



Draft sector guidance **Oil and gas**

December 2023
For market consultation and feedback

SASB sectors:
Oil and gas (EM.4)

[tnfd.global](https://www.tnfd.global)

T N
F D Taskforce on Nature-related
Financial Disclosures

Contents

Introduction	3
Scoping a LEAP assessment	5
Locate the organisation’s interface with nature	7
L1: Span of the business model and value chain	7
L2: Dependency and impact screening	7
L3: Interface with nature	10
L4: Interface with sensitive locations	11
Evaluate dependencies and impacts on nature	12
E1: Identification of environmental assets, ecosystem services and impact drivers	12
E2: Identification of dependencies and impacts	12
E3: Dependency and impact measurement	22
E4: Impact materiality assessment	22
Assess nature-related risks and opportunities	23
A1: Risk and opportunity identification	23
A2: Adjustment of existing risk mitigation and risk and opportunity management	25
A3: Risk and opportunity measurement and prioritisation	25
A4: Risk and opportunity materiality assessment	25
Prepare to respond and report	26
P1: Strategy and resource allocation plans	26
P2: Target setting and performance management	38
P3: Reporting	38
P4: Presentation	38
Glossary	39
Annex 1: Sector specific disclosure metrics – Oil and gas	40
Proposed guidance on the application of the core global disclosure metrics	40
Proposed core sector disclosure indicators and metrics	47
Proposed additional sector disclosure indicators and metrics	48
References	51



Draft for consultation

This sector guidance is a draft for consultation with market participants and other interested stakeholders. The Taskforce welcomes feedback provided via the [TNFD website](#) by 29 March 2024.

Feedback will be reviewed by the Taskforce and final guidance issued by the TNFD by 30 June 2024.

Introduction

The purpose of this guidance

In September 2023, the TNFD published its recommendations for disclosure of nature-related issues. Accompanying those recommendations is a set of additional guidance, including [Guidance on the identification and assessment of nature-related issues: The LEAP approach](#). The TNFD recognises that there can be significant differences across sectors for corporates applying the LEAP approach. It has published this additional guidance to help oil and gas 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 recommended sector disclosure metrics for the oil and gas sector, including guidance on the application of the core global disclosure metrics and core and additional sector disclosure indicators and metrics. These complement the disclosure indicators and metrics outlined in Annexes 1 and 2 of the [TNFD recommendations](#).

What this guidance covers

This guidance covers the value chain or organisations in the SASB oil and gas sub-sector (Box 1).¹ For simplicity, all organisations in this sub-sector are referred to as ‘oil and gas sector organisations’ in 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.

Box 1: Industries in scope of this guidance

Oil & Gas – Exploration & Production (EM-EP)

Oil & Gas – Midstream (EM-MD)

Oil & Gas – Refining & Marketing (EM-RM)

Oil & Gas – Services (EM-SV)

¹ SASB (2018) [SASB’s Sustainable Industry Classification System \(SICS\)](#).

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

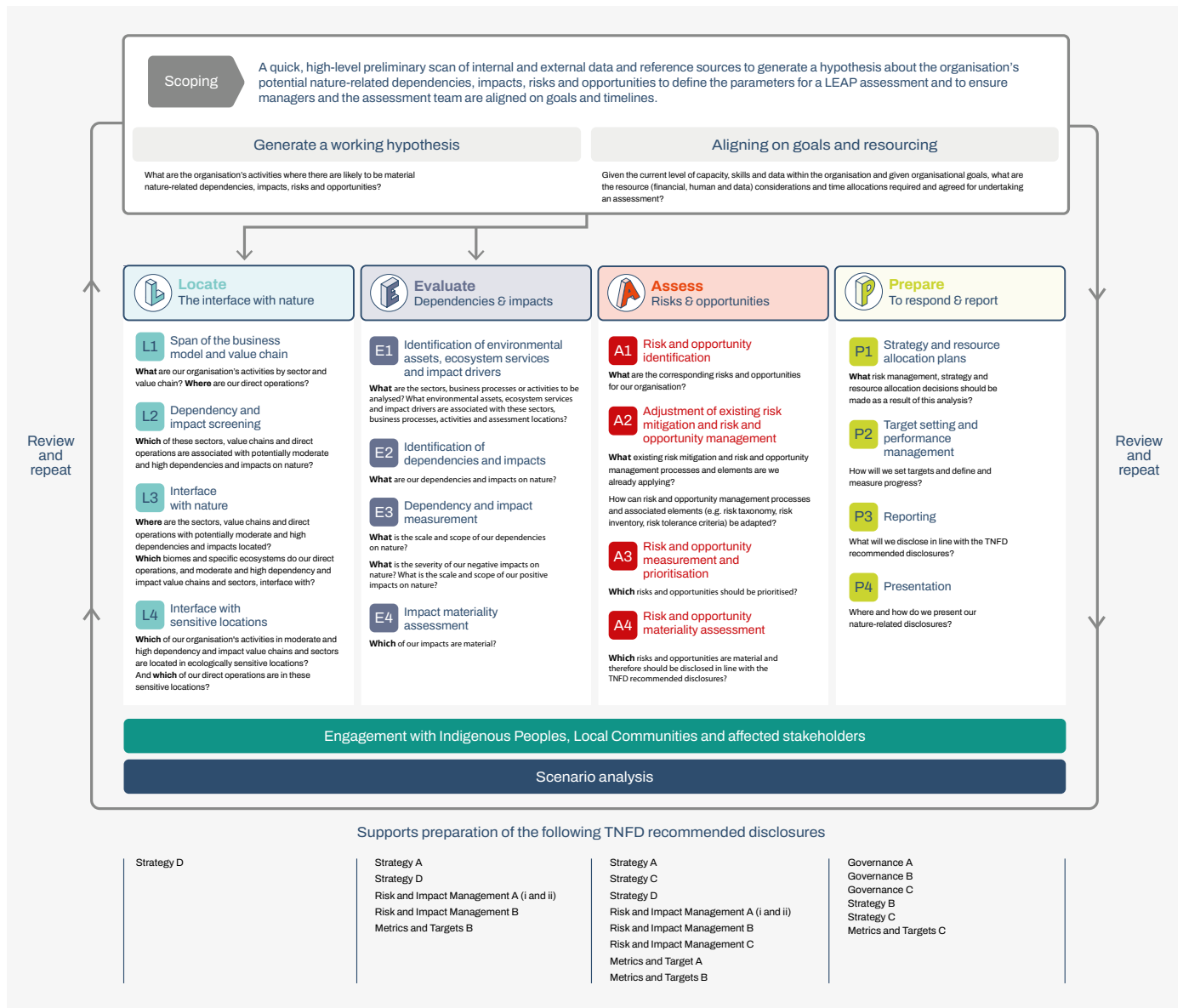


Table 1: Areas of LEAP with additional guidance for the oil and gas sector

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



Scoping a LEAP assessment

Working hypothesis generation:

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

Goals and resource 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 illustrates a non-exhaustive list of the typical business activities in the oil and gas sector. There will be material dependencies, impacts, risks and opportunities for all the SASB industries in the oil and gas sector, and these will vary considerably by industry. For example, exploration and production will have far more direct dependencies and impacts compared to refining, where dependencies and impacts may predominantly be upstream. There are also downstream dependencies and impacts, for example, from emissions due to combustion of subsequent fuels. Organisations may find it useful to refer to the ENCORE tool, GRI 11 Oil and gas and relevant SASB standards² when determining the business activities where there are likely to be material nature-related issues.

There are strong connections between the oil and gas sector and other heavy industry sectors, such as steel, cement and hydraulics. Oil and gas service companies will be involved in the construction and service or maintenance of the machinery that is used for activities such as extraction and depend on raw materials (e.g. to produce drill bits). Oil and gas organisations should refer to the relevant TNFD sector guidance (e.g. for metals and mining) where business activities interface with other sectors.

Organisations should also consider that there may be shared ownership of assets along the value chain and that many assets in the oil and gas sector may be located offshore and outside of specific governmental jurisdictions.

² SASB (2023) [Oil & Gas Exploration and Production Standard](#).

Table 2: Typical business activities in the oil and gas sector

Value chain activity		Business activity
Upstream	Oil sands mining	Extraction of bitumen from oil sands using surface mining or in situ techniques.
Direct operations	Exploration	Surveying of resources, including aerial surveys, seismic testing and exploratory drilling.
	Development	Design, planning and construction of oil and gas fields, including processing and worker facilities.
	Production	Extraction of oil and gas from onshore or offshore reserves and separation of oil, gas and water.
Direct operations	Refining	Refining of oil into petroleum products for use as fuels and as feedstocks for chemicals.
	Processing	Processing gas into pipe-quality natural gas and natural gas liquids, including removing hydrocarbons and fluids.
	Transportation	Marine and land transportation of oil and gas.
	Storage and pipelines	Distribution and storage of oil and gas in tanks and marine vessels and distribution via marine and land-based pipelines.
Downstream	Sales and marketing	Selling of oil and gas products for the purpose of, for example, fuels, gas for retail use, and inputs in the production of specialty chemicals, petrochemicals and polymers.
	Closure and rehabilitation	Closure, decommissioning, dismantling, removal, disposal or modification of assets, facilities and sites.
GRI (2021) GRI 11: Oil and gas sector 2021 .		

Decommissioning and closure

The scoping phase should also consider the inclusion of decommissioning activities and decommission facilities. Oil and gas facilities can leave a lasting environmental footprint even after they cease operations. This can manifest as soil and water contamination, alterations to landforms, and disruptions to biodiversity and wildlife. Closure processes can also have enduring consequences for local communities. Inadequate facility closure and site rehabilitation can render the land unsuitable for other productive uses, posing health and safety risks due to contamination or the presence of hazardous materials.

Decommissioning and dismantling offshore structures present unique challenges due to their size, weight and remote locations. In certain instances, structures are left in place after decommissioning, which can result in issues such as marine pollution from corrosion, ecosystem changes, damage to fishing equipment and hazards to shipping navigation.³

Equally, facility closure on owned or leased land can present an opportunity for site restoration and regeneration.

The imperative to reduce greenhouse gas emissions and transition to a low-carbon economy is anticipated to lead to more frequent facility closures, highlighting the importance of considering the nature-related impacts, risks and opportunities associated with facility closure.

³ GRI (2021) [GRI 11: Oil and gas sector 2021](#).



Locate the organisation’s interface with nature

This section provides additional information to help oil and gas sector organisations with the Locate phase of the LEAP approach.

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?

No additional sector-specific guidance identified for L1.

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?

Table 3 and Table 4 present impact drivers and ecosystem services that are highly relevant to the oil and gas sector. These tables can be used to help screen an organisation’s value chain activities for potentially moderate and high impacts and dependencies on nature.

Table 3: Oil and gas sector impact drivers

Drivers of nature change	Impact drivers	Upstream			Direct operations				
		Mining ^a	Supply chain and sourcing ^b	Equipment and services	Exploration	Production	Refining	Storage and transport	Gas distribution and retail
Land, freshwater and ocean use change	Land ecosystem use	Very high	Medium		High	High	High ^e	High	High
	Freshwater ecosystem use	High	Medium		High	High		High	
	Ocean ecosystem use	High–Very high ^c	High		Medium	Very high		High	High
Climate change	GHG emissions	High	Very high	High	High	High	High	High	High
Pollution/pollution removal	Non-GHG air pollutants	High	Medium	Medium	High	High	High	High ⁱ	
	Water pollutants	High	Medium	High	High	High	Variable ^f	Variable ^j	
	Soil pollutants	High	Medium	High	High	High	Variable ^f	Low	
	Solid waste	High	Medium	High	High	High	^g		Medium
	Disturbances	High	High	Medium	High	High	^h	Variable ^k	
Resource use/replenishment	Water use	Very high	High	High	Very high ^d	Very high ^d	Very high	High	
	Other resource use								
Invasive alien species introduction/removal	Introduction of invasive alien species	Medium					Low	Variable ^k	

Notes

- a. Mining here covers extraction of coal and consumable fuels.
 - b. Other than mining, this covers sourcing of equipment and material used for direct operations.
 - c. If applicable to the company's value chain, the rating should consider deep-sea mining as an emerging issue related to raw materials for the energy transition.
 - d. Depending on the exploration and drilling method, more or less water is used. Company specificity applies.
 - e. Refineries have a significant land footprint.
 - f. Can be very high in the case of spillages or leaks.
 - g. To be measured. Oil and gas production also generates solid wastes (oil sludge, spent catalysts, etc.).
 - h. To be measured. Refineries are more likely to cause greater noise/light disturbances than exploration/production facilities as they are usually much more concentrated facilities.
 - i. Shipping is one of the main sources of particulate emissions due to heavy oil use.
 - j. Water pollutants are very high especially in cases of leakage or oil spills from shipping.
 - k. High or very high, especially from shipping.
- Indicates that WBCSD members' views deviated from ENCORE.

Source: WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#); ENCORE.

Table 4: Oil and gas sector ecosystem services

Ecosystem services functionality	Ecosystem services	Upstream		Direct operations				
		Mining ^a	Equipment and services	Exploration	Production	Refining	Storage and transportation	Gas distribution and retail
Direct physical inputs	Groundwater	High	Medium		Low	Low		
	Surface water	High	Medium		Low	Low-medium ^b		
Enabling production processes	Ventilation		Low					
	Water flow maintenance	High	Medium					Low
	Water quality		Low			Low		Low
Mitigating direct impacts	Bioremediation				Low	Low		
	Mediation of sensory impacts		Medium					
	Dilution by atmosphere and ecosystems		Low					
	Filtration		Low		Low	Low		Low
Protecting from disruption	Climate regulation	High	Low	Medium	Low	Low	Medium	Medium
	Flood and storm protection		Medium	Low	Low	Medium	Medium	Medium
	Mass stabilisation and erosion control		Low	Low	Low	Low	High	High

Notes

- a. Mining currently includes mining of coal and consumable fuels. Other supply chain elements have not been assessed.
- b. The refining process depends heavily on water.

 Indicates that WBCSD members' views deviated from ENCORE.

Only ecosystem services for which data is provided are shown. The ecosystem service classification used by the source of this table differs from the classification used by other TNFD guidance ([UN SEEA](#)). A crosswalk is available from [UN SEEA](#).

Source: WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#); ENCORE.

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, moderate and high dependency and impact value chains and sectors, interface with?

When identifying locations that contain operations with potentially moderate and high dependencies and impacts, organisations should include locations:

- Where significant operational incidents have previously occurred;
- With high level of risk regarding asset integrity and critical incident management (including tailing facilities with oil sand mining activities);
- With activities within or in proximity to Indigenous territories;
- With proved or probable reserves in or near Indigenous land or areas of conflict;
- Associated with decommissioning, particularly those that may be difficult or expensive to manage from an environmental perspective;
- Protected through avoidance measures or offset measures; and
- Restored through on-site restoration measures or offset measures.⁴

When identifying locations upstream and downstream, organisations should consider that network assets such as gas pipelines for distribution and transportation can cover long distances. It is important to consider pipelines and other linear assets as lines and not as individual points. When pipelines are hundreds of kilometres long, they often travel through several biomes and many ecosystems, which may have varying ecosystem integrity, importance for biodiversity and water risks.

Most likely biomes of relevance

The oil and gas sector typically interfaces with the following biomes:

- Tropical-subtropical 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);
- Maritime vegetation (MT2);

⁴ GRI (2021) [GRI 11: Oil and gas sector 2021](#); SASB (2023) [Oil & gas exploration and production standard](#) (EM-EP-210a.2, SASB EM-EP-210a).



- Artificial shorelines (MT3);
- Vegetated wetlands (TF1);
- Brackish tidal systems (MFT1);
- Rivers and streams (F1);
- Lakes (F2);
- Artificial wetlands (F3);
- Subterranean freshwaters (SF1);
- Coastal inlets and lagoons (FM1);
- Marine shelves (M1);
- Open ocean waters (M2);
- Deep sea floors (M3);⁵ and
- Artificial marine systems (M4).

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 also refer to the [TNFD biome guidance](#) for further guidance when analysing their interfaces with these biomes.

L4: Interface with sensitive locations

Guiding questions:

For our organisation’s activities in moderate and high dependency and impact value chains and sectors, which of these are in ecologically sensitive locations?

Which of our direct operations are in sensitive locations?

No additional sector-specific guidance identified for L4.

⁵ Deep sea floor biomes may be relevant as offshore oil and gas extraction may require access to ocean floors.

Evaluate dependencies and impacts on nature

This section provides additional guidance to help oil and gas sector organisations with the Evaluate phase of the LEAP approach.

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 process, activities and assessment locations?

Guidance for components E1 and E2 is provided together under E2.

E2: Identification of dependencies and impacts

Guiding question:

What are our dependencies and impacts on nature?

Dependencies

Oil and gas sector organisations should refer to Table 5 for the ecosystem services on which they are likely to depend.

Impacts

Oil and gas operations exert various pressures on their surrounding environments, leading to both immediate and long-term impacts on nature. These impacts can be direct, indirect and cumulative, and often extend far beyond the operational sites and geographical boundaries of direct activities.⁶

Organisations should seek to understand their areas of influence, noting that the size of the area may vary, depending on the nature of its activities and/or assets, and on the biome. When an organisation's area of influence overlaps with those of other organisations, cumulative impacts should also be considered. These will allow an organisation to map the type and scope of the area affected and depended on by the operations as well as the need for engagement with other stakeholders.

Fossil fuel extraction often takes place in regions with high levels of biodiversity and conservation importance, leading to the significant loss and degradation of natural habitats, which affects associated species. Oil and gas activities can also lead to animal mortality, habitat fragmentation and conversion, and the introduction of invasive species and pathogens. These effects can, in turn, limit the availability and quality of ecosystem services, affecting the wellbeing and livelihoods of Indigenous Peoples, Local Communities and other stakeholders.

⁶ Refer to guidance on area of influence in the [TNFD guidance on the identification and assessment of nature-related issues: The LEAP approach](#).



When identifying impacts, organisations in the oil and gas sector should consider the non-exhaustive list presented in Table 5. These impact drivers are particularly pronounced when oil and gas activities affect protected areas or regions of high biodiversity significance. Organisations may find it useful to refer to TCFD recommendations and the relevant GRI and SASB standards for additional guidance.⁷

⁷ TCFD (2017) [Recommendations of the Task Force on Climate-related Financial Disclosures](#); GRI (2021) [GRI 11: Oil and gas sector 2021](#); SASB (2023) [Oil & Gas Exploration and Production Standard](#).

Table 5: Illustrative impacts of the oil and gas sector

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Land/water/ocean use change	Land ecosystem use	<p>Site preparation for construction and surface mining, and upstream production of packaging material. This includes seismic testing, drilling, asset and facility construction, infrastructure development, pipeline installation and road building.</p> <p>Fires from unplanned events.</p> <p>New access routes fragmenting the habitat and facilitating increased access from other sectors. The depletion of easily accessible oil and gas resources drives this access further into remote areas.</p>	<p>Direct reduction in ecosystem extent.</p> <p>Disruptions to ecosystems and ecological functions due to this reduced extent, degradation and fragmentation.</p> <p>Direct mortality of species.</p> <p>Habitat fragmentation undermining feeding and reproduction patterns.</p> <p>Depletion of carbon sinks, contributing to climate change.</p>
	Freshwater ecosystem use	Occupation and depletion of freshwater habitats as part of exploration, production and refining and upstream mining activities.	<p>Reduction in space, disruption to ecological corridors, fragmentation and changes to hydrological and hydraulic characteristics of the ecosystem can lead to displacement of local flora and fauna.</p> <p>Changes to water quality due to intentional or unintentional release of water and sediment, as well as spills and leaks.</p>
	Ocean ecosystem use	Offshore construction, deep sea mining, drilling and footings of offshore structures.	<p>Change in and destruction of marine and seabed habitats.</p> <p>Reduced water quality due to increased suspended sediments and subsequent deposition, as well as spills, leaks and wastewater releases.</p> <p>Changes in coastal processes due to the presence of infrastructure.</p>

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Climate change	GHG emissions	The sector's activities and use of oil and gas products contribute substantially to the release of carbon dioxide (CO ₂) and methane (CH ₄). Other GHGs stemming from oil and gas activities include ethane (C ₂ H ₆), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF ₆) and nitrogen trifluoride (NF ₃).	See TCFD, GRI and SASB. ⁸
Pollution/pollution removal	All pollutants	Spills to the environment and critical incidents, encompassing events like the loss of control or containment of hydrocarbons, well blowouts, explosions, fires, unforeseen plant disruptions and shutdowns, and failures of tailings dams in operations linked to oil sands. These can occur as a result of undetected equipment failures, or during the transport of oil and gas by sea, road, rail or pipelines.	Spills to the environment and critical incidents can have devastating repercussions for workers, local communities, the environment and the assets of organisations. These incidents extend beyond fatalities and injuries, often leading to the contamination of air, soil and water. Critical incidents can trigger degradation in ecosystems and habitats, as well as a significant loss of animal life. The resulting impacts can disrupt other economic activities reliant on these environmental assets, such as fishing and agriculture, thereby affecting livelihoods and jeopardising food safety and security.

⁸ TCFD (2017) [Recommendations of the Task Force on Climate-related Financial Disclosures](#); GRI (2021) [GRI 11: Oil and gas sector 2021](#); SASB (2023) [Oil & Gas Exploration and Production Standard](#).

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Pollution/pollution removal	Non-GHG air pollutants	<p>The oil and gas sector, and the combustion of oil and gas, are significant sources of air pollutants, including sulphur oxides (SO_x), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs) and hazardous air pollutants (HAP) like benzene and hydrogen sulphide.</p> <p>Heavy vehicle movements and stockpiling of ore, waste rock and products in direct operations and upstream mining and supply chain sourcing activities are associated with dust lift-off.</p> <p>Upstream mining activities:</p> <ul style="list-style-type: none"> • Fly rock, dust particles and toxic fumes due to blasting; • Release of air toxins through stacks during processing and refining; and • Localised atmospheric release of cyanide (a toxic compound used in metal leaching and susceptible to vaporisation). 	<p>The emissions disrupt the supply of clean air and lead to adverse health effects, especially for vulnerable populations. Emissions of NO_x and SO_x can alter the chemistry of water bodies, leading to negative impacts on terrestrial and aquatic life – decreased animal and vegetation growth, yield and immunity – and contribute to acid rain and ocean acidification.</p>

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Pollution/pollution removal	Water pollutants	<p>Produced water and process wastewater typically contain hydrocarbons, chemicals or other hazardous substances. Upstream activities can see leaching of acidified wastewater or water containing high concentrations of heavy metals and other toxic chemicals (e.g. sulphuric acid, cyanide, mercury, arsenic).</p> <p>Water pollution can occur through water discharge, drilling waste disposal, spills and leaks from storage sites, pipelines and motor transport. It can also occur through the injection of drilling fluids into wells and the flowback from hydraulic fracturing, leading to the seepage of contaminants and groundwater pollution. Brine storage dams can be associated with groundwater pollution. In offshore operations, drilling fluids may be discharged into water bodies or oceans, depending on regulations and alternative outlets.</p> <p>Inadequate treatment of water discharges, oil spills resulting from transportation accidents, pipeline ruptures, seepage, failures of oil sands tailings dams, or depositing and sedimentation of materials and substances used in manufacturing can also cause water pollution.</p>	<p>These activities have the potential to affect the quality of surface water, groundwater and seawater. This increases toxicity in aquatic habitats, resulting in long-term consequences for ecosystems and biodiversity, as well as adverse effects on human health, development and food security.</p>



Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Pollution/pollution removal	Soil pollutants	Storage or leaks of hazardous materials can directly contribute to soil pollution. Upstream, mining activities can contribute to dust clouds and mineral deposition. Cleared land leads to increased susceptibility to soil erosion. Upstream, stockpiles and rock dumps can also contribute to erosion.	Soil may become unsuitable for native vegetation due to the pollution.

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Pollution/pollution removal	Solid waste	<p>Oil and gas operations typically generate significant volumes of waste, including hazardous materials.</p> <p>The primary waste sources stem from the extraction and processing of oil and gas, comprising drilling muds, cuttings, scale and sludges. These waste streams may contain chemical additives, hydrocarbons, metals, naturally occurring radioactive material (NORM) and salts.</p> <p>Tailings from oil sands mining contain large quantities of hazardous waste including hydrocarbons and heavy metals. Tailings ponds carry risk of leaching, leaks and dam failures, polluting the surrounding environment and groundwater.</p> <p>Other waste products include tyres, containers and unused hazardous materials.</p> <p>Closure and rehabilitation activities involve disposal of hazardous substances and materials from decommissioned structures and equipment.</p> <p>Additional common waste products from oil and gas activities encompass waste oils, construction debris and domestic and office waste.</p>	<p>Waste products can introduce contaminants into soil, surface water, groundwater and seawater. This can alter the soil and water chemical balances and geomorphological environment structure.</p> <p>This can adversely affect plant and animal species, as well as human health. It can lead to loss of land productivity and erosion. And it can affect sedimentation and groundwater flows.</p> <p>Drilling cutting can accumulate and affect terrestrial and marine benthic organisms, resulting in growth inhibition, mortality and smothering. The disposal of drilling waste in underground injection wells can trigger seismic activity or lead to groundwater contamination.</p> <p>The extent of these impacts is influenced by the organisation's waste management practices, regulatory oversight, and the availability of nearby recovery and disposal facilities.</p>
	Disturbances	Seismic blasting, night lighting, traffic movements, extraction and production activities can all result in noise and light pollution.	Disturbance to local species, affecting their migratory, feeding and breeding routes and habits.

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Resource use/ replenishment	Water use	<p>Activities upstream and in the exploration, production and refining stages all use water as part of their processes.</p> <p>The extraction and processing phases of the oil and gas sector are the most water intensive. The volume of water required varies by extraction method, local geological conditions and the extent of processing needed. Certain methods, such as hydraulic fracturing and oil sands mining, are particularly water intensive. The amount of water extracted for specific activities also hinges on an organisation’s capacity to substitute freshwater, the required water quality, recycling infrastructure and the characteristics of local water resources.</p>	<p>Water use can lead to dewatering of aquifers and depletion of other water sources, especially in arid and drought-prone areas, where many of the world’s oil and gas reserves are located. This can lead to reduced water flow and increased drought severity and frequency. This affects the supply of water to other users – households, fishing, aquaculture and agriculture – and to nature.</p>
	Other resource use	<p>This includes upstream mining of minerals required for the energy transition.</p>	<p>Human presence to extract these minerals results in a variety of impacts on nature. Refer to the TNFD Metals and mining guidance.</p>
Invasive species introduction/removal	Introduction of invasive alien species	<p>Vehicles, equipment and plants can all carry invasive species, as can reclamation programmes that import contaminated soils.</p>	<p>Change in structure and function of ecological communities due to cumulative impacts.</p>

Driver of nature change	Impact driver	Description of the impact driver in the oil and gas sector	Impacts as a result of the impact driver
Social impacts		<p>Displacement of communities for new asset construction or transportation routes.</p> <p>Worsening health of surrounding local communities due to air, soil and water pollutants.</p> <p>Worsening living areas and conditions of local communities, also affecting their economic and working conditions.</p> <p>Increase in local conflicts.</p> <p>Disruption and/or damage to local sacred areas.</p> <p>Possible violation of human rights and use of child labour.</p>	

Source: Adapted from WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#).



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?

No additional sector-specific guidance identified for E3.

E4: Impact materiality assessment

Guiding question:

Which of the identified impacts are material?

No additional sector-specific guidance identified for E4.

Assess nature-related risks and opportunities

A1: Risk and opportunity identification

Guiding question:

What are the corresponding risks and opportunities for our organisation?

Table 6 provides illustrative nature-related risks and opportunities for the oil and gas sector. Additional consideration should be given to the potential risks and opportunities associated with decommissioning, particularly those that may be difficult or expensive to manage from an environmental perspective. This may require the development of comprehensive closure plans, rehabilitation plans and other measures to mitigate the negative effects of decommissioning.

Table 6: Illustrative nature-related risks and opportunities for the oil and gas sector

Risk or opportunity category	Illustrative risks and opportunities for the oil and gas sector
Risks	
<i>Physical</i>	
Acute	Landslides as a result of declining soil stability damaging infrastructure. Wildfires, tropical cyclones, extreme heat and other extreme weather events damaging infrastructure or interrupting business activities. Increased risk of damage from floods and storms if protective terrestrial ecosystems are degraded.
Chronic	Declining water supply as a result of the organisation's activities and those of others in the watershed, as well as climate change disrupting operations and increasing the cost of water management and control.
<i>Transition</i>	
Policy	Increased restrictions on access to remote areas where remaining reserves are located.
Market	Stranded assets as a result of changes in water availability, making some facilities unviable.
Reputation	Increasing customer awareness of, and importance placed on, impact of land, freshwater and ocean use change. Spills to the environment and critical incidents can seriously affect workers, communities, ecosystems and species.

Risk or opportunity category	Illustrative risks and opportunities for the oil and gas sector
Liability	Increased concern for impact of critical incidents on nature, increasing compensation claims.
Opportunities	
Business performance	
Markets	Prevention of financial impacts and operational disruptions through implementation of risk management practices that take into account natural disasters.
Resource efficiency	Use of some of the space cleared for solar (e.g. in between tanks in tank farms). Repurposing of offshore facilities for alternative uses (wind power). Recycling of freshwater and reducing the amount of new freshwater used.
Products and services	Drilling cuttings can be used as alternative aggregate, construction material or cement production (or other civil engineering works).
Reputational capital	Improved communication and relationships through hiring/engagement of local stakeholders.
Sustainability performance	
Sustainable use of natural resources	Scaling up recovery, recycling and reuse of critical minerals and construction materials.
Ecosystem protection, restoration and regeneration	Habitat restoration and reinstatement after clearance and along pipeline routes. Enhanced restoration of wetland habitats and water replenishment. Incorporation of Nature-based Solutions (NbS) to reduce risk along easements. Use of offshore facilities to repopulate threatened ecosystems and species (e.g. artificial reefs).

Sources: WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#); [WWF Biodiversity Risk Filter](#).



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

Guiding questions:

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

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

No additional sector-specific guidance identified for A2.

A3: Risk and opportunity measurement and prioritisation

Guiding question:

Which risks and opportunities should be prioritised?

No additional sector-specific guidance identified for A3.

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?

No additional sector-specific guidance identified for A4.

Prepare to respond and report

This section provides additional guidance to help oil and gas 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?

Table 7, Table 8 and Table 9 present illustrative priority and transformative actions that oil and gas sector organisations may want to consider based on the risks identified in the Assess phase. Table 7 shows actions specific to the energy system's direct operations, Table 8 shows actions specific to the supply chain, and Table 9 illustrates how two actions can be varied in their adoption for companies at different stages of maturity.⁹ All actions have been categorised into the corresponding impact driver and classified according to SBTN's AR3T framework: avoid and reduce negative impacts; restore and regenerate; transformation of business models, products, services, markets and investments; and contributing to needed systemic change inside and outside value chains.

When making capital allocation, management and strategy decisions, organisations should particularly consider:

- **Decarbonisation and business model evolution:** Organisations may find it useful to refer to the TCFD's recommendations and the GRI and SASB standards;¹⁰
- **Water management:** Early identification of water-related risks offers companies the chance to formulate and execute a sustainable water management strategy. This strategy should adhere to local, national or international regulatory standards and prioritise improvements in water efficiency, the encouragement of water reuse and the exploration of alternative water sources, including desalinated water and wastewater;¹¹
- **Critical incidents and spills to environment:** Organisations in the oil and gas sector can prevent critical incidents with an effective process safety management system. Process safety refers to the systematic application of good design, construction and operating principles to ensure the safe containment of hazardous materials, while also addressing the sources or factors that lead to potential incidents. A process safety management system can also limit impacts associated with critical incidents related to extreme weather events, which are likely to increase in frequency and intensity due to the effects of climate change.¹²

Significant effort and priority should be dedicated to designing operations and employing procedures that prevent spills from occurring in the first instance and improving the efficacy and speed of clean-up operations, should an incident occur.¹³

⁹ WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#).

¹⁰ TCFD (2017) [Recommendations of the Task Force on Climate-related Financial Disclosures](#); GRI (2021) [GRI 11: Oil and gas sector 2021](#); SASB (2023) [Oil & Gas Exploration and Production Standard](#).

¹¹ WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#).

¹² GRI (2021) [GRI 11: Oil and gas sector 2021](#).

¹³ IPIECA (2019) [Oil spill preparedness and response: An introduction](#).

When incidents occur, response objectives will vary depending on the specific circumstances of the spill. There are certain basic objectives that will guide any response:

- Safeguarding the safety and health of people, including workers, responders and communities;
 - Stopping the source of the spill as quickly as possible;
 - Minimising environmental and community impact;
 - Minimising the risk of oil reaching the shore in offshore scenarios; and
 - Minimising the risk of oil entering watercourses or groundwater in onshore scenarios.¹⁴
- **Decommissioning and closure:** At the conclusion of their commercial operations, organisations are expected to carry out asset closure and site rehabilitation, which can lead to impacts both during and after this process.

The closure and rehabilitation of oil and gas fields typically encompass actions like the removal and proper disposal of hazardous substances and chemicals, the sealing or plugging of abandoned wells, the dismantling of structures with materials either being reused, recycled or disposed of appropriately. Additionally, it involves the management of waste, addressing issues related to the quality of surface water and groundwater resulting from spills and leaks, and the restoration of land to a condition or economic value comparable to its pre-development state. In the case of oil sands mining, this process also involves the management of tailings ponds.

Technological solutions aimed at repurposing or extending the life of assets after production ceases, such as repurposing pipelines for carbon dioxide (CO₂) storage or low-carbon fuel transport, are currently under exploration. However, their effectiveness and economic viability are yet to be fully demonstrated.

To proactively address potential impacts, the planning for closure must be initiated during the project's early phases. Failure to designate responsible parties and allocate funds can result in closed oil and gas facilities creating enduring environmental challenges and imposing financial burdens on communities and governments.¹⁵

- **Use of materials:** The choice and volume of materials employed by organisations in the oil and gas sector can reflect their reliance on natural resources and the impact on resource availability. The specific environmental consequences hinge on how the organisation sources, utilises and disposes of these materials.

Within the sector, a substantial portion of material use is associated with oil and gas extraction, development, production and processing activities. Materials like concrete, cement, steel and various metals are vital for the construction of offshore platforms, onshore facilities, and for the equipment and infrastructure essential for oil and gas extraction, processing and transportation (including items like valves, tubing and pipelines). Additionally, significant quantities of chemicals are employed during drilling and well completion processes.

The oil and gas sector can adopt practices that enhance material efficiency, whether by leveraging its considerable purchasing power to promote the responsible production of materials or by implementing circularity initiatives aimed at reusing or recycling materials from decommissioned structures, such as steel and concrete.¹⁶

¹⁴ IPIECA (2019) [Oil spill preparedness and response: An introduction](#).

¹⁵ GRI (2021) [GRI 11: Oil and gas sector 2021](#).

¹⁶ GRI (2021) [GRI 11: Oil and gas sector 2021](#).

Table 7: Illustrative priority and transformative actions (direct operations)

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Land, freshwater and ocean use change	For new developments, avoid all protected areas, internationally recognised areas and critical habitat (including but not limited to Natura 2000 sites or geography-specific equivalent network or standard).	EU Article 6(4) Habitats Directive 92/43/EEC SBTN Interim Targets GBF – Target 3					
	For new developments, avoid natural habitat and commit to net gain (not no net loss) when avoidance not practicable. Focus development in modified habitat and commit to net gain/restoration.	GBF – Targets 1, 2, 3, 4 IFC SD 6					
	For new developments and all operating sites, restore and regenerate nature by introducing innovative and nature-based solutions and implement habitat restoration and reinstatement after clearance/decommissioning.	GBF – Targets 2, 3, 11, 12 SDG 15					
	Research or fund innovative ways to reduce the negative impact of the operating process by collaborating with peers or research institutes.	GBF – Target 11					
Climate change	Invest in building and site resilience (e.g. thermal comfort with natural shading, green-roofs passive heating and cooling).	GBF Target 8					

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Climate change	Reduce operational and transport greenhouse gas emissions.	TCFD Paris Agreement					
Pollution/pollution removal	Recycle end-of-life and/or abandoned facilities to restore and regenerate the site to avoid, prevent and reduce air, water and soil pollution generated by discarded facilities.	GBF – Target 7 SDG 6					
	For new and operating sites, implement operational anti-pollution measures and monitoring plans, including but not limited to operational prevention and control plans (e.g. noise impact mitigation).	GBF – Target 7					
	Take effective legal, policy and administrative measures to reduce pollution and waste risks and avoid introducing any harmful levels of pollutants to biodiversity and ecosystem functions and services. This includes but is not limited to excessive nutrients, hazardous chemicals and spills.	GBF – Target 7 SDG 12					
	For all new and operating sites, avoid construction, maintenance and production in/during breeding, nesting, migrating, resting areas and seasons of key and threatened local species.	GBF – Target 4					
	For operating sites, minimise negative impacts on threatened species and aim to restore and regenerate local genetic diversity.	GBF – Targets 4, 5, 6					
	For all sites, reduce disturbances (e.g. light and noise), especially in already-existing, highly-sensitive operational sites.	GBF – Targets 4, 5, 6					

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Resource use/ replenishment	For operating sites, reduce water use in times of scarcity and implement sustainable water management that may include but not be limited to periodic water risk assessment and minimisation of freshwater withdrawals in water-stressed areas or during drought periods (accounting for company-specific available data).	GBF Target 11 Water Framework Directive (EU) Integrated Water Resources Management (UNEP) SDG 6					
	For operating sites, implement water replenishment programmes and conservation/restoration of water species affected by water withdrawals.	SDG 6 Net Positive Water Impact – CEO Water Mandate					

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Resource use/ replenishment	For all operating sites, maximise recovery of process water (e.g. water reuse/recycling, closed loops) by collecting, quantifying and mapping on-the-ground water use and mitigation policies already in place; identify potential regeneration/restoration of areas at higher risk of depletion.	GBF Target 11 Water Framework Directive (EU) CDSB Framework on water-related disclosures SDG 6 International Water Stewardship Standard (AWS)					
	Use innovative, habitat-enhancing, biodiversity-friendly, sustainable materials and solutions (e.g. wind turbines from fabric, turbine reefs) to replace highly negatively impactful material, through collaboration with suppliers.	SDG 12					
	Establish collaboration with Indigenous Peoples, Local Communities and local conservation organisations to continue to monitor habitat restoration processes and implement larger scale conservation and restoration projects in the site area/ region.	GBF – Target 2					

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Resource use/ replenishment	For raw materials used in high volumes during production, commit to integrating recycled materials in the value chain to reduce and avoid the use of virgin materials.	GBF – Target 8 SDG 12					
Invasive species introduction/ removal	For operating sites, eliminate invasive alien species by identifying and managing pathways of introduction (e.g. ballast water management, hygiene and maintenance protocols for vehicles, vessels and equipment, and contractors) and commit to restoring genetic diversity within and between populations of native, wild and domesticated species.	GBF – Targets 4, 5, 6					
	Use site-specific, indigenous and non-invasive species for landscaping and rehabilitation works.	GBF – Targets 4, 5					
Social	Involve and employ local expertise through Indigenous Peoples, Local Communities, NGOs and local stakeholders to better understand local ecosystems, assess onsite activities, mitigate risks and impacts for local communities, and build alliances.	SDG 4, 8, 10					
	Implement social programmes to promote local livelihoods and education	SDG 4, 8, 10					

Source: WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#). Note the table has been adjusted to match the TNFD categorisation of drivers of nature change.

Table 8: Illustrative priority and transformative actions (supply chain)

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Land, freshwater and water ocean use change	Source from suppliers that regularly monitor, assess and transparently disclose their impacts, dependencies and risks on natural capital and biodiversity.	GBF – Targets 2, 3, 15					
	Source and engage with suppliers who commit to no negative impact on UNESCO sites, sensitive or priority habitats.	GBF – Targets 2, 3, 15					
	Source and engage with suppliers who implement and promote habitat restoration and reinstatement in and around the site – for new and existing sites and/or after clearance/ decommissioning (including ecological corridors).	GBF – Targets 2, 3, 15					
	Develop policies and administrative measures with suppliers to reduce negative impacts on the surrounding natural capital.	GBF – Targets 2, 3, 15					
	Support and engage suppliers to increase understanding of the risks and opportunities of reducing and avoiding negative impacts on natural capital, ecosystem services and biodiversity.	GBF – Targets 2, 3, 15					
Climate change	Source and engage with suppliers with a transparent climate strategy and targets and with clear actions to reduce their GHG emissions.	TCFD Paris Agreement GBF – Target 8					

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Pollution/pollution removal	Prioritise suppliers who have implemented anti-pollution measures, periodically monitor their impact and have a response plan in place.						
	Collaborate and engage with suppliers to develop and implement a circular business model to reduce direct operational waste.	GBF – Targets 14, 15 SDG 12					
	Source and engage with suppliers committed to sustainable production.	GBF – Targets 14, 15 SDG 12					
	Source and engage with suppliers that minimise negative impacts and disturbances during critical reproductive and feeding seasons of key species.	GBF – Targets 14, 15					

Driver of nature change	Priority actions	Global frameworks alignment	SBTN Action Framework (A3RT)				
			Avoid	Reduce	Regenerate	Restore	Transform
Resource use/ replenishment	Adopt third-party certification and traceability procedures for raw materials used in production stage.	GBF – Target 15					
	Prioritise suppliers that have in place sustainable water management plans, minimise freshwater withdrawals and maximise water recovery.	GBF – Targets 11, 14 Water Framework Directive (EU) CDSB Framework on water-related disclosures SDG 6					
	Source commodities only/mostly from ethical and environmentally certified suppliers.	SDG 12					
	Use certified sustainable raw materials and include thorough procurement and traceability processes along the supply chain.						
Invasive species introduction/ removal	Prioritise suppliers who measure and monitor invasive alien species and have policies in place to address their introduction.						
Social	Prioritise suppliers who ethically source and produce their products.	GBF – Targets 14, 15					
	Engage with suppliers to be transparent on local livelihood impacts.	GBF – Targets 14, 15					

Source: WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#). Note the table has been adjusted to match the TNFD categorisation of drivers of nature change.

Table 9: Illustrative priority and transformative actions (by maturity level)

Driver of nature change	Addressed risk	Maturity level	Priority actions	SBTN Action Framework (A3RT)				
				Avoid	Reduce	Regenerate	Restore	Transform
Land, freshwater and water ocean use change	Land degradation disrupts ecosystems and ecosystem services, increasing biodiversity loss and habitat fragmentation	Starting	For new developments, commit to no negative impacts on UNESCO sites, sensitive or priority habitats, Key Biodiversity Areas and High Conservation Value Areas (including but not limited to Natura 2000 sites or geography-specific equivalent network or standard).					
		Developing	For new developments, avoid sites with threatened species, commit to No Net Biodiversity Loss, limit reducing ecosystem services and functioning (e.g. flood control, water purification), and mitigate negative impacts by restoring and regenerating nature.					
		Advanced	For new developments and all operating sites, restore and regenerate nature by introducing innovative and nature-based solutions and implement habitat restoration and reinstatement after clearance/ decommissioning.					
		Leading	Research or fund innovative ways to reduce the negative impact of the operating process by collaborating with peers or research institutes.					

Driver of nature change	Addressed risk	Maturity level	Priority actions	SBTN Action Framework (A3RT)				
				Avoid	Reduce	Regenerate	Restore	Transform
Resource use/ replenishment	Significant water use depletes water basins and watersheds increasing risks to production processes and contributing to ecosystem degradation and drought severity	Starting	Reduce water use in times of scarcity and implement sustainable water management, which may include but not be limited to periodic water risk assessment and minimisation of freshwater withdrawals in water-stressed areas or during drought periods (accounting for company-specific available data).					
		Developing	Maximise recovery of process water (e.g. water reuse/recycling, closed loops) and identify areas at higher risk of depletion for potential regeneration/restoration.					
		Advanced	For operating sites, implement water replenishment programmes and conservation/restoration of water species affected by water withdrawals by using innovative technological and nature-based solutions.					
		Leading	Collaborate with local conservation organisations to continue to monitor habitat restoration processes and implement larger scale conservation and restoration projects in the site area/region.					

Source: WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#). Note the table has been adjusted to match the TNFD categorisation of drivers of nature change.



P2: Target setting and performance management

Guiding question:

How will we set targets and define and measure progress?

Relevant standards and frameworks for oil and gas sub-sector targets include, but are not limited to:

- [GRI 11: Oil and gas](#);
- [SASB](#);
- [SBTN](#);
- [TCFD](#);
- [Global Biodiversity Framework](#);
- [CDP \(forests/water/climate\)](#);
- [SBTi \(Oil and Gas\)](#);
- [WWF: Contextual and Science Based targets for Water](#);
- [CEO Water Mandate: Exploring the case for corporate context-based water target](#); and
- [SDG Goal 6: Clean water and sanitation](#).

When companies are applying the TNFD framework to set targets for methane leak reductions, the TNFD recommends they seek to align with or exceed the [Global Methane Pledge](#).

P3: Reporting

Guiding question:

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

No additional sector-specific guidance identified for P3.

P4: Presentation

Guiding question:

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

No additional sector-specific guidance identified for P4.

Glossary

Sector specific concepts and definitions are defined in this section. The [TNFD glossary](#) will be updated to include these concepts once the oil and gas sector guidance is finalised, based on market consultation and feedback. The user is recommended to visit the TNFD glossary for other terms used throughout the document.

Concept	Definitions
Decommissioning	<p>A structured process of planning, preparation and execution, leading to the eventual removal from service or reuse of an asset, giving due consideration to the potential impact on the environment and communities. The term ‘decommissioning’ is intended to include the following activities:</p> <ul style="list-style-type: none"> • Abatement: safe removal of hazards, such as asbestos, polychlorinated biphenyls (PCBs), hydrocarbon or hydrogen sulphide (H₂S) from an asset; • Demolition: the process and activities to remove an asset; • Remediation: a process to reduce or eliminate the impact on areas of land or water in order to restore environmental conditions to acceptable levels, with reference to regulatory or company standards as appropriate; and • Reclamation: the restoration of disturbed lands to similar pre-development condition, other economically productive use, or natural or semi-natural habitat. <p>International Petroleum Industry Environmental Conservation Association (2020) Sustainability reporting guidance for the oil and gas industry.</p>
Spill to the environment	<p>Any unintended release of liquids or solids associated with current operation, from primary containment or secondary containment, into the environment.</p> <p>International Petroleum Industry Environmental Conservation Association (2020) Sustainability reporting guidance for the oil and gas industry.</p>

Annex 1: Sector-specific disclosure metrics – Oil and gas

The TNFD’s recommended core global and core sector metrics for disclosure draw from, and are aligned with, a range of existing standards such as the ISSB’s IFRS standards, SASB, GRI, CDP, UN frameworks, ESRS and others. Where the Taskforce believes it is important to do so, it has also proposed additional metrics below. 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 will periodically update its recommended core sector metrics for disclosure in line with these ongoing initiatives.

Proposed guidance on the application of the core global disclosure metrics

Organisations should refer to Annex 1 of the [TNFD Recommendations](#) for further information on the core global disclosure metrics.

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
Driver of nature change: Climate change				
	GHG emissions	Refer to IFRS S2 Climate-related Disclosure Standard.	No further guidance.	
Driver of nature change: Land/freshwater/ocean-use change				
C1.0	Total spatial footprint	Total spatial footprint (km ²) (sum of): <ul style="list-style-type: none"> Total surface area controlled/managed by the organisation, where the organisation has control (km²); Total disturbed area (km²); and Total rehabilitated/restored area (km²). 	In reporting the core global disclosure metric, the organisation should include: <ul style="list-style-type: none"> Area that is owned, leased and/or operated (e.g. rights-of-way, easements, and area concessions) in the exploration, production (drilling, completion or fracturing), decommissioning phases, as well as recently decommissioned sites or sites being restored. 	SASB – EM-SV-160a.1 SASB – EM-MD-160a.3

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
C1.1	Extent of land/freshwater/ocean-use change	Extent of land/freshwater/ocean ecosystem use change (km ²) by: <ul style="list-style-type: none"> • Type of ecosystem;¹⁷ and • Type of business activity. 	No further guidance.	
		Extent of land/freshwater/ocean ecosystem conserved or restored (km ²), split into: <ul style="list-style-type: none"> • Voluntary; and • Required by statutes or regulations. 	No further guidance.	
		Extent of land/freshwater/ocean ecosystem that is sustainably managed (km ²) by: <ul style="list-style-type: none"> • Type of ecosystem;¹⁸ and • Type of business activity. 	No further guidance.	
Driver of nature change: 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.	No further guidance.	

¹⁷ When disclosing on ecosystem types, refer to the International Union for Conservation of Nature [Global Ecosystem Typology](#).

¹⁸ When disclosing on ecosystem types, refer to the International Union for Conservation of Nature [Global Ecosystem Typology](#).

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
C2.1	Wastewater discharged	<p>Volume of water discharged (m³), split into:</p> <ul style="list-style-type: none"> • Total; • Freshwater; and • Other.¹⁹ <p>Including:</p> <ul style="list-style-type: none"> • 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. 	<p>In reporting the core global disclosure metric, the organisation should include:</p> <ul style="list-style-type: none"> • The volume of produced water and flowback generated. <p>This should be broken down by percentage:</p> <ul style="list-style-type: none"> • Discharged; • Injected; and • Recycled. <p>Pollutants to report under the core global disclosure metric include:</p> <ul style="list-style-type: none"> • Hydrocarbons in both produced water and process wastewater (mg/litre); and • Chemical additives, metals, naturally occurring radioactive material (NORM) and salts. 	GRI – Oil and gas; SASB – Oil and gas

¹⁹ Freshwater: (<=1,000 mg/L Total Dissolved Solids). Other: (>1,000 mg/L Total Dissolved Solids). Reference: GRI (2018) [GRI 303-4 Water discharge](#).

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
C2.2	Waste generation and disposal	<p>Weight of hazardous and non-hazardous waste generated by type (tonnes), referring to sector-specific guidance for types of waste.</p> <p>Weight of hazardous and non-hazardous waste (tonnes) disposed of, split into:</p> <ul style="list-style-type: none"> • Waste incinerated (with and without energy recovery); • Waste sent to landfill; and • Other disposal methods. <p>Weight of hazardous and non-hazardous waste (tonnes) diverted from landfill, split into waste:</p> <ul style="list-style-type: none"> • Reused; • Recycled; and • Other recovery operations. 	<p>In reporting the core global disclosure metric, the organisation should include a breakdown by:</p> <ul style="list-style-type: none"> • Drilling waste (muds and cuttings); • Scale and sludges; and • Tailings. 	GRI Oil and Gas 306-3

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
C2.3	Plastic pollution	<p>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.²⁰</p> <p>For plastic packaging, percentage of plastics that is:</p> <ul style="list-style-type: none"> • Reusable; • Compostable; • Technically recyclable; and • Recyclable in practice and at scale. 	No further guidance.	
C2.4	Non-GHG air pollutants	<p>Non-GHG air pollutants (tonnes) by type:</p> <ul style="list-style-type: none"> • Particulate matter (PM_{2.5} and/or PM₁₀); • Nitrogen oxides (NO₂, NO and NO₃); • Volatile organic compounds (VOC or NMVOC); • Sulphur oxides (SO₂, SO, SO₃, SO_x); and • Ammonia (NH₃). 	<p>Additional pollutants to report under the core global disclosure metric include:</p> <ul style="list-style-type: none"> • Hazardous air pollutants (HAP), such as benzene (C₆H₆) and hydrogen sulphide (H₂S), and ozone (O₃). <p>Reporting under the core global metric should include air emissions released during production and processing; refining, distribution and storage; flaring and venting; fuel combustion for powering machinery; transportation of supplies and products; evaporation losses; fugitive emissions from equipment leaks and failures; process-safety incidents and events; and fuel combustion by end-users.</p>	GRI Oil and Gas

²⁰ Raw material content: % of virgin fossil-fuel feedstock; % of post-consumer recycled feedstock; % of post-industrial recycled feedstock; % of virgin renewable feedstock.

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
Driver of nature change: Resource use/replenishment				
C3.0	Water withdrawal and consumption from areas of water scarcity	Water withdrawal and consumption ²¹ (m ³) from areas of water scarcity, including identification of water source. ²²	No further guidance.	
C3.1	Quantity of high-risk natural commodities sourced from land/ocean/freshwater	Quantity of high-risk natural commodities ²³ (tonnes) sourced from land/ocean/freshwater, split into types, including proportion of total natural commodities.	No further guidance.	
		Quantity of high-risk natural commodities ²⁴ (tonnes) sourced under a sustainable management plan or certification programme, including proportion of total high-risk natural commodities.	No further guidance.	

21 Water consumption is equal to water withdrawal less water discharge. Reference: GRI (2018) [GRI 303-5](#).

22 Surface water; groundwater; seawater; produced water; third-party water. Reference: GRI (2018) [GRI 303-3](#).

23 Users should refer to the Science Based Targets Network (SBTN) [High Impact Commodity List \(HICL\)](#) and indicate what proportion of these commodities represent threatened and [CITES listed species](#).

24 Users should refer to the Science Based Targets Network (SBTN) [High Impact Commodity List \(HICL\)](#) and indicate what proportion of these commodities represent threatened and [CITES listed species](#).

Oil and gas				
Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
Driver of nature change: Invasive alien species and other				
C4.0	Placeholder indicator: Measures against unintentional introduction of invasive alien species (IAS) ²⁵	Proportion of high-risk activities operated under appropriate measures to prevent unintentional introduction of IAS, or low-risk designed activities.	No further guidance.	
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:	No further guidance.	
	Placeholder indicator: Species extinction risk	<ul style="list-style-type: none"> Level of ecosystem condition by type of ecosystem and business activity; Impacts on mean species extinction risk. <p>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.</p> <p>The TNFD will continue to work with knowledge partners to increase alignment.</p>	No further guidance.	

²⁵ 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'.

Proposed core sector disclosure indicators and metrics

Metric category	Driver of nature change	Indicator	Proposed core sector disclosure indicator or metric	Source
Impact driver	Land/freshwater/ocean-use change	Reserves in sensitive locations	The percentage of (1) proved and (2) probable reserves in or near sites with protected conservation status or endangered species habitat.	SASB EM-EP-160a.3
		Site location in protected areas or endangered species' habitat	The percentage of land owned, leased and/or operated within areas of protected conservation status or endangered species habitat.	SASB EM-MD-160a.2
		Site location in, adjacent to protected or high value areas	Location and size of land owned, leased, managed in or adjacent to protected areas and areas of high biodiversity value outside protected areas.	GRI 304
		Site location in Indigenous territories	The percentage of land owned, leased and/or operated in Indigenous territories.	TNFD
		Intensity of land/freshwater/ocean use	Average disturbed area per (1) oil and (2) gas well site (ha).	SASB EM-SV-160a.1
	Pollution/pollution removal	Spills	The number and aggregate volume of hydrocarbon spills, volume affecting sensitive locations (e.g. Arctic, shorelines) and volume recovered (bbls).	SASB EM-MD-160a.4
		Pipeline incidents	The number of reportable pipeline incidents and percentage that were significant.	SASB EM-MD-540a.1
		Releases from transportation activities	The number of (1) accidental releases and (2) non-accidental releases from transportation activities.	SASB EM-MD-540a.3
	Resource use/replenishment	Water use	The volume (m ³) of potable freshwater withdrawn and consumed.	TNFD
State of nature	Species populations	Endangered species	Number and populations of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.	GRI 11.4.5

Proposed additional sector disclosure indicators and metrics

Metric category	Driver of nature change	Indicator	Proposed core sector disclosure indicator or metric	Source
Impact driver	Land/freshwater/ocean-use change	Reserve's location in proximity to Indigenous territories	The percentage of (1) proved and (2) probable reserves in or near Indigenous land.	SASB EM-EP-210a.2
		Operations where Indigenous Peoples are present	Number and area (km ²) of operations where Indigenous Peoples are present or affected by activities of the organisation.	GRI 11.17.3
		Land use	Location and size of land owned, leased, managed in or adjacent to protected areas and areas of high biodiversity value outside protected areas.	
	Pollution/pollution removal	Process Safety Events	Total number of Tier 1 and Tier 2 process safety events and a breakdown of this total by business activity (e.g. exploration, development, production, closure and rehabilitation, refining, processing, transportation, storage).	GRI
		Process Safety Events (Tier 1)	The Process Safety Event (PSE) rates for Loss of Primary Containment (LOPC) of greater consequence (Tier 1).	SASB EM-EP-540a.1
		Process Safety Events (Tier 2)	The Process Safety Event (PSE) rates for Loss of Primary Containment (LOPC) of lesser consequence (Tier 2).	SASB EM-RM-540a.1
		Decommissioned structures	Number of decommissioned structures left in place and rationales for leaving them in place.	GRI 11.7.5
		Hydraulic fracturing fluid	Volume of hydraulic fracturing fluid used and percentage considered hazardous (for organisations performing hydraulic fracturing activities).	SASB EM-SV-150a.1)
		Non-GHG air pollution	Emissions of each air pollutant by region and/or business activity (tonnes).	IPIECA

Metric category	Driver of nature change	Indicator	Proposed core sector disclosure indicator or metric	Source	
Impact driver	Pollution/pollution removal	Water pollution	Share of hydraulic fracturing sites where ground or surface water quality deteriorated compared to a baseline (%).	SASB	
			Number of incidents of non-compliance associated with water quality permits, standards and regulations. Typical parameters of concern include hydrocarbons (including oil and grease), chemical oxygen demand (COD), biochemical oxygen demand (BOD), sulphides, ammonia, phenols, total suspended solids (TSS) and total dissolved solids (TDS).	SASB	
			Volume of produced water and process wastewater discharged (m ³).	GRI	
			Concentration of hydrocarbons discharged in produced water and process wastewater (mg/l).	GRI	
		Soil/water pollution	List of significant spill events and the cause of each spill event.	GRI	
		Waste	Weight of transported, imported, exported or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III and VIII, and percentage of transported waste shipped internationally (tonnes).	GRI EN24	
			(1) Number of underground storage tanks (USTs), (2) number of UST releases requiring cleanup and (3) percentage in states with UST financial assurance funds.	SASB	
			The composition of the waste diverted from disposal broken down by, if applicable: <ul style="list-style-type: none"> • Drilling waste (muds and cuttings); • Scale and sludges; and • Tailings. 	GRI Sector standard	
		Resource use/replenishment	Water use	Volume of produced water and flowback generated (m ³), including a breakdown with the proportions discharged, injected and recycled (%).	SASB

Metric category	Driver of nature change	Indicator	Proposed core sector disclosure indicator or metric	Source
Impact driver	Invasive alien species introduction/removal	Removal of invasive species	Number of invasive species removal programmes underway and volume. Share of invasive species removed (%).	TNFD
State of nature	Ecosystem condition	State of water bodies	Identity, size, protected status and biodiversity value of water bodies and related habitats significantly affected by the reporting organisation’s withdrawal and discharges of water and runoff.	SASB GRI EN25
Response	Impact management	Inspection of infrastructure	Percentage of (1) natural gas and (2) hazardous liquid pipelines inspected, by type of inspection (internal or external).	SASB EM-MD-540a.2
		Offsets	Biodiversity of offset habitats compared to the biodiversity of the affected areas.	GRI EU 13

References

GRI (2021) [GRI 11: Oil and gas sector 2021](#).

IPIECA (2020) [Sustainability Reporting Guidance for the oil and gas industry](#). International Petroleum Industry Environmental Conservation Association.

Pacific Institute (2017) [Exploring the case for corporate context-based water target](#).

SASB (2023) [Oil & Gas Exploration and Production Standard](#). Sustainability Accounting Standards Board.

SASB (2018) [SASB's Sustainable Industry Classification System \(SICS\)](#). Sustainability Accounting Standards Board.

TCFD (2017) [Recommendations of the Task Force on Climate-related Financial Disclosures](#). Task Force on Climate-Related Financial Disclosures.

WBCSD (2023) [Roadmap to nature positive: Foundations for energy system](#). World Business Council For Sustainable Development.

