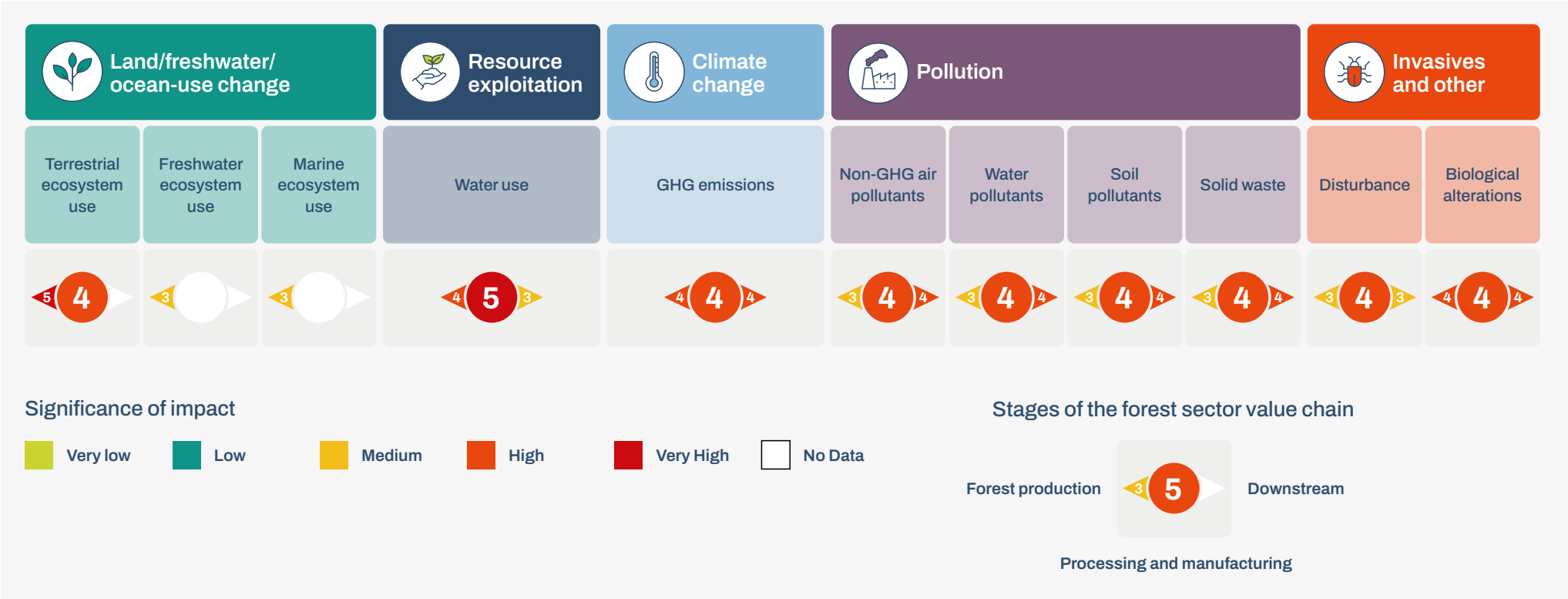
Note: The ecosystem service classification used by the 2018-2023 version of the ENCORE knowledge base, the source of this table, differs from the classification used by TNFD guidance, based on the UN SEEA. A correspondence mapping across these classifications is available from UN SEEA. Note:The 2018-2023 version of the ENCORE knowledge base. does not consider consumer and end-of-life stages.

Figure 4b: Materiality ratings of ecosystem services the forestry and paper sector typically depends on (based on 2024 version of ENCORE)

	ISIC group/class	Silviculture and other forestry activities	Support services to forestry	Sawmilling and planing of wood	Manufacture of furniture	Manufacture of paper and paper products	Other land transport
Provisioning services	Water supply	High	High	Low	Medium	Medium	Very low
	Other provisioning services	Low	Low	N/A	N/A	N/A	Medium
	Biomass provisioning	Very high	Medium	N/A	N/A	N/A	N/A
	Genetic material	Very high	Medium	N/A	N/A	N/A	N/A
Regulating & maintenance services	Solid waste remediation	Medium	Very low	Medium	Medium	Medium	ND
	Soil and sediment retention	Very high	Medium	Low	Low	Low	Low
	Water purification	Very high	Very high	N/A	Medium	N/A	ND
	Soil quality regulation	Very high	N/A	N/A	N/A	N/A	N/A
	Other regulating and maintenance service	ND	N/A	Low	Low	Low	Very low
	Biological control	High	Low	Very low	N/A	Very low	ND
	Air filtration	Medium	ND	Medium	Very low	Very low	Very low
	Flood control	High	Very low	Medium	Medium	Medium	Medium
	Global climate regulation	Very high	Very low	Very low	Very low	Very low	Medium
	Nursery population and habitat maintenance	High	ND	N/A	N/A	N/A	N/A

	ISIC group/class	Silviculture and other forestry activities	Support services to forestry	Sawmilling and planing of wood	Manufacture of furniture	Manufacture of paper and paper products	Other land transport
Regulating & maintenance services	Noise attenuation	N/A	N/A	Very low	Very low	Very low	Very low
	Other regulating and maintenance service	N/A	N/A	N/A	Very low	N/A	N/A
	Local (micro and meso) climate regulation	Very high	Medium	Low	Low	Low	Low
	Pollination	Medium	N/A	N/A	N/A	N/A	N/A
	Storm mitigation	Medium	Very low	Medium	Medium	Medium	Medium
	Water flow regulation	Medium	Medium	Medium	Medium	Medium	Low
	Rainfall pattern regulation	Very high	Very high	Very low	Very low	Medium	Medium
Cultural services	Visual amenity services	N/A	N/A	N/A	N/A	N/A	Very high
	Spiritual, artistic and symbolic services	ND	N/A	N/A	N/A	N/A	N/A

Figure 5a: Impact drivers typically relevant for the forestry and paper sector



Note: SBTN's Sectoral Materiality Tool provides information on potential sector-level impacts on nature along different value chains. The ratings of the sector-level materiality assessment above represent a sectoral average based on data from the 2018-2023 version of the ENCORE knowledge base (direct operations and upstream) and EXIOBASE (upstream). The most recent version at the time of assessment only provided information for direct operations and upstream, so data from the Forest Products Sector Guide to the Natural Capital Protocol were used to fill the gap. The significance of impact from impact driver categories factors in the frequency, timeframe and severity of impacts, and varies along the different stages of the forestry, pulp and paper sector value chain. The figure shows that all impact driver categories, except for freshwater ecosystem use and marine ecosystem use (where data is not yet available), are relevant for the forestry, pulp and paper sector in at least one stage of the value chain.

Source: WBCSD-FSG (2022) Forest Sector Nature Positive Roadmap, *p18, adapted from SBTN's Sectoral Materiality Tool and the Natural Capital Protocol.*

Figure 5b: Materiality ratings for impact drivers typically relevant for the forestry and paper sector (based on 2024 version of ENCORE)

	ISIC Group	Silviculture and other forestry activities	Support services to forestry	Manufacture of furniture	Manufacture of paper and paper products	Sawmilling and planing of wood	Other land transport
Land, freshwater and ocean use change	Area of land use	Very high	N/A	Low	Low	Low	Medium
	Area of freshwater use	N/A	N/A	N/A	N/A	N/A	N/A
	Area of seabed use	N/A	N/A	N/A	N/A	N/A	N/A
Climate change	Emissions of GHG	ND	Medium	Medium	Medium	Medium	Medium
Pollution/pollution removal	Emissions of non-GHG air pollutants	Very high	Low	High	High	Medium	Low
	Disturbances (e.g noise, light)	High	Medium	Medium	Medium	Medium	Medium
	Emissions of toxic soil and water pollutants	High	Medium	High	Medium	Very low	Low
	Emissions of nutrient soil and water pollutants	High	N/A	N/A	N/A	N/A	Medium
	Generation and release of solid waste	Low	Low	Low	High	Medium	Very low

	ISIC Group	Silviculture and other forestry activities	Support services to forestry	Manufacture of furniture	Manufacture of paper and paper products	Sawmilling and planing of wood	Other land transport
Resource use/ replenishment	Other biotic resource extraction (e.g. fish, timber)	ND	ND	N/A	N/A	N/A	N/A
	Other abiotic resource extraction	N/A	N/A	N/A	N/A	N/A	N/A
	Volume of water use	Medium	Medium	Medium	Medium	Medium	Low
Invasive alien species introduction/removal	Introduction of invasive species	High	Medium	N/A	N/A	ND	Low

N/A = Non-applicable, ND = No data

Source: ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (Unpublished, Expected 2024). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. Cambridge, UK: the ENCORE Partners. Available at: https://encorenature.org. *DOI:* https://doi.org/10.34892/dz3x-y059.

L3

L3: Interface with nature

Guiding questions:

Where are the sectors, value chains and direct operations with potentially moderate and high dependencies and impacts located?

Which biomes and specific ecosystems do our direct operations, and moderate and high dependency and impact value chains and sectors, interface with?

Organisations operating in the forestry, pulp and paper sector value chain should consider different scales when identifying or locating business operations. For example, an organisation should consider not only forest management units but also the surrounding landscapes that may affect the nature-related issues of these forest management units.

Organisations identifying relevant biomes, as part of their assessments, should consider both natural primary and secondary growth forests and other critical ecosystems.

Biomes of relevance (according to IUCN Global Ecosystem Typology)

The forestry, pulp and paper sector typically interfaces with the following biomes:

- Tropical and sub-tropical forests (T1);
- Temperate boreal forests and woodlands (T2);
- Shrublands and shrubby woodlands (T3);
- Savannas and grasslands (T4);
- Deserts and semi-deserts (T5);
- Polar/alpine (T6);
- Intensive land use systems (T7);
- Shoreline systems (MT1);
- Vegetated wetlands (TF1);
- Rivers and streams (F1);
- Lakes (F2);
- Artificial wetlands (F3);
- Subterranean freshwaters (SF1); and
- Artificial subterranean freshwaters (SF2).

This list can be considered as a reference. However, organisations should review all applicable biomes connected to their specific interfaces across their value chains and associated activities where significant dependencies and impacts on those biomes exist.

Organisations may refer to national and regional guidelines and legislations as well as third-party certification standards to identify and prioritise the most critical areas/biomes/ecosystems. Organisations may also refer to the TNFD biome guidance for further guidance when analysing their interfaces with these biomes.

Identifying specific locations for assessment – traceability considerations

Where granular location information and precise tracing information for upstream and downstream activities with potentially moderate and high dependencies and impacts on nature is not available, organisations can look at the likely dependencies and impacts associated with the relevant forest product types or geographic region.

Forestry, pulp and paper sector organisations may find it useful to follow SBTN's Step 3 Guidance on Nature Targets for Land to classify their activities into three levels of traceability and granularity:

- Production unit of origin;
- Sourcing area; and
- Limited/no traceability.

Where full traceability to specific locations is not possible, organisations should aim to acquire data for the fibre sourcing area (e.g. forest district, cooperative, jurisdiction) and work to improve the precision of the location data of their suppliers' operations through supplier engagement. This is particularly important when sourcing product types that are likely to be associated with elevated dependencies or impacts on nature (e.g. certified and non-certified materials sourced from certain regions).

If the initial analysis in L2 determined the site or asset was associated with low dependencies and impacts on nature, then using third-party certified chain of custody or other accepted fibre-sourcing certification standards may be sufficient to provide assurance of sustainable production in areas where there is less of a requirement for high scrutiny. It is recommended that organisations use the chain of custody and other fibre-sourcing certification standards at their disposal, but do not rely on certification as the sole method of tracing and identifying locations for further analysis, especially when sourcing product types, or from regions, associated with moderate or high dependencies and impacts on nature.

L4 L4: Interface with sensitive locations

Guiding questions:

For our organisation's activities in moderate and high dependency and impact value chains and sectors, which ones are located in ecologically sensitive locations? And which of our direct operations are in sensitive locations?

Direct operations

Table 3 provides additional guidance for forestry, pulp and paper sector organisations to consider when identifying their interface with sensitive locations. Forestry, pulp and paper sector organisations should also refer to the relevant TNFD biome guidance for further details on what are considered sensitive locations in each biome, as applicable.

When assessing whether locations are sensitive, organisations should ensure they are adopting an appropriate scale for their operations and for the larger regions from which they are operating or sourcing.

Table 3: Additional guidance for sensitive location identification for forestry, pulp and paper sector organisations

Area	Additional guidance for forestry and paper sector organisations
Biodiversity importance	Consider, whenever possible, landscape-level biodiversity objectives, such as forest age, class representation or habitat connectivity, which may be influenced beyond the direct location of operational activities. Consider areas highly relevant for threatened or endemic species. For example, caribou populations in North America[3] or koalas in Australia[4] face challenges due to increasing forest degradation.
Ecosystem integrity	Consider areas with medium or high risk of deforestation, forest conversion and forest degradation within the regions of operation. Even if ecosystem integrity is assessed as good within an organisation's territory, if the integrity of the surrounding forests is low (e.g. if there are high incidences of insect pests or poor habitat connectivity for an endangered species), then this should be considered a sensitive location. Soil and water quality are also aspects of ecosystem integrity that are of particular relevance to the sector and should be assessed.
Ecosystem service delivery importance	Forest ecosystems play a significant cultural and economic role for all landscape stakeholders and rights-holders. Organisations should therefore engage relevant stakeholders in line with the TNFD engagement guidance, including Indigenous Peoples and Local Communities, who may be affected by forest management activities. Organisations may wish to consult regional stakeholder lists.
High physical water risks	The effective use of water resources by other actors, and their cumulative water impacts within watersheds, should be considered carefully. Water-related ecosystem services are critical for forest production, processing and manufacturing activities of the forestry, pulp and paper sector value chain. Activities performed by other actors in the sector, or in other sectors, can also impact the availability and quality of water-related ecosystem services. These can include changes in hydrological function due to water-demanding species in plantations and altered patterns of precipitation associated with climate change.

In addition to the criteria outlined in the TNFD LEAP guidance, organisations should focus in particular on the identification of sensitive locations in geographies where:

3 Johnson, C. A., et al. (2022) Protecting boreal caribou habitat can help conserve biodiversity and safeguard large quantities of soil carbon in Canada. Scientific Reports 12(1), 17067.

4 Rus, A. I., et al. (2021) Habitat fragmentation affects movement and space use of a specialist folivore, the koala. Animal Conservation 24(1), 26–37.

Upstream

There is a risk of conversion/deforestation or forest degradation due to weak forest regulation and enforcement, and/or where suppliers are not certified by internationally recognised third-party certification systems.

Downstream

There is a risk of conversion/deforestation or forest degradation due to poor manufacturing and end-of-life practices and/or where there is weak legislation and enforcement, poor infrastructure, low recycling and low reuse of materials.

List of datasets and tools

Forestry, pulp and paper sector organisations operating upstream in the value chain, such as forest managers, typically maintain nature-related databases and/or make use of local datasets for their forest management planning and risk assessments. However, forestry, pulp and paper sector organisations further down the value chain, such as those sourcing fibre or manufacturing forest products, may need to rely on regional or global databases from external providers.

The following datasets may be particularly relevant to build on the initial scoping analysis:

- Geospatial asset location data for direct operations, direct procurement and/or for suppliers (where available);
- Forest management or product certification databases that list the locations of suppliers' operations as well as chain of custody certificates; and
- Local or regional conservation management plans or strategies that specify land management objectives.

2.3. Evaluate dependencies and impacts on nature

This section provides additional guidance to help forestry, pulp and paper sector organisations with the Evaluate phase of the LEAP approach.

E1

E1: Identification of environmental assets, ecosystem services and impact drivers

Guiding questions:

What are the sectors, business processes or activities to be analysed?

What environmental assets, ecosystem services and impact drivers are associated with these sectors, business processes, activities and assessment locations?

Table 4 identifies ecosystem services that are highly relevant for organisations in the forestry, pulp and paper sector and should be considered for a LEAP assessment. This includes ecosystem services that:

- Forestry, pulp and paper sector organisations commonly depend on;
- Can be promoted and enhanced by forestry activities; and
- Are typically present in areas where forestry, pulp and paper sector organisations operate.

Table 4: Ecosystem services the forestry, pulp and paper sector typically depends on

Ecosystem service category	Ecosystem services
Provisioning services	• Water supply; and • Biomass provisioning services (e.g. wood-provisioning services).
Regulating and maintenance services	• Soil and sediment retention; • Water flow regulation; and • Global climate change regulation.
Cultural services	• Recreation-related services; and • Spiritual, artistic and symbolic services and other cultural services (e.g. livelihoods for Indigenous Peoples and Local Communities).

Source: Adapted from ENCORE and WBCSD-FSG (2022) Forest Sector Nature Positive Roadmap

E2

E2: Identification of dependencies and impacts

Guiding question:

What are our dependencies and impacts on nature?

Table 5 includes a list of common nature-related dependencies and impacts along the forestry, pulp and paper sector value chain. The LEAP assessment team may choose to use these tables as a reference and to identify those common to their business activities, considering whether and how these apply to their specific circumstances.

Table 5: Examples of impact pathways for the forestry, pulp and paper sector

Nature-related issue	Pressure category	Pressure category	Examples of processes that can cause such impacts		
			Forest production	Processing & manufacturing	Downstream
Land/water/sea-use change	Terrestrial ecosystem use	• Biodiversity loss • Habitat loss	• Unsustainable forest management • Infrastructure construction • Road construction	• Infrastructure construction • Road construction	• Landfill establishment in sensitive areas
Resource exploitation	Water use	• Depletion of water resources • Habitat loss	• Water-demanding tree species and nursery irrigation in water stressed areas	• Bleaching of wood pulp	• Paper and board recycling
Climate change	GHG emissions	• Increased GHG concentration in the atmosphere	• Carbon released at harvest • Forestry machinery	• Wood and recovered fiber pulping • Burning biomass without carbon capture technology	• Waste decomposition in landfills • Transportation • Paper and board recycling

Nature-related issue	Pressure category	Pressure category	Examples of processes that can cause such impacts		
			Forest production	Processing & manufacturing	Downstream
Pollution	Non-GHG air pollutants	• Biodiversity loss • Habitat loss	• Forestry machinery • Fertilizers and pesticides	• Incineration of process residuals and waste	• Shipping • Waste incineration
	Water pollutants	• Changes in water quality • Eutrophication	• Fertilisers and pesticides	• Chemicals • Wastewater discharge	• Shipping • Waste decomposition in landfills
	Soil pollutants	• Changes in soil quality • Biodiversity loss	• Fertilisers and pesticides	• Chemicals • Wastewater discharge	• Waste decomposition in landfills
	Solid waste	• Increased GHG concentration in the atmosphere	• Solid waste disposal (e.g., unused fertilizers, pesticides and containers)	• Solid waste disposal (e.g., sludge)	• Hazardous and non-hazardous waste disposal in landfills
Invasives and other	Disturbances	• Habitat loss	• Light, noise and vibration pollution from harvesting	• Odor, noise and light pollution from industrial facilities	• Waste decomposition in landfills • Transportation
	Biological alterations/ interference	• Biodiversity loss • Habitat loss	• Introduction of unadapted non-native tree species	• Released water changing local water temperature	• Introduction of invasive species through transportation

Notes: Based on pressure categories from SBTN, equivalent to impact drivers in the TNFD guidance. The table focuses on negative impacts on nature.

Positive impacts are shown as opportunities linked to resource efficiency in Table 9.

Note that water extracted from rivers, for example for use in pulp mills, may be released back into the river after secondary or tertiary treatment.

Source: WBCSD-FSG (2022) Forest Sector Nature Positive Roadmap, *pp. 20 and 22.*

Box 3: Illustrative example identifying dependencies and impacts on nature for a forestry, pulp and paper sector organisation

Organisation A has identified its likely impact drivers and dependencies on ecosystem services by consulting the ENCORE database. Organisation A then reviews its assessment locations to confirm whether those impact drivers and ecosystem services are present.

It identifies that its impact drivers are potentially contributing to sediment loss and impacts on soil quality, and that this could also undermine soil quality in the future, on which its business depends. To do this, it uses a variety of resources, including geospatial tools, audit reports, industry assessments and stakeholder engagement.

Organisation A engaged with internal subject-matter experts, on-the-ground staff, Indigenous Peoples and Local Communities, and external stakeholders, e.g. affected communities and academics. Through this engagement, it identified topographies and soil types where certain harvesting practices were a potential contributing factor to sediment loss and erosion.

Organisation A also analysed its forest inventory and conducted a growth and drain analysis. This identified issues with forest productivity and health caused by changing climatic conditions affecting natural disturbance and the growth and survival rates of commercial species.

To better understand the scale and scope of its impact, Organisation A identified its highest impact locations based on ground surveys. From this approach, Organisation A was able to establish a clear impact pathway for this nature-related issue and understand its relative importance compared to other identified impacts and dependencies that will inform its work during the Assess phase.

External factors

The TNFD also recommends that organisations take into account external factors that may affect the availability of environmental assets and ecosystem services on their sites.

An external factor with particular relevance to the sector is climate change. Climate change leads to a higher frequency of extreme weather events, such as drought and floods, and slow onset weather events, such as the lowering of water tables. These influence provisioning and regulating ecosystem services, such as soil and sediment retention and water supply. The TNFD recommends that forest sector organisations assess the influence of climate change on ecosystem services upon which their production depends.

Organisations should refer to the TNFD biome guidance for more examples of ecosystem services that may be present in the locations where the organisation is operating.

E3

E3: Dependency and impact measurement

Guiding questions:

What is the scale and scope of our dependencies on nature?

What is the severity of our negative impacts on nature? What is the scale and scope of our positive impacts on nature?

Tables 6 and 7 provide additional considerations for dependencies and impact drivers that are relevant for the forestry, pulp and paper sector.

Table 6: Additional considerations for highly relevant dependencies for the forestry, pulp and paper sector

Category of ecosystem services	Additional considerations
Provisioning services	• The availability of direct physical inputs (e.g. high-quality soil and water supply, resilience against pests and diseases), extending beyond current land-use borders, and their availability in the medium and long term.
Regulating and maintenance services	• The availability of pollinators, adequate water supply and soil quality for optimum production, comparing life cycle needs against short, medium and long-term horizons. • The availability of water flow, in the context of the water needs of the ecosystem, local and other stakeholders. • The resilience of ecosystems in providing protection against pests and invasive species, as well as against extreme events, such as fires, droughts, floods and storms.

Table 7: Additional considerations for highly relevant impact drivers for the forestry, pulp and paper sector

Driver of nature change	Additional considerations
Land, freshwater and ocean-use change	• Ecosystem degradation, habitat loss and changes to the composition, structure and/or function of the ecosystems are consequences of unsustainable forest management, deforestation/forest conversion and/or ecosystem fragmentation. These can have impacts on biodiversity and ecosystem services. • To capture the impacts of both direct activities and the knock-on effects of business activities, organisations should consider evaluating deforestation/ forest conversion, habitat loss, fragmentation and biodiversity loss at the landscape level. Organisations can narrow their investigations where evidence and analysis have shown indications or high relevance for your organisation's nature-related assessment. • Organisations should consider land and ecosystem connectivity across managed forest areas and landscapes.
Resource use/ replenishment	• Organisations should consider high water consumption and water diversion from critical habitats and reduction in the availability/provision of ecosystem services to the organisation and stakeholders, given the importance of water to the forestry, pulp and paper sector.
Climate change	• Refer to IFRS S2 Climate-related Disclosures.
Pollution/pollution removal	• To capture the impacts of both direct activities and the knock-on effects of business activities, organisations should consider evaluating potential soil and water pollution (and any other sources of pollution) at the landscape level. Organisations can narrow the investigation where evidence and analysis have shown indications or high relevance for your organisation's nature-related assessment. • Organisations should compare changes in soil quality to protected or otherwise intact forest areas, or a similar classification. Impacts from sediments due to harvesting and other production processes should also be assessed.
Invasive alien species introduction/ removal	• Organisations should consider disease/pest control in the context of both ecosystem change and climate change impacts. For example, as the climate changes, ecosystems that were once resilient or free from specific diseases/pests may experience novel or worsened infestations and infections. • Organisations should consider assessing locations and forest management practices for prevention and early detection of invasive and alien species to avoid and minimise impacts.

E4

E4: Impact materiality assessment

Guiding question:

Which of the identified impacts are material?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

2.4. Assess nature-related risks and opportunities

This section provides additional guidance to help forestry, pulp and paper sector organisations with the Assess phase of the LEAP approach.

A1

A1: Risk and opportunity identification

Guiding question:

What are the corresponding risks and opportunities for our organisation?

Forestry, pulp and paper sector organisations can leverage the data and processes already in place for risk assessment and risk mitigation for compliance with forest certification and other relevant standards.

For a list of potential nature-related risks and opportunities tailored to the forestry, pulp and paper sector, please refer to Table 8 and Table 9. A wider list is also accessible in the TNFD nature-related risk and opportunity registers.

Box 4: Illustrative example of nature-related risk and opportunity assessments for a forestry, pulp and paper sector organisation

Organisation A identified nature-related risks and opportunities arising from each of its dependencies and impacts.

Risks

Physical risks
Organisation A identified that changes to the capacity of its forest estate to provide timber was the most material physical risk. This was determined through timber supply analysis, which considered the effect of changing climatic conditions on growth rates and incidence of natural disturbance to estimate long-term sustainable harvest yields. Through this analysis, the organisation found that changes in precipitation and temperature, combined with other increased natural disturbances, may be affecting growth rates and survival, which would result in lower allowable annual cut (AAC) levels. The resulting financial impacts were estimated based on the difference in harvest revenue from current and forecasted cut levels.

Transition risks
Organisation A used a regulatory landscape review to assess potential transition risks relevant across its value chain. Where risks were identified – for example, the EU Deforestation Regulation, relevant to forestry products in Europe – it created a risk mitigation and management plan. Organisation A integrated this into its overall risk management structure by incorporating nature-related risks as a new sub-category under sustainability risks.

Opportunities
Organisation A identified an opportunity to increase biodiversity and ecosystem resilience at all sites that were deemed to be of high biodiversity importance. It measured the baseline using eDNA, bioacoustics and ground surveys and identified activities that could improve habitat crucial to sustaining key species. By engaging local stakeholders, regulators and Indigenous Peoples and Local Communities in this work, the organisation has increased trust, which translates into quicker approvals of forest harvesting plans and corresponding cost savings. Organisation A is also able to engage with key customers and shareholders on these issues and support its sustainable forest management claims associated with its products. This provides a competitive advantage and differentiator in key markets.

Organisation A also undertook a market analysis to understand what nature-related opportunities exist and what other organisations in the forestry, pulp and paper sector are doing in this space. It analysed:

- Nature-related technological innovation, e.g. bioacoustics and eDNA being used jointly to measure biodiversity present in forestry assets;
- Consumer preferences and demand, e.g. market sentiment towards forest certification; and
- Market dynamics, e.g. product pricing of timber.

Table 8: Illustrative nature-related risks for the forestry, pulp and paper sector

Risk type			
Physical, transition or systemic-type risk	**Risk category**	**Illustrative risk**	**Illustrative magnitude indicator**
Physical risk	**Acute** (the following can also identify chronic risks) • Ecosystem degradation and biodiversity loss may diminish yield • Increased occurrence of disease and pests affecting forest health • Degradation of ecosystem services and increased exposure and impacts from extreme weather • Loss of key species **Chronic** • Increased scarcity of key natural inputs, such as water and fibre, due to climate change and invasive alien species • Changing climate or nature conditions, impacting resilience of tree species and intactness of ecosystems where organisation operates	**Acute** • Quantity and concentration of pollutants emitted (impact driver) • Change in population number of keystone species (state of nature) • Changes to annual visitor rates (ecosystem service) • Changes in tree growth/ increased mortality rates (state of nature) • Levels of sediment loss to water bodies (impact driver) **Chronic** • Change in abundance of pollinators (ecosystem service) • Occurrence/increase of storms/floods in area (external driver) • Changes in biodiversity/ ecosystem intactness, e.g. fragmentation, soil erosion and depletion, species diversity and composition (state of nature)	• Increased costs of natural inputs/reduced supply • Increased costs due to interruption of operations/ supply chain • Write-offs and early retirement of existing assets • Number of locations/ business lines/facilities exposed • Insurance costs

Risk type			
Physical, transition or systemic-type risk	**Risk category**	**Illustrative risk**	**Illustrative magnitude indicator**
Transition risk	**Policy and legal** • Changes in regulation aimed at achieving nature positive outcomes • Tighter regulation on activities that impact and alleviate pressures on nature, such as permits for natural resources • Enhanced reporting obligations	• Quantity and concentration of pollutants emitted into water (impact driver) • Forest management and harvesting practices adopted by the organisation (impact driver)	• Increased costs of operations and input, including compliance costs, fines and penalties • Increased capital costs • Reduced revenue due to reduction in production capacity/ loss of licence to operate • Costs related to the loss of operating area • Increased fines/ penalties

Risk type			
Physical, transition or systemic-type risk	**Risk category**	**Illustrative risk**	**Illustrative magnitude indicator**
Transition risk	**Market** • Shifting customer values or preferences (e.g. away from single-use forest products) • Volatility or increased costs of materials due to increased competition or scarcity	• Amount of input used in the production process (ecosystem service) • Increase in price of alternative products (external driver)	• Reduction in revenue due to lower demand for products and services • Increased production/ raw material costs • Costs related to substituting existing products • Loss of market share and investor goodwill
	Reputation • Shift of customer sentiment away from brands with poorly perceived nature management	• Decline in brand perception • Decline in recreational value of area (ecosystem service)	• Increased costs due to employee turnover • Increased operational costs due to reduction in loyalty of suppliers or stakeholders
	Technology • Transition to more efficient and cleaner technologies with lower nature impact • Lack of access to high quality data, that hampers nature-related assessments	• Reduction in negative impact drivers expected as a result of innovation (impact driver)	• Increased expenditure for R&D of new and alternative technologies • Increased costs of operations required to achieve nature-related costs • Lack of access to technology developed by a competitor resulting in higher operational costs

Source: Adapted from TNFD LEAP Guidance, Table 16, and the WBCSD-FSG (2022) Forest Sector Nature Positive Roadmap, p46.

Table 9: Illustrative nature-related opportunities for the forestry, pulp and paper sector

Opportunity category	Nature-related opportunity types	Illustrative opportunity	Illustrative magnitude indicator
Resource efficiency	• Transition to processes with increased positive impact on nature (e.g. restoration, reduced pollution) • Adoption of resource circularity mechanisms that reduce dependencies and impacts on nature • Diversification of nature-related resources • Adoption of nature-based solutions	• Improved water quality and supply in area (ecosystem condition and ecosystem service) • Area of degraded land restored (impact driver) • Improvement in ecosystem condition (state of nature) • Reduced incidence of flooding events (ecosystem service) • Increased carbon sequestration/ removal and storage through sustainable forest management (ecosystem service)	• Reduced exposure to raw material and natural resource price volatility • Increased resilience to reduction in availability of natural resources • Reduced capital/ infrastructure costs
Products/ services	• New business model activities with positive/ reduced impacts on nature • New products with positive/ reduced impacts on nature and climate	• Number of products/ services with increased efficiency compared to a baseline (impact driver) • Number of products with reduced impact on nature and climate compared to a baseline/counterfactual (impact driver)	• Increased resilience due to business diversification • New revenue streams • Reduced costs of raw materials and production inputs • Increased revenue due to better competitive position • Increased market valuation through resilience planning • Increased business contribution to climate change mitigation

Opportunity category	Nature-related opportunity types	Illustrative opportunity	Illustrative magnitude indicator
Markets	• Access to new and emerging markets • Access to new assets and locations • Development of value streams from new areas or waste materials	• Development of new markets to leverage wood as alternative renewable material	• Access to new sources of finance • Increased resilience due to business diversification • Increased revenue due to better competitive position
Capital flow and financing	• Access to nature-related green funds, bonds or loans • Use of financial incentives for suppliers • Use of public service initiatives		• Access to new sources of finance • Access to capital for high-risk projects • Reduced operational costs (suppliers)
Reputational capital	• Collaborative engagement with stakeholders • Actions that create positive changes in sentiment towards the brand	• Promote and support production by Indigenous Peoples and Local Communities • Develop community forestry projects • Implement integrated forest management plans	• Increase in revenue due to improved reputation • Increase in brand value • Reduced costs due to engagement of suppliers and stakeholders

Opportunity category	Nature-related opportunity types	Illustrative opportunity	Illustrative magnitude indicator
Ecosystem protection, restoration and regeneration	• Direct or indirect (e.g. financing partners, advocacy) restoration, conservation or protection of important ecosystems or habitats • Implementation of site-based, nature-based solutions • Investment in multistakeholder action at land/jurisdictional level • Climate change mitigation through carbon removals	• Water quality and supply in area (state of nature and ecosystem service) • Area of degraded land restored (impact driver) • Improvement in ecosystem condition (state of nature) • Reduced incidence of flooding events (ecosystem service)	• Increased resilience, e.g. to natural disasters • Reduced capital/ infrastructure costs • Avoided fines/ penalties • Reduction in operational costs due to improved readiness and response to regulatory changes • Reduced costs of potential impacts on operations that are out of control of the organisation (e.g. impacts at the landscape level)

Sustainable use of natural resources	• Transition to processes with increased positive impacts on nature
	• Increased circularity of natural resources
	• Adoption of nature-based solutions within services and product lines
	• Certification for products/ services
	• Actions that create positive changes to the supply of natural resources
		• Improvement in ecosystem condition (state of nature)
		• Reduction in total freshwater discharge in areas with water stress (impact driver)
			• Transmission mechanisms to business performance benefits:
			  • Market share
			  • Resource efficiency
			  • Reputational capital
			  • Capital flow and financing
			• Avoided fines/ penalties
			• Reduction in operational costs due to improved readiness and response to regulatory changes

A2

A2: Adjustment of existing risk mitigation and risk and opportunity management

Guiding questions:

What existing risk mitigation and opportunity management processes and elements are we already applying?

How can risk and opportunity management processes and associated elements (risk taxonomy, risk inventory and risk tolerance criteria) be adapted?

Forestry, pulp and paper sector organisations can leverage risk mitigation or opportunity management processes already in place for compliance with forest certification and other relevant standards and adapt these as required.

A3

A3: Risk and opportunity measurement and prioritisation

Guiding question:

Which risks and opportunities should be prioritised?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

A4

A4: Risk and opportunity materiality assessment

Guiding question:

Which risks and opportunities are material and therefore should be disclosed in line with the TNFD recommended disclosures?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

Locate | Evaluate | Assess | Prepare

2.5. Prepare to respond and report

This section provides additional guidance to help forestry, pulp and paper sector organisations with the Prepare phase of the LEAP approach.

P1: Strategy and resource allocation plans

Guiding question:

What risk management, strategy and resource allocation decisions should be made as a result of this analysis?

Organisations can leverage existing sustainable forest management plans and nature strategies to support their decision-making process about risk and opportunity management, strategy and resource allocation. Table 10 provides a summary of key actions to halt and reverse nature loss for organisations in the forestry, pulp and paper sector. Most actions recommended in this table are taken from the WBCSD-FSG's Forest Sector Nature-Positive Roadmap and are based on TNFD's interpretation of SBTN's AR3T framework (pending alignment with future development of SBTN's Step 4 guidance).

Figure 6: The SBTN AR3T framework

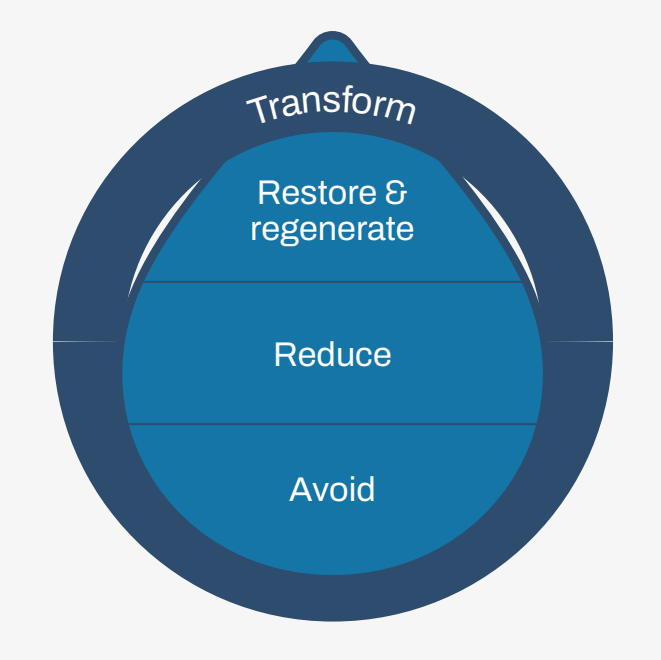


Table 10: Illustrative priority and transformative actions for the forestry, pulp and paper sector mapped to the AR3T Framework

Impact driver	Example of organisation response to impacts on nature	SBTN action framework (AR3T)					Global Framework alignment
		Avoid	Reduce	Regenerate	Restore	Transform	
GHG emissions	Upstream: • Enhance carbon removals in soils and forests (this should not be at the cost of increased fertiliser usage)						GBF Target 8 AFi Core Principles FLAG Targets
	Processing and manufacturing: • Reduce operational GHG emissions • Reduce contribution to climate change by enhancing long term carbon storage						
Land-use change	Upstream: • Avoid deforestation in direct operations and value chain • Avoid conversion of areas of significant biodiversity value to intensively managed forests Avoid over-exploitation of forest resources beyond the regenerative capacity of nature Processing and manufacturing: • Avoid establishing new operations in/adjacent to areas of significant biodiversity value or in water-stressed regions • Avoid sourcing raw materials and forest products without robust due diligence and traceability systems Downstream: • Avoid establishing landfills or recycling facilities in/adjacent to areas of significant biodiversity value and water bodies						GBF Target 1 and 3 AFi Core Principles SBTN Land Targets

Impact driver	Example of organisation response to impacts on nature	SBTN action framework (AR3T)					Global Framework alignment
		Avoid	Reduce	Regenerate	Restore	Transform	
Land-use change	Upstream: • Recover and regenerate working forests after harvest						GBF Target 1 and 3 AFi Core Principles SBTN Land Targets
	Upstream: • Preserve forest diversity when recovering/ regenerating after harvest • Protect forest diversity during harvesting • Restore areas of significant biodiversity and carbon value • Restore connectivity between habitats • Restore native or endangered tree species adapted to climatic conditions						GBF Targets 1, 2, 3, 4 and 5 AFi Core Principles
Pollution/ pollution removal	Processing and manufacturing: • Reduce and reuse operational waste Downstream: • Reduce waste by promoting the recovery and recycling of forest products						GBF Target 7
	Processing/manufacturing and downstream: • Actions, research and development to develop alternative fossil-based products						GBF Target 7

Impact driver	Example of organisation response to impacts on nature	SBTN action framework (AR3T)					Global Framework alignment
		Avoid	Reduce	Regenerate	Restore	Transform	
Resource use: Water use	Upstream: • Conserve and protect water bodies						GBF Targets 2 and 3 SBTN Water Targets
Resource use: Other resource use	Downstream • Reduce use of fossil based and non-renewable materials by stimulating use of forest products						
Invasive species	Upstream: • Reduce drivers related to introduction of invasive alien species						GBF Target 6
	Downstream: • Implement species mapping and management programmes • Restore native or endangered species adapted to local conditions						

Additional actions that cover all impact drivers and apply to all A3RT categories can include:

- Social programmes for crafts using native species; and
- Community training on important topics for biodiversity.

Source: Adapted from WBCSD-FSG (2022) Forest Sector Nature Positive Roadmap, p48–51.

P2

P2: Target setting and performance management

Guiding question:

How will we set targets and define and measure progress?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach, which includes additional guidance on target setting in this component P2.

Organisations may wish to refer to the target setting methods developed by the Science Based Targets Network (SBTN) and the summary guidance on SBTN's methods for setting science-based targets for nature, which the TNFD has co-developed with the Science Based Targets Network (SBTN). Aligned to the methods recommended by SBTN, organisations wishing to set targets may find it useful to consider:

- Setting land science-based targets incorporating:
  - No conversion of natural ecosystems;
  - Land footprint reduction;
  - Landscape engagement.
- Setting freshwater targets:
  - Water quantity
  - Water quality
- Setting targets to reduce negative impacts and increase positive impacts on nature and biodiversity. Organisations can use SBTN's Biodiversity Short Paper to address biodiversity within science-based targets for nature. The document introduces a forthcoming detailed analysis of biodiversity coverage in the first release of science-based targets for nature, which will inform the development of further SBTN methods.

Table 11 provides illustrative examples of highly relevant targets in key areas for the forestry, pulp and paper sector, and examples of relevant indicators. Targets such as these could be adopted as response metrics to manage identified material risks and opportunities.

Table 11: Illustrative examples of highly relevant targets for the forestry, pulp and paper sector.

Topics	Illustrative target	Illustrative indicator
Sustainable land management	Maintain sustainable forestry practices on all land owned/leased/managed	Share of all owned, leased and managed forests certified (%)
Sustainable sourcing	By 2025, have 100% of fibre sourced certified by robust third-party certification standard	Share of fibre sourced certified by third-party certification standard (%)
Reduce water use and waste	By 2030, reduce water use in water stress locations by X%	Water consumed (m^3)
Repurpose/reuse	By 2030, repurpose/reuse process and residual waste generated across all manufacturing sites by X%	Share of repurposed/reused process and residual and total waste generated (%)
Reduce GHG emissions	By 2030, reduce scope 3 emissions by X%	GHG emissions (tCO_2e)

Source: Adapted from WBCSD-FSG (2022) Forest Sector Nature Positive Roadmap, p39.

P3 P3: Reporting

Guiding question:

What will we disclose in line with the TNFD recommended disclosures?

No additional sector specific guidance identified for P3. Refer to the TNFD disclosure metrics for forestry management and pulp and paper products (Section 3).

P4 P4: Presentation

Guiding question:

Where and how do we present our nature-related disclosures?

As for all components, refer to the Guidance on the identification and assessment of nature-related issues: The LEAP approach.

2.6. List of tools of datasets and tools relevant to the forestry, pulp and paper sector

Table 12: List of datasets and tools relevant to the forestry, pulp and paper sector

Tool name	Description (relevance to sector)	LEAP phase
FSC Verified Impact	FSC Verified Impact helps forest managers and owners to quantify the intangible value of their forest with third-party validation.	Locate
Global Forest Watch	Geospatial data for monitoring companies and portfolios in forest-risk commodity supply chains. Can be used to build understanding of the extent of deforestation in forest-risk commodities and financing, focusing on the state of forests and the pressures.	Locate
Common Guidance for the Identification of High Conservation Values	A good practice guide for identifying High Conservation Values (HCVs) across different ecosystems and production systems developed by the HCV Network.	Locate Evaluate
MapBiomas (Brazil)	Historical land cover and land use data, covering Brazil, the Amazon and the Gran Chaco. Allows visibility of deforestation over time.	Locate Evaluate
FSC Search	A database that provides FSC certification and licensing information.	Locate Evaluate Assess
FSC Risk Assessment Platform	This platform provides a simplified, easy-to-use overview of the contents of all 60 FSC risk assessments for use when applying FSC-STD-40-005 *Requirements for Sourcing FSC Controlled Wood* with summaries of the risk descriptions and the precise control measures that are contained in the original risk assessments.	Locate Evaluate Assess
Programme for the Endorsement of Forest Certification (PEFC) Certificate Holder Database	This database helps users find PEFC-certified companies and provides information on them.	Locate Assess

Tool name	Description (relevance to sector)	LEAP phase
Sustainable Forestry Initiative (SFI) Fiber Sourcing Standard and Certificate Holder locations	The SFI Fiber Sourcing Standard is for organisations that do not own or manage land but do procure wood directly from forests. SFI-certified organisations must show that the raw material in their supply chain comes from legal and responsible sources, whether the forests are certified or not. Primary producers must be third-party audited and certified to the SFI 2022 Fiber Sourcing Standard. The SFI 2022 Fiber Sourcing Standard promotes responsible forestry practices through 13 Principles, 11 Objectives, 29 Performance Measures and 59 Indicators. These fiber sourcing requirements include measures to broaden the practice of biodiversity, use forestry best management practices to protect water quality, provide outreach to landowners and use the services of forest management and harvesting professionals. The Fiber Sourcing Standard applies to organisations in the United States and Canada that procure wood domestically or globally.	Locate Evaluate Assess Prepare
SFI Water Benefits Tool	This online tool provides access to summaries of some of the benefits of certified lands in the US. The data presented are based on geographic analysis of private and public land ownership boundaries, publicly available spatial data on lakes and streams, and state guidelines for protection of water quality.	Locate Evaluate Assess
United States Department of Agriculture (USDA) Forest Service Climate Change Tree Atlas	A tool that enables exploration of current tree species and suitable habitats in the Eastern United States and how they are likely to be affected by changing climate. Models developed, which form basis of Tree Atlas, bring together information about potential suitable habitat, migration potential and tree species traits for 125 tree species in the East, with an additional 23 species.	Locate Evaluate
Biostar	Biostar designed to help stakeholders quantify and visualise the potential sustainability benefits and trade offs of cellulosic biomass production systems.	Evaluate

Tool name	Description (relevance to sector)	LEAP phase
Natural Capital Protocol Forest Products Sector Guide	The guide offers a standardised decision-making framework to help businesses along the forest products value chain to identify, measure and value their impacts and dependencies on natural capital. It is aimed primarily at managers from sustainability, environmental and operations departments from companies along the forest products value chain.	Evaluate
FSC Document Centre	A core document that provides an overview of normative documents to help certificate holders understand the requirements they have to comply with.	Assess
Global Illegal Logging and Associate Trade Risk Assessment Tool (ILAT Risk)	The tool is designed to give a better understanding of global trade in timber, pulp and paper products, revealing the main producers and processors of timber commodities as well as the trade routes associated with an elevated risk that the timber was illegally harvested or traded. Users can access global timber trade data and the ILAT Risk Data Tool can help raise flags related to the risk of illegal timber entering a supply chain. ILAT Risk provides publicly available global trade data as well as key proxies/indicators of risk for 211 countries.	Assess

The above list is not exhaustive and the other country-specific datasets and guidance not listed here can be used as additional reference tools.

Additionally, compliance with national regulations, companies' data and tools, official country reports and other sources should be considered on a case-by-case basis.

Table 13 provides a list of tools that may be useful to forestry, pulp and paper sector organisations.

Table 13: List of datasets and tools relevant (but not exclusive) to the forestry, pulp and paper sector

Tool name	Description (relevance to sector)	LEAP phase
Co$tingNature	Web-based spatial policy support system for natural capital, accounting and analysing the ecosystem services provided by natural environments (i.e. nature's benefits), identifying the beneficiaries of these services and assessing the impacts of human interventions.	Locate Evaluate
Copernicus	Synthetic Aperture Radar (SAR) Analysis Ready Data (ARD) on land-use mapping, including hot spotting of environmentally stressed areas.	Locate Evaluate
Crowther Lab interactive maps	Provides interactive maps with key data about the Earth's ecosystems.	Locate Evaluate
ESG Signals Biodiversity	ESGSignals® biodiversity metrics can be applied in financial analysis or corporate due diligence to help estimate potential influence on the surrounding environment and at an asset level.	Locate Evaluate
Global Assessment of Ecoregion Intactness	An intactness metric that captures both habitat loss, quality and fragmentation effects and is calculated using continuous measures of habitat quality. Applied at a global scale using 1 km^2 resolution data in order to quantify changes in intactness of the world's terrestrial ecoregions over a 16-year period.	Locate Evaluate
Google Earth Engine	A planetary-scale platform for Earth science data and analysis.	Locate Evaluate
NatureServe Explorer	Source for information on rare and endangered species and ecosystems in the Americas. This online guide provides information on the 100,000 species and ecosystems tracked.	Locate
RepRisk ESG Data	Third-party controversy data on a range of ESG topics to help with tasks such as materiality assessments, due diligence and monitoring.	Locate Evaluate Assess

Tool name	Description (relevance to sector)	LEAP phase
AWARE	AWARE is to be used as a water use midpoint indicator representing the relative Available WAter REmaining per area in a watershed, after the demand of humans and aquatic ecosystems has been met. It assesses the potential of water deprivation, to either humans or ecosystems, building on the assumption that the less water remaining available per area, the more likely another user will be deprived.	Evaluate
Environmental Justice Atlas	The Environmental Justice Atlas maps conflicts across 10 main categories: nuclear; mineral ores and building extractions; waste management; biomass and land conflicts; fossil fuels, energy and climate justice; water management; infrastructure and built environment; tourism; recreation; biodiversity conservation conflicts and industrial and utilities conflicts.	Evaluate
Rezatec Geospatial AI	Geospatial AI data that enables remote monitoring of water infrastructure and water catchment areas, water quality, pipeline risk, etc. Aside from water, there are also datasets available for forestry, agriculture and energy.	Evaluate
Universal Human Rights Index	The UHRI allows users to explore over 230,000 observations and recommendations made by the international human rights protection system.	Evaluate
EXIOBASE	Multi-regional environmentally-extended input-output databases can be used to estimate environmental impacts based on sector and geography. Can also be used to estimate supply chain sector/geography breakdown, and relative impacts.	Evaluate
FAO Aquastat	A tool that collects, analyses and provides free access to over 180 variables and indicators by country from 1960.	Evaluate Assess
GEMI Local Water Tool	A tool for companies and organisations that wish to evaluate water-related external impacts, business risks and sufficiency of management plans at specific sites.	Evaluate Assess
Global Impact Database	Estimates impacts for organisations, countries and sectors worldwide.	Evaluate Assess

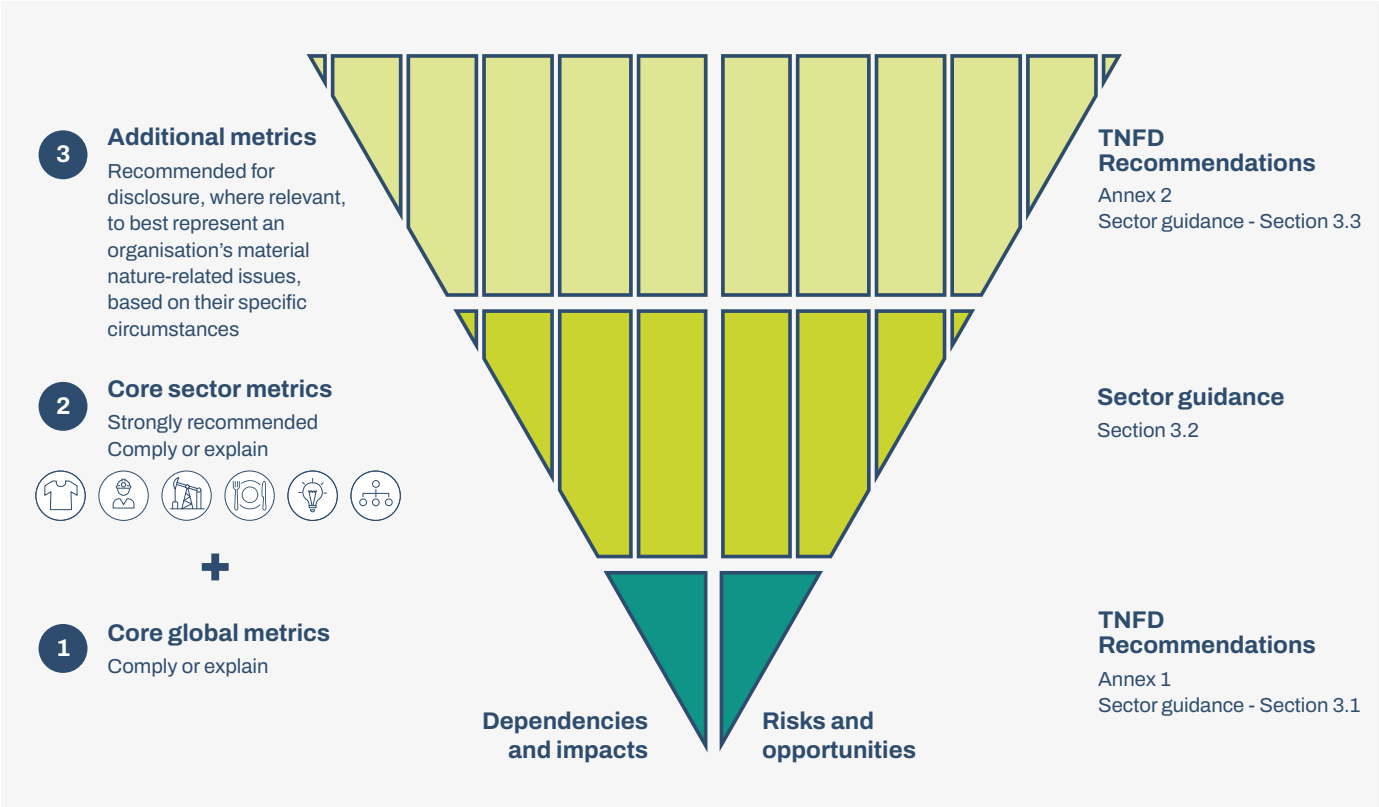
3. Sector-specific disclosure metrics and related guidance – Forestry, pulp and paper

Sector-specific metrics form an important part of the TNFD's measurement architecture (see Figure 7). This reflects the diversity of business models across value chains and their interface with nature across and within sectors. Sector-specific metrics help financial institutions to compare organisations within the same sector, which often face similar nature-related issues.

This section provides the TNFD sector-specific metrics for the forestry, pulp and paper sector. It includes:

- Guidance on the application of the core global disclosure indicators and metrics to the forestry, pulp and paper sector (Section 3.1); and
- Core and additional disclosure indicators and metrics for the forestry, pulp and paper sector (Sections 3.2 and 3.3).

Figure 7: TNFD disclosure measurement architecture



Where available, the TNFD's recommended metrics for disclosure draw from a range of existing standards and frameworks including the IFRS Sustainability Disclosure Standards, Sustainability Accounting Standards Board (SASB) Standards, GRI Standards, the CDP disclosure platform, the Kunming-Montreal Global Biodiversity Framework and other relevant UN frameworks, ESRS and others. A number of organisations, including standard-setting organisations, continue to work on identifying relevant sector-level assessment and reporting metrics. The Taskforce recommends that report preparers stay engaged with year-on-year progress on these developments and implement the latest definitions within their risk management processes and disclosures. The TNFD is working closely with standard-setting organisations and others and will periodically update this guidance on recommended sector metrics for disclosure in line with these ongoing initiatives.

Organisations in the forestry, pulp and paper sector should refer to Annex 1 of the TNFD Recommendations for further information on the core global disclosure metrics. As outlined in the TNFD Recommendations, core global disclosure metrics should be reported on a comply or explain basis, with the exception of the placeholder metrics.

Where organisations are unable to report against any of the core global metrics, they should provide a short explanatory statement as to why they have not reported those metrics. An organisation should report on the core global disclosure metrics unless:

- It has not been identified as relevant and material to the organisation, e.g. not relevant to business activities or the location the organisation is operating in, or not found to be a material issue for the organisation; or
- It has been identified as relevant and material, but the organisation is unable to measure it due to limitations with methodologies, access to data or because the information is commercially sensitive. In this case, organisations should explain how they plan to address this in future reporting periods.

Companies should report on the same basis for the core sector disclosure metrics outlined in Section 3.2.

Organisations are also encouraged to draw on the TNFD additional sector disclosure indicators and metrics outlined in Section 3.3 and any other relevant metrics to represent most accurately the organisation's nature-related dependencies, impacts, risks and opportunities.

1 Core global metrics

3.1. Guidance on the application of the core global disclosure metrics

This section provides guidance, where relevant, on how to apply the TNFD core global disclosure metrics in the forestry, pulp and paper sector. If no further sector specific guidance is provided, organisations should refer to the core global disclosure metrics.

As outlined above, core global disclosure metrics should be reported on a comply or explain basis following the guidance for the forestry, pulp and paper sector where provided.

For the placeholder indicators on invasive alien species and the state of nature, the TNFD encourages organisations to consider and report against these indicators where possible, but are not expected on a comply or explain basis. There are not yet widely accepted metrics for these indicators, but the Taskforce recognises their importance, and will continue to work with knowledge partners to develop further guidance on these metrics.

Table 14: Guidance on the application of the core global disclosure metrics

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Land/ freshwater/ ocean-use change	C1.0	Total spatial footprint	Total spatial footprint (km^2) (sum of): • Total surface area controlled/ managed by the organisation, where the organisation has control (km^2); • Total disturbed area (km^2); and • Total rehabilitated/restored area (km^2).	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Land/ freshwater/ ocean-use change	C1.1	Extent of land/ freshwater/ ocean-use change	Extent of land/freshwater/ ocean ecosystem use change (km^2) by: • Type of ecosystem;[5] and • Type of business activity.	In reporting this core global disclosure metric, an organisation should include: • Conversion of primary forests, other naturally regenerating (second growth) forests, savannahs, grasslands and freshwater natural ecosystems linked to land owned, leased, operated, financed or sourced from, regardless of the future forest management plans (e.g. conversion of primary forests into plantation forests or other non-forest land-uses). The TNFD recognises the data limitations for areas financed/ sourced from. Those organisations who do not have control over the land/forest area should strive to disclose where they have access to this data. Organisations should refer to the TNFD Glossary for definitions of forest, conversion, deforestation and plantation forests. In reporting this core global disclosure metric, organisations should specify the 'cover type conversion' to account for the types of changes between plantations and semi-natural forests. If more appropriate, an organisation may provide information additional to the IUCN Global Ecosystem Typology (GET) to define the type of ecosystems they refer to, such as regional or local classifications.	FSC (2023); AFi (2019); WBCSD-FSG (2022)

5 When disclosing on ecosystem types, refer to the International Union for Conservation of Nature Global Ecosystem Typology.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Land/ freshwater/ ocean-use change	C1.1	Extent of land/ freshwater/ ocean-use change	Extent of land/freshwater/ ocean ecosystem conserved or restored (km^2), split into: • Voluntary; and • Required by statutes or regulations.	In reporting this core global disclosure metric, an organisation should report land conserved and restored separately, if data are available. If applicable, an organisation should describe its long-term (3+ years) efforts in context-based landscape management approaches focused on fire prevention, watershed stewardship, enhancing biodiversity and/or ecosystems services. This should refer to initiatives engaging land tenants and other stakeholders at a landscape level.	WBCSD-FSG (2022)
Land/ freshwater/ ocean-use change	C1.1	Extent of land/ freshwater/ ocean-use change	Extent of land/freshwater/ ocean ecosystem that is sustainably managed (km^2) by: • Type of ecosystem;[6] and • Type of business activity.	This metric applies only to ecosystems owned/managed/ leased by the organisation. In reporting this core global disclosure metric: • Sustainably managed refers to the UN FAO definition of Sustainable Forest Management (see TNFD glossary); • If more appropriate, an organisation may provide information additional to the IUCN Global Ecosystem Typology (GET) to define the type of ecosystems they refer to, such as regional or local classifications; • An organisation should provide additional detail on the type of forest, where applicable (e.g. semi-natural forests).	WBCSD-FSG (2022)

6 When disclosing on ecosystem types, refer to the International Union for Conservation of Nature Global Ecosystem Typology.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Pollution/ pollution removal	C2.0	Pollutants released to soil split by type	Pollutants released to soil (tonnes) by type, referring to sector-specific guidance on types of pollutants.	In reporting this core global disclosure metric, an organisation should consider the relevance of the following to its activities: • Pesticides from forestry operations; • Nitrogen; • Phosphorus; • Perfluoroalkyl and Polyfluoroalkyl substances (PFAS); and • Ash (e.g. from boilers in processing and manufacturing activities). In determining which pollutants to report, an organisation should consider: • The FAO and WHO definitions of highly hazardous pesticides, with an emphasis on extremely hazardous and highly hazardous pesticides (class 1A and 1B, respectively) (see TNFD glossary); • The chemicals included in the list of banned persistent organic pollutants (POPs) of the Stockholm Convention; • Other substances or residues that are not inherently hazardous, but where significant quantities or poor disposal practices may be damaging or represent a risk to biodiversity or health, including fertilisers, wood debris and bark accumulation from forestry operations, non-recyclable paper, rejects from recycling processes or other solid waste; and • Pollutants of concern identified during engagement with stakeholder groups, Indigenous Peoples and Local Communities. Note that pollutants in water discharged are more likely to be produced by processing and manufacturing and other downstream activities.	Ashrafi et al. (2015); IFC (2007); OECD and UNEP (2013); UNEP and WHO (2016); The Stockholm Convention (2001); WBCSD-FSG (2022); WHO (2019); WRI and WBCSD (2015)

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Pollution/ pollution removal	C2.1	Wastewater discharged	Volume of water discharged (m^3), split into: • Total; • Freshwater; and • Other.[7] Including: • Concentrations of key pollutants in the wastewater discharged, by type of pollutant, referring to sector-specific guidance for types of pollutants; and • Temperature of water discharged, where relevant.	Reporting of water discharged under this core global disclosure metric should additionally be broken down by destination: • Original water source; • Wider water supply; and • Third parties. Pollutants and water quality metrics to report under this core global disclosure metric include: • Absorbable Organic Halogens (AOX); • Nitrogen; • Phosphorus; • Chemical Oxygen Demand (COD); and • Total suspended solids (TSS) from fibre production, bleaching, recycling and/or other chemical processes; and forest production. In determining which pollutants to report, an organisation should also consider the pollutants listed under the pollutants to soil metric (C2.0).	Ashrafi et al. (2015); IFC (2007); OECD and UNEP (2013); UNEP and WHO (2016); The Stockholm Convention (2001); WBCSD-FSG (2022); WHO (2019); WRI and WBCSD (2015)

7 Freshwater: (≤1,000 mg/L Total Dissolved Solids). Other: (>1,000 mg/L Total Dissolved Solids). Reference: GRI (2018) GRI 303-4 Water discharge.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Pollution/ pollution removal	C2.2	Waste generation and disposal	Weight of hazardous and non-hazardous waste generated by type (tonnes), referring to sector-specific guidance for types of waste. Weight of hazardous and non-hazardous waste (tonnes) disposed of, split into: • Waste incinerated (with and without energy recovery); • Waste sent to landfill; and • Other disposal methods. Weight of hazardous and non-hazardous waste (tonnes) diverted from landfill, split into waste: • Reused; • Recycled; and • Other recovery operations.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Pollution/ pollution removal	C2.3	Plastic pollution	Plastic footprint as measured by total weight (tonnes) of plastics (polymers, durable goods and packaging) used or sold broken down into the raw material content.[8] For plastic packaging, percentage of plastics that is: • Reusable; • Compostable; • Technically recyclable; and • Recyclable in practice and at scale.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

8 Raw material content: % of virgin fossil-fuel feedstock; % of post-consumer recycled feedstock; % of post-industrial recycled feedstock; % of virgin renewable feedstock.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Pollution/ pollution removal	C2.4	Non-GHG air pollutants	Non-GHG air pollutants (tonnes) by type: • Particulate matter ($PM_{2.5}$ and/ or PM_{10}); • Nitrogen oxides (NO_2, NO and NO_3); • Volatile organic compounds (VOC or NMVOC); • Sulphur oxides (SO_2, SO, SO_3, SO_x); and • Ammonia (NH_3).	Additional pollutants to report under this core global disclosure metric include: • Hazardous air pollutants (HAPs). From the list of pollutants under the core global disclosure metric, an organisation should particularly look to include particulate matter from the combustion of wood fuel during production; and sulphur and nitrogen oxides, particulate matter and volatile organic compounds (VOCs) from processing and manufacturing.	Biofuels SASB Standard (2023); Pulp & Paper Products SASB Standard (2023); IFC Environmental, health, and safety guidelines pulp and paper mills (2007); WRI and WBCSD (2015)
Resource use/ replenishment	C3.0	Water withdrawal and consumption from areas of water scarcity	Water withdrawal and consumption[9] (m^3) from areas of water scarcity, including identification of water source.[10]	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

9 Water consumption is equal to water withdrawal less water discharge. Reference: GRI (2018) GRI 303-5.

10 Surface water; groundwater; seawater; produced water; third-party water. Reference: GRI (2018) GRI 303-3.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Resource use/ replenishment	C3.1	Quantity of high-risk natural commodities sourced from land/ ocean/ freshwater	Quantity of high-risk natural commodities[11] (tonnes) sourced from land/ocean/ freshwater, split into types, including proportion of total natural commodities.	In reporting this core global disclosure metric: • The metric only applies to procured volumes; • High-risk natural commodities refer to certified and non-certified materials sourced. These should be broken down by regions classified as 'high risk 'and 'low risk' according to the organisation's risk assessment, which should include both natural ecosystems and established plantations; • Volumes sourced from natural ecosystems and plantations should be disclosed separately, if data is available; and • For wood products, types refer to biomass, pulp or wood. In reporting this core global disclosure metric, an organisation should provide information on the organisation's traceability and due diligence systems.	TNFD

11 Users should refer to the Science Based Targets Network (SBTN) High Impact Commodity List (HICL), species listed as vulnerable, endangered or critically endangered on the IUCN red list, and species listed in appendix I, II and III of CITES.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Resource use/ replenishment	C3.1	Quantity of high-risk natural commodities sourced from land/ ocean/ freshwater	Quantity of high-risk natural commodities[12] (tonnes) sourced under a sustainable management plan or certification programme, including proportion of total high-risk natural commodities.	In reporting this core global disclosure metric, an organisation should: • Report on volumes sourced from planted forests and native forests separately, providing data is available; • Note that this metric only applies to procured volumes; • Provide information on the forest management conditions for the wood or fibre, such as whether these are certified by a broadly recognised third-party certification system with a global presence, such as the Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC) and Sustainable Forestry Initiative (SFI). 'Controlled Wood', 'Controlled Sources' or 'SFI Fiber Sourcing' are excluded; and • Refer to the UN FAO definition of 'Sustainable Forest Management' (see TNFD glossary).	TNFD

12 Users should refer to the Science Based Targets Network (SBTN) High Impact Commodity List (HICL), species listed as vulnerable, endangered or critically endangered on the IUCN red list, and species listed in appendix I, II and III of CITES.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
Invasive alien species and other	C4.0	Placeholder indicator: Measures against unintentional introduction of invasive alien species (IAS)[13]	Proportion of high-risk activities operated under appropriate measures to prevent unintentional introduction of IAS, or low-risk designed activities.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

13 Due to the measurement of levels of invasive species for organisations being a developing area, the chosen indicator focuses on whether an appropriate management response is in place for the organisation. The additional sets of metrics contain measurement of the level of invasive species within an area. The TNFD intends to do further work with experts to define 'high-risk activities' and 'low-risk designed activities'.

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
State of nature	C5.0	Placeholder indicator: Ecosystem condition	For those organisations that choose to report on state of nature metrics, the TNFD encourages them to report the following indicators, and to refer to the TNFD additional guidance on measurement of the state of nature in Annex 2 of the LEAP approach: • Level of ecosystem condition by type of ecosystem and business activity; • Species extinction risk. There are a number of different measurement options for these indicators. The TNFD does not currently specify one metric as there is no single metric that will capture all relevant dimensions of changes to the state of nature and a consensus is still developing. The TNFD will continue to work with knowledge partners to increase alignment.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

Driver of nature change/Other metric category	Metric no.	Core global indicator	Core global metric	Guidance for sector	Source
State of nature	C5.0	Placeholder indicator: Species extinction risk	For those organisations that choose to report on state of nature metrics, the TNFD encourages them to report the following indicators, and to refer to the TNFD additional guidance on measurement of the state of nature in Annex 2 of the LEAP approach: • Level of ecosystem condition by type of ecosystem and business activity; • Species extinction risk. There are a number of different measurement options for these indicators. The TNFD does not currently specify one metric as there is no single metric that will capture all relevant dimensions of changes to the state of nature and a consensus is still developing. The TNFD will continue to work with knowledge partners to increase alignment.	No further sector specific guidance; refer to the core global disclosure metric.	TNFD
Climate change		GHG emissions	IFRS S2 Climate-related Disclosures	No further sector specific guidance; refer to the core global disclosure metric.	TNFD

2 Core sector metrics

3.2. Core sector disclosure indicators and metrics

No core sector disclosure metrics have been identified for the forestry, pulp and paper sector. The sector-specific guidance for the core global metrics captures the expectations for the most significant nature-related issues for this sector to disclose.

3 Additional metrics

3.3. Additional sector disclosure indicators and metrics

The TNFD additional sector disclosure metrics for the forestry, pulp and paper sector are outlined below. The TNFD encourages all report preparers in the sector to draw on these and any other relevant metrics where relevant to best represent an organisation's material nature-related dependencies, impacts, risks and opportunities.

Table 15: Additional sector disclosure indicators and metrics

Metric category	Metric subcategory	Metric no.	Indicator	Additional sector metrics	Source
Response	Dependency, impact, risk and opportunity management: Value chain	FP.A22.0	Forest certification	The proportion of forest area (%) certified by broadly recognised third-party certification systems with a global presence, such as: the Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC) and Sustainable Forestry Initiative (SFI). 'Controlled Wood', 'Controlled Sources' or 'SFI Fiber Sourcing' are excluded.	WBCSD-FSG KPI
Response	Dependency, impact, risk and opportunity management: Voluntary conservation, restoration and regeneration	FP.A24.0	Forest conservation/restoration	Proportion (%) of land owned, leased or managed that is designated for restoration or conservation.	WBCSD-FSG KPI

Metric category	Metric subcategory	Metric no.	Indicator	Additional sector metrics	Source
Impact driver	Climate change	FP.AX.1.0	Carbon sequestration	Carbon sequestered by land owned, leased or managed (t CO_2e), broken down by forest plantations and natural/semi-natural land and products.	TNFD
Impact driver	Land/freshwater/ocean-use change	FP.A1.0	Areas of high biodiversity value or high conservation value	Area (km^2) of high biodiversity value or high conservation value protected.	Adapted from GRI 101
Impact driver	Resource use/ replenishment	FP.A3.0	Area used for production of natural commodities	Area (km^2) that the organisation controls/ manages that is used for the production of natural commodities from land/ocean/freshwater (extent of area split into ecosystem types, change from previous year). This metric only applies to land owned/managed/leased and not to fibre procured.	TNFD
Impact driver	Resource use/ replenishment	FP.A3.1	Quantity of DCF high-risk natural commodities	Quantity of high-risk natural commodities (tonnes) sourced from land/ocean/freshwater, split into types, that are demonstrated deforestation and conversion-free.	AFi, GRI 101, CGF FPC
Response	Dependency, impact, risk and opportunity management: Value chain	FP.A22.1	Non-certified wood/fiber covered by due diligence and traceability systems	Proportion (%) of non-certified wood or fibre covered by due diligence and traceability systems.	TNFD

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Taskforce on Nature-related
Financial Disclosures

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