

# Draft sector guidance

## Fishing

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Open for consultation and feedback

**SICS® industry:**  
Meat, Dairy & Poultry



Taskforce on Nature-related  
Financial Disclosures



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## 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 27 September 2024.

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

# 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 fishing 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 fishing 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 2 sets out the elements of LEAP for which this document provides additional guidance.

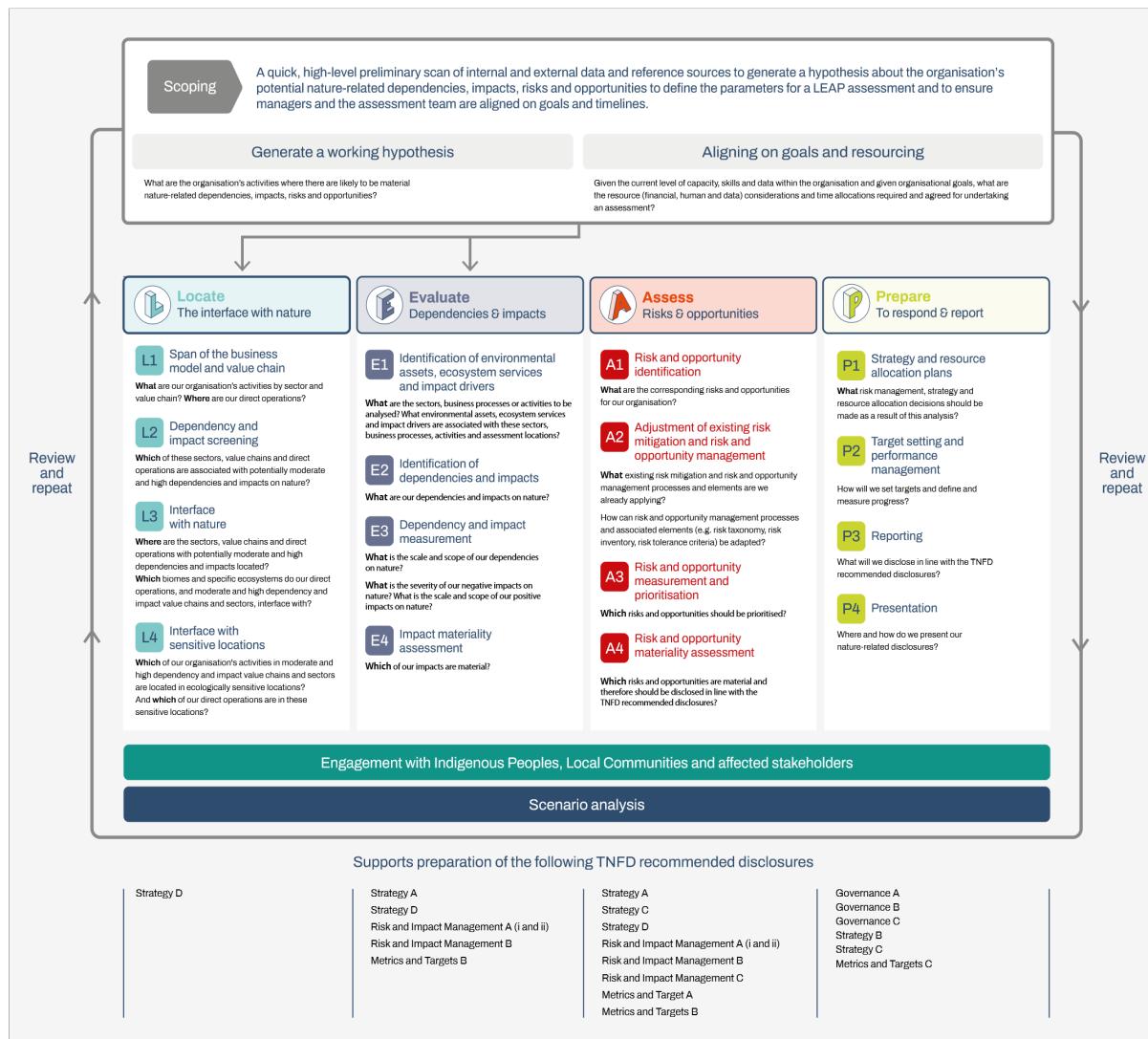
The Taskforce also recognises that investors and other stakeholders require quantitative information to compare performance and nature-related issues within sectors. To facilitate that sector-level analysis, this guidance also includes:

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

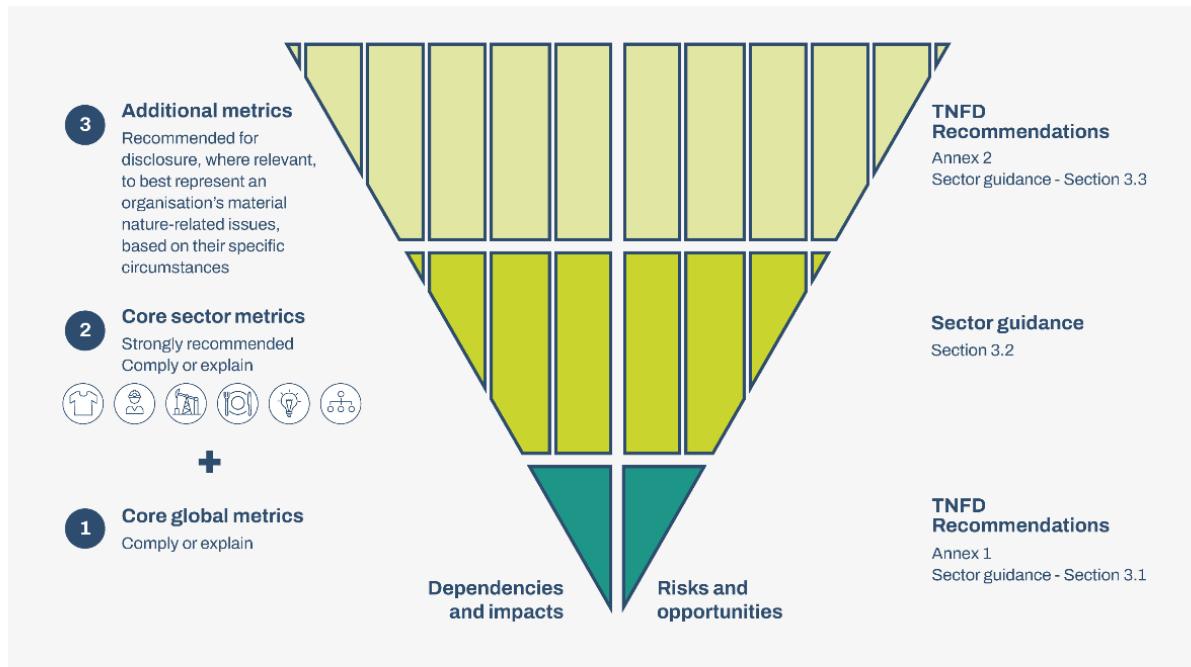
Figure 2 provides an overview of the TNFD disclosure measurement architecture and where indicators and metrics are listed in the [TNFD recommendations](#) and relevant sector guidance.



**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 outlined, 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 aims to support organisations with business models or value chains in the fishing sector. The fishing sector is covered by the SASB Meat, Poultry & Dairy and Processed Foods standards, which in this guidance, is taken to cover the activities defined in Table 1.<sup>1</sup> This includes food systems and the Marine Aquarium Trade (MAT), but does not include recreational fishing. For simplicity, all organisations in this industry are referred to as ‘fishing sector organisations’ in this guidance.

Organisations in the fishing sector should also refer to the [TNFD guidance on biomes](#), particularly the sections on the marine shelf realm (M1) and rivers and streams (F1).

<sup>1</sup> SASB Standards (2023) [Meat, Poultry & Dairy and Processes Foods](#).



**Table 1: Business activities for the fishing sector**

Activity	Description	Scope
Fishing	Capturing wild aquatic organisms, such as fish, molluscs, crustaceans and kelp, via shore-based methods or via commercial or artisanal vessels in inshore, coastal or offshore waters.	In this guidance, the TNFD considers capture and primary processing to be an organisation's direct operations. Note that primary processing can occur on a vessel or at a land-based facility. Aggregation is also considered to be part of the direct operations of some fishing sector organisations and is in scope of this guidance.
Primary processing	Onboard handling of live wild aquatic organisms after capture, at point of landing or at land-based facility or at point of transshipment.	
Aggregation	Aggregating caught fish, molluscs, crustaceans and kelp from multiple sources for onward sale to downstream markets, which can involve transaction by intermediary organisations or single actors.	
Storage	Keeping fishing products in a way that preserves their quality and keeps them safe from, for example, harmful bacteria.	The TNFD considers all of these activities to be downstream for the fishing sector and covers them in this guidance.
Transport	Using traditional or mechanised transportation to move fishing products.	For fish sold to the aquaculture sector for fish feed, organisations should look at the <a href="#">TNFD aquaculture sector guidance</a> .
Trading	Buying and selling fishing products.	For food packaging and food waste issues, organisations should refer to the food and agriculture sector guidance. For transport, organisations should also refer to the relevant sector guidance where available.

Adapted from: GRI (2022)

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 2: Areas of LEAP with additional guidance for the fishing sector in this guidance document**

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

### 1.3. Sector background

Fisheries are governed differently to land-based activities. Fish stocks are a common resource and many are managed by government bodies and through international negotiations or by fishing communities. There are a range of approaches to managing a fishery, from open access to comprehensive management schemes with total allowable catches divided into individual quotas for each vessel.

The fishing industry depends on the wild fish stocks that are the basis of its business. Some practices by individual fishing organisations and the cumulative impacts of many individual organisations can lead to high nature-related risks, affecting the sector's long-term profitability and the health of ocean and freshwater ecosystems. One-third of fish stocks are currently being overfished and about 60% are fished at their maximum sustainable levels.<sup>2</sup> This increases the risk of suboptimal yields and fish stock collapse. In addition, some fishing activities are major contributors to other negative marine environmental impacts, including the decline of non-target fish stocks, injury or mortality to marine mammals, seabirds and other endangered or protected marine life, and the destruction of ocean and freshwater habitats (e.g. seabed, coral reefs in coastal or deep-sea environments, seagrass beds).<sup>3</sup> Illegal, unreported and unregulated (IUU) fishing is estimated to account for one-fifth of wild-caught fish (an estimated 10–26 million tonnes per year) with an estimated cost to the global economy of US\$10–23 billion per year.<sup>4</sup>

A sustainable fishing sector is possible through:

- Better management of fisheries using rights and ecosystem-based management approaches;
- Protecting important spawning or breeding grounds;
- Setting restrictions on gear used in specific areas and the seasons for fishing particular stocks;
- Improved data collection;
- Better traceability of catches and seafood products throughout the value chain;
- Certification of catches to leading standards;
- Stronger regulations;<sup>5</sup>
- Effective enforcement against overfishing and IUU; and
- Reducing the impact of pollutants such as abandoned and lost 'ghost' fishing gear.

<sup>2</sup> GRI (2022) [GRI 13: Agriculture, Aquaculture and Fishing Sectors 2022](#).

<sup>3</sup> UNEP FI (2021) [Turning the tide: How to finance a sustainable ocean recovery](#).

<sup>4</sup> Monterey Bay Aquarium Seafood Watch (2023) [Stop illegal fishing](#).

<sup>5</sup> e.g. EU (2024) [The EU fisheries control system gets a major revamp](#).



## 2. Sector-specific LEAP assessment guidance

### 2.1. Scoping a LEAP assessment

Working hypothesis generation:

*What are the organisation's business processes and activities where there are likely to be 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?*

Fishing organisations scoping their LEAP assessment may want to consider the target species, gear types (Table 3), ecosystems, operational scale (industrial versus artisanal) and production methods across their value chains to identify areas of potential focus.

**Table 3: Types of fishing gear and species typically caught**

Fishing gear category	Type of fishery	Description and typical depth used at	Species typically caught
Surrounding nets	Inland; marine	A long piece of net framed by ropes that surrounds a school of fish to catch them, including purse seines, and other surrounding nets without a purse line.  Usually used on pelagic fish near the surface or in shallow water.	Purse seines: Skipjack tuna, Atlantic mackerel, Atlantic herring  Other surrounding nets: Sardines, mackerel, squid
Seine nets	Inland; marine	Either cone-shaped nets with long wings and a codend, or a long piece of net without a codend, that catches fish by encircling and herding. This type of net may be set from the shore (beach seine) or from one or two boats (boat seine).  Beach seines are common in small-scale and artisanal fisheries. They are used in shallow coastal waters.  Boat seines are usually used over smooth seabed with fewer obstructions.	Flounders



Fishing gear category	Type of fishery	Description and typical depth used at	Species typically caught
Trawls	Marine (sometimes inland, but to a lesser extent)	<p>A cone-shaped body of netting usually with one codend towed behind one or two boats. They are designed to be towed across the seabed (bottom trawling) or in midwater (midwater trawls). Semi pelagic trawls can do either.</p> <p>Trawls can be used by one or more boats and are very versatile.</p> <p>Bottom trawls have heavy ground gears to ensure that contact with the seabed is maintained and the net is not damaged.</p> <p>Midwater trawls use echo sounders and/or scanning sonars to locate schools of fish.</p>	<p>Bottom trawl: Flatfish, shrimp, cod, haddock, halibut</p> <p>Midwater trawl: Mackerel, herring, sprats</p>
Dredges	Inland; marine	<p>A dredge is a cage-like structure usually with a scraper blade or teeth on its lower edge which is pulled or towed to dig animals out of the substrate and lift them into the cage or bag.</p> <p>Usually made of metal rods or chain mesh and pulled along the bottom. Dredges can be towed, used by hand, or mechanised.</p>	Mussels, oysters, scallops, clams
Lift nets	Inland; marine	<p>A lift net is a piece of netting mounted onto a frame that is lowered into the water to allow fish to enter the area above the net and is then lifted or hauled upward to collect the fish accumulated there.</p> <p>This gear ranges from being small and portable to large and assisted by a winch or equivalent device.</p>	Cuttlefish, Pacific saury
Falling gear	Inland; marine	<p>Falling gear is a net or a basket-like structure which is cast, pushed down or allowed to fall from above to catch fish underneath it.</p> <p>These are usually used in shallow coastal water, but some large-scale falling nets are used in deep waters from a boat with lights used to attract fish.</p>	Sardines, scads, mackerel
Gillnets and entangling nets	Inland; marine	<p>Gillnets and entangling nets are long rectangular walls of netting that catch fish by gilling, wedging, snagging, entangling or entrapping them in pockets.</p> <p>Can be used at any depth – near the surface, midwater, near the seabed.</p>	Monkfish, skates, sole, squid



Fishing gear category	Type of fishery	Description and typical depth used at	Species typically caught
Traps	Inland; marine	Traps are stationary structures of many shapes and sizes into which fish are guided, or pushed by the current, or drawn into the gear by bait or other attractants.	Lobster, crabs, shrimps
Hooks and lines	Inland; marine	<p>Hook-and-line gears use hooks (including jigs) and lines to catch fish by the mouth with baited hooks, or penetrate their flesh (impaling, ripping or tearing) with unbaited hooks when fish pass within the hook's range of movement. Bait can include mackerel, herring and squid, or artificial lures such as rubber, plastic or feather.</p> <p>Hook-and-line gear can be used at all depths, set on or near the bottom with weights, near the surface, or drifting in midwater.</p> <p>Hooks and lines can be longlines or handlines, with different environmental impacts. With longlines, hooks are connected to branch lines, which are attached to a long horizontal mainline. These are usually baited and set in open water, untended, and can be from hundreds of metres to over 80km long.</p> <p>Handlines are operated and/or tended to by a fisher.</p>	Cod, halibut, haddock, squid
Miscellaneous gear		Includes harpoons, hand implements, pumps, electric fishing, scoopnets, pushnets, drive-in nets, diving. Diving is most applicable to the marine aquarium trade.	Various.
Adapted from He, P. et al. (2021) <a href="#">Classification and illustrated definition of fishing gears</a> .			Notes: There is ongoing debate over the intensity and destructiveness of different gears. Organisations should refer to resources such as McCarthy, A. H. et al. (2024) <a href="#">Destructive fishing: An expert-driven definition and exploration of this quasi-concept</a> . Note that, however, there are ways to mitigate the destructiveness of certain fishing gears and this should be taken into account.



## 2.2. Locate the organisation's interface with nature

This section provides additional considerations to support fishing sector organisations with the Locate phase of the LEAP approach.

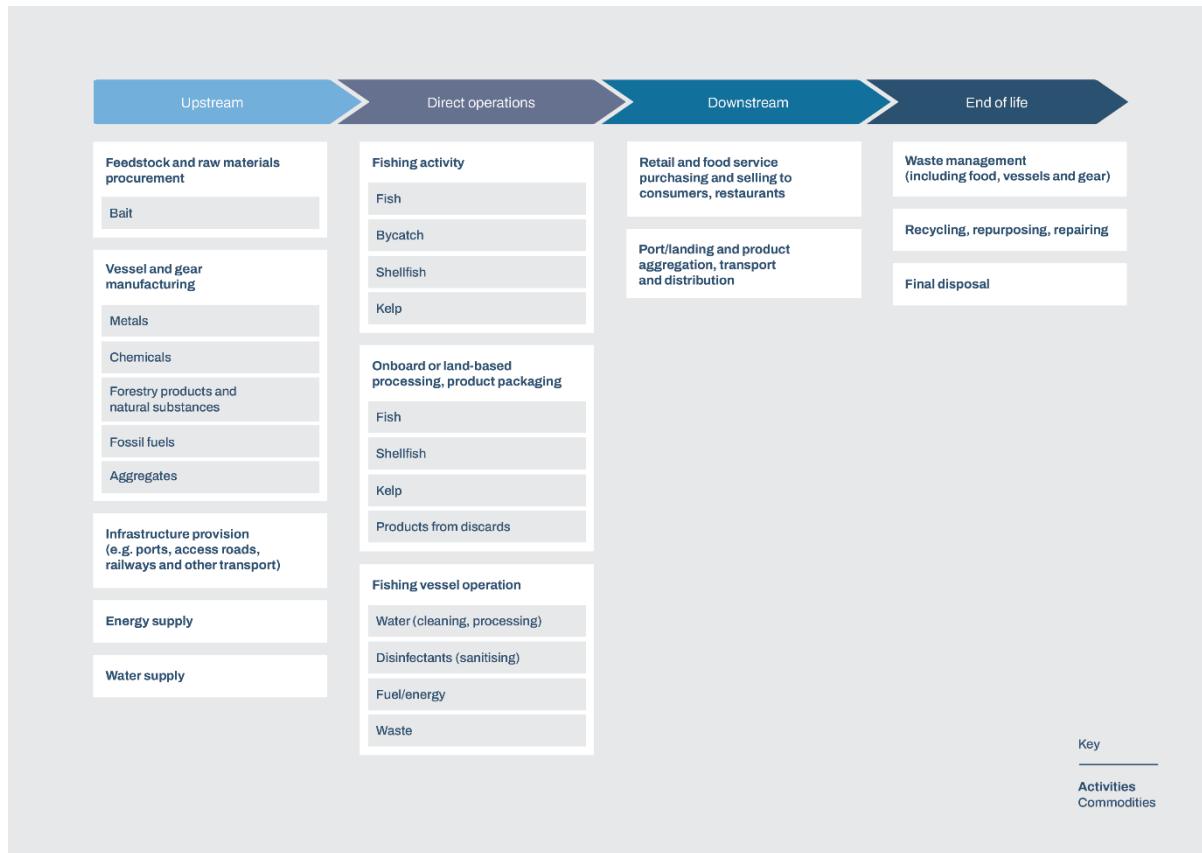
### L1: Span of the business model and value chain

Guiding questions:

*What are our organisation's activities by sector, value chain and geography?*

Fishing sector value chains are complex and diverse, often involving multiple actors, ranging from small-scale operations that may only consist of one or two boats to large fisheries with thousands of fishing vessels. Primary fishers will often sell to a trading company or aggregator who will pool and sell the product down the value chain to distributors, wholesalers, packed and processed food manufacturers and retailers. Consumers and the end of life are downstream for all the organisations in this sector. Figure 3 presents an illustrative value chain.

**Figure 3: Typical fishing industry value chain**



*Where are our direct operations?*

Describing the location of fishing operations is different to land-based activities. Boats can cover large areas and catch fish in many locations; ocean ecosystems are large, and made up of both the seabed and the water column



above it, with different habitats and ecosystems at different depths (marine shelf, pelagic ocean waters, deep sea floors); and target fish are, to varying extents, mobile.<sup>6</sup>

Organisations identifying the location of fishing operations in this phase of LEAP should identify the geographic catch area where the seafood capture occurred, the location of landing and the species (that will indicate the depth of the catch). This includes identifying the:

- FAO Major Fishing Areas or Sub-areas;
- Exclusive economic zone (EEZ) of the country where the seafood was caught;
- Regional fishery management organisation (RFMO);
- Sub-national permit area where the seafood was caught (if applicable); and
- Geographic coordinates of fishing activities and/or landing:
  - For port landings, the port name ([United Nations Code for Trade and Transport Locations UN/LOCODE](#)); and
  - For non-port landings, the GPS coordinates where the seafood was first discharged to land and/or transhipped to another vessel.

Fishing organisations can use AIS/VMS data to gather this information and smaller vessels can use data from transponders or GPS locator data. If coordinates are not possible for smaller vessels, the management area (e.g. [ICES statistical rectangles](#) for the North Atlantic) or the total maximum area fished can be an appropriate proxy. In the absence of primary data from source vessels, for processing organisations, [Global Fishing Watch](#) data can be helpful in estimating the area fished.

Further guidance and support on location is available from the [Global Dialogue on Seafood Traceability Key Data Elements](#), the FAO [Fisheries and Resources Monitoring System](#) (FIRMS) or the [Ocean Biodiversity Information System](#) (OBIS) mapper.

For the live-fish trade (e.g. ornamental fish, marine aquarium trade) organisations should identify the location of the reefs in which the species were caught and the landing location where the organisms were first discharged to land, which for in-port landings, includes the port name ([United Nations Code for Trade and Transport Locations UN/LOCODE](#)), and for non-port landings, the GPS coordinates where the organisms were first discharged to land.

Organisations in the downstream value chain may also find standards such as the [MSC Chain of Custody](#) standard useful.

## 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?*

In L2, organisations should filter the list of upstream and downstream activities and commodities identified in L1 to prioritise which should be located and then considered for further analysis.

Tables 4a, 4b, 5a and 5b present the ENCORE materiality ratings for ecosystem services and impact drivers associated with fishing and processing activities. Given the low degree of granularity of these screening tools, note that ENCORE and SBTN outputs should be considered as guidance only and further analysis may be needed to better prioritise activities and commodities. For instance, ‘other resource use’ in Tables 5a and 5b can be considered ‘very high’ and not ‘high’ in instances of overfishing and high bycatch rates.

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<sup>6</sup> Global Ecosystem Typology: [Marine Realm](#).



**Table 4a: Materiality ratings of ecosystem services the fishing sector typically depends on (based on 2018-2023 version of ENCORE)**

Production Process	Freshwater wild caught fish	Saltwater wild caught fish
<b>Bioremediation</b>	NA	NA
<b>Genetic materials</b>	Medium	Medium
<b>Climate regulation</b>	VH	NA
<b>Filtration</b>	NA	NA
<b>Flood and storm protection</b>	NA	NA
<b>Ground water</b>	NA	NA
<b>Mass stabilisation and erosion control</b>	Very low	Very low
<b>Surface water</b>	Very high	Very high
<b>Water flow maintenance</b>	NA	NA
<b>Water quality</b>	Very high	Very high
<b>Maintain nursery habitats</b>	Very high	Very high
<b>Soil quality</b>	Medium	Very low
<b>Buffering and attenuation of mass flows</b>	Very high	Medium
<b>Ventilation</b>	Low	Very low
<b>Dilution by atmosphere and ecosystems</b>	Very low	Very low
<b>Pest control</b>	Low	Low
<b>Disease control</b>	Low	NA

Source: 2018-2023 version of the ENCORE knowledge base

NA = Not applicable ND = No data



**Table 4b: Materiality ratings of ecosystem services the fishing sector typically depends on (based on 2024 version of ENCORE)**

	ISIC class	Fishing	Processing and preserving of fish, crustaceans and molluscs
Provisioning services	<b>Genetic material</b>	High	N/A
	<b>Water supply</b>	High	High
	<b>Other provisioning services - Animal-based energy</b>	N/A	N/A
	<b>Biomass provisioning</b>	Very high	N/A
Regulating and maintenance services	<b>Solid waste remediation</b>	Very high	Medium
	<b>Soil and sediment retention</b>	Very high	Low
	<b>Water purification</b>	Very high	Very high
	<b>Soil quality regulation</b>	Medium	N/A
	<b>Other regulating and maintenance service - Dilution by atmosphere and ecosystems</b>	Medium	Low
	<b>Biological control</b>	High	Very low
	<b>Air filtration</b>	Low	N/A
	<b>Flood control</b>	Medium	Medium
	<b>Global climate regulation</b>	Very high	Very low
	<b>Nursery population and habitat maintenance</b>	Very high	N/A
	<b>Noise attenuation</b>	ND	N/A
	<b>Other regulating and maintenance service - Mediation of sensory impacts (other than noise)</b>	N/A	N/A
	<b>Local (micro and meso) climate regulation</b>	Medium	ND
	<b>Pollination</b>	N/A	N/A
Cultural services	<b>Storm mitigation</b>	High	Medium
	<b>Water flow regulation</b>	High	High
	<b>Rainfall pattern regulation</b>	Very high	N/A
	<b>Recreation related services</b>	ND	N/A
	<b>Visual amenity services</b>	ND	N/A
	<b>Education, scientific and research services</b>	Very high	N/A
	<b>Spiritual, artistic and symbolic services</b>	Very high	N/A

NA = Not 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>.



**Table 5a: Materiality ratings for impact drivers typically relevant for saltwater and freshwater wild-caught fish activities (based on 2018-2023 version of ENCORE)**

			Saltwater wild-caught fish	Freshwater wild-caught fish
Land/water/ocean-use change	Terrestrial ecosystem use	Upstream	High	High
		Direct operations	ND	ND
	Freshwater ecosystem use	Upstream	Medium	Medium
		Direct operations	ND	Very high
	Marine ecosystem use	Upstream	Medium	Medium
		Direct operations	Very high	ND
Climate change	GHGs emissions	Upstream	Very high	Very high
		Direct operations	ND	ND
Resource exploitation/replenishment	Water use	Upstream	Medium	Medium
		Direct operations	ND	ND
	Other resource use	Upstream	ND	ND
		Direct operations	High	High
Pollution/pollution removal	Non-GHG air pollutants	Upstream	Low	Low
		Direct operations	ND	ND
	Water pollutants	Upstream	Medium	Medium
		Direct operations	Medium	High
	Soil pollutants	Upstream	Low	Low
		Direct operations	ND	ND
	Solid waste	Upstream	Medium	Medium
		Direct operations	ND	ND
	Disturbances	Upstream	Low	Low
		Direct operations	ND	ND
Invasive alien species introduction/removal	Biological alterations/interferences	Upstream	ND	ND
		Direct operations	ND	ND

Source: 2018-2023 version of the ENCORE knowledge base, SBTN

Note: ENCORE and SBTN only focus on upstream and direct operations within the fishing value chain. In addition to considerations from this table, organisations should consider water use and pollutants from fish processing.



**Table 5b: Materiality ratings for impact drivers typically relevant for the fishing sector (based on 2024 version of ENCORE)**

	<b>ISIC class/group</b>	<b>Fishing</b>	<b>Processing and preserving of fish, crustaceans and molluscs</b>
Land, freshwater and ocean-use change	<b>Area of land use</b>	N/A	Low
	<b>Area of freshwater use</b>	High	N/A
	<b>Area of seabed use</b>	High	N/A
Climate change	<b>Emissions of GHG</b>	Medium	Low
Pollution/pollution removal	<b>Emissions of non-GHG air pollutants</b>	Medium	Low
	<b>Disturbances (e.g. noise, light)</b>	High	Medium
	<b>Emissions of toxic soil and water pollutants</b>	Medium	Medium
	<b>Emissions of nutrient soil and water pollutants</b>	ND	Very high
	<b>Generation and release of solid waste</b>	High	Medium
Resource use/replenishment	<b>Other biotic resource extraction (e.g. fish, timber)</b>	High	N/A
	<b>Other abiotic resource extraction</b>	N/A	N/A
	<b>Volume of water use</b>	Medium	Medium
<b>Introduction of invasive alien species</b>		Medium	ND

NA = Not 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: 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?*

In this phase, organisations identify the locations of activities and commodities prioritised in L2 and associate these and the locations of direct operations and value chains with biomes and ecosystems.

Organisations identifying catch locations should refer to the guidance in L1.

Table 6 lists marine and freshwater biomes most likely to be relevant for the fishing sector. Organisations may also find it useful to refer to the [TNFD biome guidance](#) for further guidance when analysing their interfaces with these biomes.

**Table 6: Marine and freshwater ecosystem functional groups by biome for the fishing sector**

Rivers and streams (F1)	Marine shelf (M1) Seagrass meadows (M1.1) Kelp forests (M1.2) Photic coral reefs (M1.3) Shellfish beds and reefs (M1.4) Photo-limited marine animal forests (M1.5) Subtidal rocky reefs (M1.6) Subtidal sand beds (M1.7) Subtidal mud plains (M1.8) Upwelling zones (M1.9) Rhodolith/Maerl beds (M1.10)	Artificial marine systems (M4) Submerged artificial structures (M4.1) Marine aquafarms (M4.2)	Anthropogenic shorelines (MT3) Artificial shorelines (MT3.1)
Permanent upland streams (F1.1) Permanent lowland rivers (F1.2) Freeze-thaw rivers and streams (F1.3) Seasonal upland streams (F1.4) Seasonal lowland rivers (F1.5) Episodic arid rivers (F1.6) Large lowland rivers (F1.7)			



<b>Lakes (F2)</b> Large permanent freshwater lakes (F2.1) Small permanent freshwater lakes (F2.2) Seasonal freshwater lakes (F2.3) Freeze-thaw freshwater lakes (F2.4) Ephemeral freshwater lakes (F2.5) Permanent salt and soda lakes (F2.6) Ephemeral salt lakes (F2.7) Artesian springs and oases (F2.8) Geothermal pools and wetlands (F2.9) Subglacial lakes (F2.10)	<b>Pelagic ocean waters (M2)</b> Epipelagic oceans waters (M2.1) Mesopelagic ocean waters (M2.2) Bathypelagic ocean waters (M2.3) Abyssopelagic ocean waters (M2.4) Sea ice (M2.5)	<b>Shorelines (MT1)</b> Rocky shorelines (MT1.1) Muddy shorelines (MT1.2) Sandy shorelines (MT1.3) Boulder and cobble shores (MT1.4)	<b>Semi-confined transitional waters (FM1)</b> Deepwater coastal inlets (FM1.1) Permanently open riverine estuaries and bays (FM1.2) Intermittently closed and open lakes and lagoons (FM1.3)
<b>Artificial wetlands (F3)</b> Large reservoirs (F3.1) Constructed lacustrine wetlands (F3.2) Rice paddies (F3.3) Freshwater aquafarms (F3.4) Canals, ditches and drains (F3.5)	<b>Deep sea floors (M3)</b> Continental and island slopes (M3.1) Submarine canyons (M3.2) Abyssal plains (M3.3) Seamounts, ridges, and plateaus (M3.4) Deepwater biogenic beds (M3.5) Hadal trenches and troughs (M3.6) Chemosynthetic-based-ecosystems (CBE) (M3.7)	<b>Supralittoral coastal (MT2)</b> Coastal shrublands and grasslands (MT2.1) Large seabird and pinniped colonies (MT2.2)	<b>Brackish tidal (MFT1)</b> Coastal river deltas (MFT1.1) Intertidal forests and shrublands (MFT1.2) Coastal saltmarshes and reedbeds (MFT1.3)
Adapted from: <a href="#">IUCN Global Ecosystem Typology</a> .			



## 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?*

Assessing ecosystem integrity in an ocean context is subject to fast-evolving ongoing research and an organisation should be aware of any new indicators and future research. For the ocean and freshwater realms, organisations should, in addition to the criteria in the [TNFD LEAP approach](#), consider as sensitive locations areas that:

- Contain habitats unable to recover to at least 80% of their unimpacted structure and function within 20 years (e.g. coral reefs, mangroves);
- Blue carbon-rich sediments;
- Ecologically or Biologically Significant Marine Areas (EBSAs) defined by:
  - Uniqueness or rarity;
  - Special importance for life history stages of species;
  - Importance for threatened endangered or declining species and/or habitats;
  - Vulnerability, fragility, sensitivity or slow recovery;
  - Biological productivity;
  - Biological diversity;
  - Naturalness;<sup>7</sup> and
- Vulnerable Marine Ecosystems (VMEs), such as seamounts, cold-water corals, hydrothermal vents and sponge fields.<sup>8</sup>

In addition to the guidance provided in the [LEAP approach](#), organisations can use the following recommended metrics and datasets for identifying and measuring sensitive locations:

- [Ecologically or Biologically Significant Marine Areas \(EBSAs\) dataset](#);
- [The IMMA e-Atlas Marine Mammal Protected Areas Task Force](#);
- [Ocean+ Habitat Datasets](#);
- [The FAO Database for Vulnerable Marine Ecosystems \(VMEs\)](#);
- [The Mapping Ocean Wealth Explorer](#) – in particular, the mangroves dataset;
- [The OSPAR List of Threatened and/or Declining Habitats](#);
- [IMO's Particularly Sensitive Sea Areas](#);
- [Birdlife International's List of Important Bird Areas](#);
- [Marine Protected Areas \(MPAs\)](#) – in particular, those with a no-take policy in place;
- [Coastal Risk Index](#); and
- [Convex Seascapes Survey](#).

<sup>7</sup> CBD [Ecologically or biologically significant marine areas](#).

<sup>8</sup> FAO [Vulnerable marine ecosystems](#).



Local knowledge about biodiversity is important to consider and may in some cases be the only way of getting information about the presence of rarely observed species that would otherwise require surveys to assess.

## 2.3. Evaluate dependencies and impacts on nature

This section provides additional guidance to help fishing 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?*

#### Impacts

Table 7 gives illustrative examples of sector-specific business processes and activities, the associated impact drivers and the environmental assets and ecosystem services that the impact drivers affect.

This table connects the impact pathways for the specific impact drivers identified in L2 and E1 to key fishing production systems. It also gives guidance to help organisations identify further impacts associated with their particular business model.

Organisations should refer to the relevant [TNFD sector guidance](#) for upstream and downstream impacts, e.g. food and agriculture and aquaculture.

This table describes impacts over different environmental assets, but the organisation should then think of how these impacts apply to their specific locations and their areas of influence.

**Table 7: Examples of impact pathways for fishing, land-based and vessel-based seafood processing and the marine aquarium trade**

Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<p><b>Land, freshwater and ocean-use change</b></p> <p><b>Ocean ecosystem use change:</b> The United Nations estimates that 95% of global ocean damage is a direct result of bottom trawling.<sup>9</sup></p>	<p><i>Environmental assets:</i></p> <ul style="list-style-type: none"> <li>Marine (ocean) ecosystems</li> <li>Freshwater and subterranean freshwater ecosystems</li> </ul> <p><i>Ecosystem services:</i></p> <ul style="list-style-type: none"> <li>Biomass provisioning</li> <li>Biological control</li> <li>Genetic material</li> <li>Local (micro and miso) climate regulation</li> <li>Nursery population and habitat maintenance</li> <li>Other regulating and maintenance services</li> <li>Cultural services</li> </ul>	<p>Gear such as blast/dynamite fishing, chemicals/poisons, mechanised dredges and towed dredges have been identified as four of the most potentially destructive gear types.<sup>10</sup> Dredging and bottom trawling disturbs benthic habitats and drags up plants and coral populations that maintain the balance of marine ecosystems by providing nursery and feeding grounds for many species.<sup>11</sup> Dredging and bottom trawling can disturb carbon-rich ecosystems such as seagrass, leading to the release of stored carbon.<sup>12</sup> These activities in turn can affect cultural services, such as educational and tourism activities.</p> <p>Organisations can identify the ecosystem where they are trawling or dredging and determine whether it will suffer long-term damage if it lacks an ability to maintain its ecological structure and function or recover from the impact (e.g. trawling on a highly disturbed sandy seafloor as opposed to through a coral reef).</p> <p>Organisations can identify whether the areas where they operate overlap with key marine breeding, nursery or feeding grounds, as well as carbon-rich sediments and other carbon-rich ecosystems such as seagrass meadows and mangroves.</p>

<sup>9</sup> UN (2006) [The Impacts of Fishing on Vulnerable Marine Ecosystems: Actions taken by States and regional fisheries management organizations and arrangements to give effect to paragraphs 66 to 69 of General Assembly resolution 59/25 on sustainable fisheries, regarding the impacts of fishing on vulnerable marine ecosystems](#).

<sup>10</sup> McCarthy et al. (2024) [Destructive fishing: An expert-driven definition and exploration of this quasi-concept](#).

<sup>11</sup> Pitcher et al. (2022) [Trawl impacts on the relative status of biotic communities of seabed sedimentary habitats in 24 regions worldwide](#).

<sup>12</sup> Australian Government (2024) [A guide to measuring and accounting for the benefits of restoring blue carbon ecosystems](#).



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<b>Pollution/pollution removal</b>  <b>Plastic pollution:</b> Fishing gear is often lost by accident or abandoned at sea deliberately. An estimated 29% of all fishing lines are lost each year, along with 6% of all nets. An estimated 640,000 tonnes of fishing gear enter the ocean each year, making up 10% of ocean plastic waste. Fishing gear accounts for over 85% of the refuse on the seafloor, seamounts and ocean ridges, and in the Great Pacific Gyre. <sup>13</sup>	<i>Environmental assets:</i> Marine (ocean) ecosystems Freshwater and subterranean freshwater ecosystems  <i>Ecosystem services:</i> Biomass provisioning Biological control Genetic material Nursery population and habitat maintenance Other regulating and maintenance services Cultural services	Abandoned, lost or otherwise discarded fishing gear (ALDFG) – or ‘ghost gear’ – can trap, entangle, smother or kill animals. Over 300,000 small whales, dolphins and porpoises die from entanglement in fishing nets each year. <sup>14</sup>  Ghost gear may continue to catch both commercial and non-target species for many months, years or even decades after it is lost or discarded. It is worse than other types of plastic pollution because it was specifically designed to trap and kill marine wildlife.  Plastic gear’s lightness, buoyancy, durability and low cost makes it ideal for fishing, but fatal to marine life. There are socioeconomic costs where ghost fishing competes against fishers for their catch.  Ghost gear can damage marine habitats and biodiversity through physical damage caused by abrasion, shearing or smothering, and can change the physical and chemical composition of marine sediments, especially sensitive habitats and endangered species.  Physical damage to marine habitats can impair critical feeding areas, breeding grounds (e.g. turtle and seabird nesting sites), nurseries and refuges used by a range of organisms that occupy these habitats. Lost or degraded habitats reduce the resilience of marine creatures and their ability to survive and can ultimately alter complex marine ecosystems and reduce local biodiversity.  Organisations can find more information about ghost gear and how to prevent it at the Global Ghost Gear Initiative, which has a reporting app and a database.

<sup>13</sup> Greenpeace (2019) [Ghost gear, the abandoned fishing nets haunting our oceans](#).

<sup>14</sup> WWF [Bycatch](#).



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<b>Pollution/pollution removal:</b> <b>Water pollutants:</b> Commercial fishermen store the fish and shellfish they catch in chilled condition on their fishing vessels. The two most common methods of cooling seawater are by mechanical refrigeration to create refrigerated seawater (RSW) or by adding ice (or ice slurry or ice chips). Fish-hold effluent includes RSW, ice and melted ice that remains in the fish hold after the catch has been off-loaded. The water that is drained as the ice melts during the fishing expedition is also fish-hold effluent, as is any fish-hold cleaning wastewater. Fish-hold effluent is often immediately discharged overboard following off-loading. <sup>15</sup>	<i>Environmental assets:</i> Marine (ocean) ecosystems Terrestrial (land-based) and subterranean terrestrial ecosystems Freshwater and subterranean freshwater ecosystems <i>Ecosystem services:</i> Water supply Water purification Biological control Nursery population and habitat maintenance Genetic material Other regulating and maintenance services Cultural services	Fish-hold effluent and the effluent produced from the cleaning of fish holds may contain organic material resulting from the degradation of seafood and cleaning products (e.g. soaps and detergents), such as trace heavy metals and nutrients, and have an altered pH. Such effluents are often discharged by vessels into near-shore waters and have been shown to have the potential to contribute to water pollution in bays and estuaries as well as impact human health. <sup>16</sup> High pathogen concentrations have also been found in some fish-hold effluent and fish hold cleaning wastewater samples. <sup>17</sup>

<sup>15</sup> United States Environmental Protection Agency (2011) [Fish Hold Effluent and Fish Hold Cleaning Wastewater Discharge](#).

<sup>16</sup> Albert, McLaughlin and Falatko (2014) [Characterization of fish hold effluent discharged from commercial fishing vessels into harbor waters](#).

<sup>17</sup> However, the source of pathogens can likely have been contaminated by ambient background water used to clean the decks aboard these vessels.



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<b>Pollution/pollution removal:</b> <b>Disturbances:</b> Noise pollution from fishing vessels.	<i>Environmental assets:</i> Marine (ocean) ecosystems Freshwater and subterranean freshwater ecosystems <i>Ecosystem services:</i> Biomass provisioning Biological control Noise attenuation Genetic material Nursery population and habitat maintenance Other regulating and maintenance services Cultural services	Marine noise pollution (to which fishing vessel operations contributes) has well-documented negative effects – namely the injury (often fatal) of marine mammals, fish and invertebrates, <sup>18</sup> changes in behaviour to avoid the noise included altered migration patterns and masking of sounds marine life uses to communicate. <sup>19</sup> This can change population distribution and abundance of marine species and affect trophic pathways within an ecosystem. Evidence has also shown that exposure to noise pollution from vessel noise can affect taxa like marine invertebrates down to the level of DNA integrity. <sup>20</sup>  Some studies have even shown that anthropogenic noise pollution causes a reduction of the catch rate of some commercial marine species. <sup>21</sup>  Bottom trawling noise can propagate across oceanic geographic features. It will have more impact if it is done during the times of year and in locations where cetaceans and other species sensitive to noise pollution are migrating or breeding. <sup>22</sup>

<sup>18</sup> Williams, R. et al. (2015) [Quiet\(er\) marine protected areas](#).

<sup>19</sup> Daly, E. et al. (2021) [Bottom trawling noise - are fishing vessels polluting to deeper acoustic habitats?](#)

<sup>20</sup> Wale, M. A. et al. (2019) [From DNA to ecological performance - effects of anthropogenic noise on a reef-building mussel.](#)

<sup>21</sup> Peng, C. et al. (2015) [Noise in the sea and its impacts on marine organisms.](#)

<sup>22</sup> Daly, E. et al. (2021) [Bottom trawling noise: Are fishing vessels polluting to deeper acoustic habitats?](#)



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<b>Pollution/pollution removal</b>  <b>Solid waste:</b> Between 2014 and 2020, 219,000 gross cumulative tonnes of fishing vessels were dismantled and removed from the oceans. Half of these vessels were beached – meaning deliberately laid ashore – and broken down in India or Bangladesh on tidal mudflats. This rate is expected to increase over time as the global number of vessels increased sevenfold between 1950 and 2015. <sup>23</sup>	<i>Environmental assets:</i>  Marine (ocean) ecosystems Terrestrial (land-based) and subterranean terrestrial ecosystems Freshwater and subterranean freshwater ecosystems  <i>Ecosystem services:</i>  Water supply Nursery population and habitat maintenance Genetic material Other regulating and maintenance services Cultural services	Ships contain hazardous materials such as asbestos, Polychlorinated Biphenyl (PCBs), and paints and coatings that contain heavy metals and waste oils. These can have serious implications for the environment and human health if not managed properly. <sup>24</sup> When dumped on beaches or locally, they contaminate the sands and sediments. Current and tides then distribute the pollutants, especially during the monsoon season. This affects marine life: near Chattogram in Bangladesh, 21 species of fish and crustacean have been wiped out by the local shipbreaking industry, which also endangered another 11 species. <sup>25</sup>

<sup>23</sup> Planet Tracker (2021) [Beached, not stranded.](#)

<sup>24</sup> UNEP: [Environmentally sound management of priority waste streams: end-of-life ships.](#)

<sup>25</sup> Planet Tracker (2021) [Beached, not stranded.](#)

Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<b>Resource use/replenishment</b> <b>Other resource use:</b> Volume of wild-caught species, including bycatch species such as marine mammals, turtles, and seabirds	<i>Environmental assets:</i> Marine (ocean) ecosystems <i>Ecosystem services:</i> Biomass provisioning Biological control Genetic material Local (micro and macro) climate regulation Nursery population and habitat maintenance Other regulating and maintenance services Cultural services	<p>Catching fish can lead to decline in fish populations if not undertaken in a sustainable way. Fish stocks that are overfished are vulnerable to reduced reproduction and changing feeding patterns, increasing the risks of population decline or extinction.</p> <p>Organisations should also be able to track whether a specific fish stock is overfished – meaning that it is not caught when at a level fluctuating around or above a level consistent with MSY or an appropriate proxy.</p> <p>Bycatch and discards negatively impact the levels of target and non-target species.<sup>26</sup> Bycatch species that are discarded overboard often die and cannot reproduce, impacting marine ecosystems. Bycatch can slow the rebuilding of overfished stocks, and place protected species such as whales and sea turtles at further risk. Bycatch from trawling or dredging activities causes mortalities due to increased predation following the redistribution of benthic species into surface waters and on the seabed.</p> <p>Oxygen depletion occurs when sufficient quantities of non-target catch and processing waste is discarded at sea, as decomposition processes consume oxygen and introduce anaerobic conditions.<sup>27</sup></p> <p>Bycatch can also have negative economic and social impacts on fishermen and their communities. For example, a fishery may close early because of high bycatch of a non-target species. Ecologically, bycatch can change the availability of prey, which affects marine ecosystems and the productivity of fisheries.<sup>28</sup></p>

<sup>26</sup> FAO [Bycatch and discard impacts](#).

<sup>27</sup> FAO [Bycatch and discard impacts](#).

<sup>28</sup> NOAA [Understanding bycatch](#).



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Fishing	<b>Invasive species introduction/removal</b>  <b>Introduction of invasive species:</b> Invasive species can be introduced into ecosystems by imported bait, or by wastewater discharged, such as bilge and ballast water, which can negatively impact local stocks through disease or competition for resources and/or prey. <sup>29</sup>	<i>Environmental assets:</i> Marine (ocean) ecosystems  <i>Ecosystem services:</i> Biological control Genetic material Nursery population and habitat maintenance Other regulating and maintenance services	Invasive species can alter the local ecosystem by squeezing out local species, altering the structure, composition and distribution of the ecosystem, with consequent impacts on ecosystem services.

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<sup>29</sup> Venugopal and Sadidharan (2021) [Seafood industry effluents: Environmental hazards, treatment and resource recovery](#).

Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Vessel-based and land-based fish processing	<b>Pollution/pollution removal</b> <b>Water pollutants:</b> Discharge of wastewater from processing.	<i>Environmental assets:</i> Marine (ocean) ecosystems Terrestrial (land-based) and subterranean terrestrial ecosystems Freshwater and subterranean freshwater ecosystems  <i>Ecosystem services:</i> Water supply Biomass provisioning Biological control Nursery population and habitat maintenance Genetic material Other regulating and maintenance services	The environmental concerns associated with the disposal of fish wastes into ocean waters include reduced oxygen levels in the seawater at the ocean bottom, burial or smothering of living organisms and the introduction of disease or non-native and invasive species to the ecosystem of the sea floor. Nutrients (e.g. nitrogen and phosphorus), suspended solids, disinfectants and possible coliform bacteria from seafood industry effluents affect coastal water quality and hence human life, particularly in coastal regions. During rainy seasons, seepage of water through landfill dumps causes additional problems.



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Vessel-based and land-based fish processing	<b>Pollution/pollution removal</b> <b>Soil pollutants:</b> Discharge of seafood effluent from processing.  It has been estimated that about 8% of seafood production is wasted annually, with about 7.3 million tonnes during the period 1992–2001. <sup>30</sup>	<i>Environmental assets:</i> Terrestrial (land-based) and subterranean terrestrial ecosystems  <i>Ecosystem services:</i> Water flow regulation Water purification Biological control Genetic material	Discharge of untreated seafood effluents to soil significantly enhances moisture, salinity, electrical conductivity and inorganic carbon. The effluents also had an impact on prokaryotic organisms in the soil. <sup>31</sup>

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<sup>30</sup> Venugopal and Sadidharan (2021) [Seafood industry effluents: Environmental hazards, treatment and resource recovery](#).

<sup>31</sup> Venugopal and Sadidharan (2021) [Seafood industry effluents: Environmental hazards, treatment and resource recovery](#).

Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Vessel-based and land-based fish processing	<b>Resource use/replenishment</b> <b>Volume of water used</b>	<i>Environmental assets:</i> Marine (ocean) ecosystems Terrestrial (land-based) and subterranean terrestrial ecosystems Freshwater and subterranean freshwater ecosystems Water resources <i>Ecosystem services:</i> Water supply	Fish processing requires large amounts of water, primarily for washing and cleaning purposes, but also as media for storage and refrigeration of fish products before and during processing. In addition, water is an important lubricant and transport medium in the various handling and processing steps of bulk fish processing. <sup>32</sup>
Vessel-based and land-based fish processing	<b>Invasive species introduction/removal</b> <b>Introduction of invasive species</b>	<i>Environmental assets:</i> Marine (ocean) ecosystems <i>Ecosystem services:</i> Biological control Genetic material Water purification	Water spraying processes in seafood processing may result in the formation of aerosols with bacteria that can be inhaled. <sup>33</sup>

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<sup>32</sup> IFC (2007) [Environmental, Health, and Safety Guidelines for Fish Processing](#).

<sup>33</sup> IFC (2007) [Environmental, Health, and Safety Guidelines for Fish Processing](#).



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Marine aquarium trade	<b>Land, freshwater and ocean-use change</b> <b>Ocean-use change</b>	<i>Environmental assets:</i> Marine (ocean) ecosystems Subterranean marine ecosystems <i>Ecosystem services:</i> Biomass provisioning Genetic material Nursery population and habitat maintenance Cultural services	Despite being illegal in many jurisdictions, cyanide fishing and other destructive fishing methods are still used in certain locations for the marine aquarium trade. This affects both the life on the reef and the quality of the fish down the supply chain, as cyanide use impacts organisms' chances of survival from point of collection through to point of sale. Mortality rates for fish collected using cyanide have been reported as 90% between collection and retailer. <sup>34</sup>

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<sup>34</sup> Davis et al (2017) [Cyanide in the aquatic environment and its metabolism by fish.](#)



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Marine aquarium trade	<b>Resource use/replenishment</b>  <b>Other resource use:</b> Collection of wild-caught reef fish and organisms.	<i>Environmental assets:</i> Marine (ocean) ecosystems  <i>Ecosystem services:</i> Biomass provisioning Biological control Nursery population and habitat maintenance Genetic material Other regulating and maintenance services Cultural services	Research has shown that about 500 species of fish are being traded for the marine aquarium trade, 25 of which are listed as high risk, with certain areas and reefs being key areas of over exploitation. <sup>35</sup> This presents an impact to reefs which are already under stress from climate change and subject to more frequent and intense bleaching events and could contribute to ecosystem collapse.

<sup>35</sup> Watson, G. et al. (2023) [Can the global marine aquarium trade \(MAT\) be a model for sustainable coral reef fisheries?](#)



Business activity	Drivers of nature loss	Example environmental assets and ecosystem services affected	Description
Marine aquarium trade	<b>Invasive species introduction/removal</b> <b>Introduction of invasive species</b>	<i>Environmental assets:</i> Marine (ocean) ecosystems <i>Ecosystem services:</i> Biomass provisioning Biological control Nursery population and habitat maintenance, Genetic material Other regulating and maintenance services Cultural services	The main way the marine aquarium trade contributes to the introduction of invasive species is at the customer end due to the accidental or intentional release of marine aquarium fish into the wild. One example of this is the invasive population of lionfish in the southeastern US and Caribbean, which it is thought was started by aquarium release. Lionfish feed on small crustaceans and fish, including the larvae and young of important commercial fishery species in the region such as snappers and groupers. <sup>36</sup>

<sup>36</sup> NOAA (2024) [Why are lionfish a growing problem in the Atlantic Ocean?](#)



## Dependencies

Table 8 gives some key illustrative material dependencies for fishing sector organisations.

**Table 8: Examples of dependency pathways for fishing, land-based and vessel-based processing and the marine aquarium trade**

Business activity	Environmental asset and ecosystem services depended on	Guidance to identify dependencies
Inland freshwater fisheries	<i>Environmental assets:</i> Freshwater ecosystems  <i>Ecosystem services:</i> Water supply Biomass provisioning Water flow regulation Nursery population and habitat maintenance Local (meso and micro) climate regulation Genetic material	Freshwater fisheries depend on stable ecosystem conditions to maintain fish populations.  Organisations should consider whether they are operating in areas of high water scarcity and areas that are susceptible to drought that might affect the waterway and the stocks of/access to fish by using tools such as the <a href="#">WWF Water Risk Filter</a> and <a href="#">WRI Aqueduct</a> .  They should also identify areas affected by dams and other sectors using a lot of water from natural waterways and consider habitat connectivity. <sup>37</sup>

<sup>37</sup> Barbarossa, V et al (2020) [Impacts of current and future large dams on the geographic range connectivity of freshwater fish worldwide](#), PNAS 117 (7) 3648-3655.



Business activity	Environmental asset and ecosystem services depended on	Guidance to identify dependencies
Fishing, marine aquarium trade	<p><i>Environmental assets:</i></p> <p>Marine (ocean) ecosystems</p> <p>Subterranean marine ecosystems</p> <p><i>Ecosystem services:</i></p> <p>Biomass provisioning</p> <p>Water supply</p> <p>Biological control</p> <p>Genetic material</p> <p>Local (micro and macro) climate regulation</p> <p>Nursery population and habitat maintenance</p> <p>Other regulating and maintenance services</p>	<p>Ocean fisheries and the marine aquarium trade depend on stable ecosystem conditions and collective fish stock management to maintain fish populations.</p> <p>Organisations should identify which stocks are being overfished that are therefore likely to see drops in productivity.</p> <p>They should identify which regions/habitats fish and other target species indirectly or directly depend on for key life cycle stages such as breeding and feeding, or through food web interactions, e.g.:</p> <ul style="list-style-type: none"><li>• Coral reefs, which occupy less than 1% of the ocean floor, but are home to more than 25% of all marine life;<sup>38</sup></li><li>• Coastal vegetated wetlands, including mangroves, which 13% all marine megafauna use at different points in their lifecycles;<sup>39</sup></li></ul> <p>They should identify regions where:</p> <ul style="list-style-type: none"><li>• Water currents are susceptible to shift and affect distribution of key fish stocks;</li><li>• Fish stocks are more likely to be forced to migrate or decline, owing to various climate change-induced pressures, such as increased temperature and acidity and changes in oxygen levels; and</li><li>• Potential new breeding grounds and sensitive areas as a result of such impacts due to climate change.</li></ul>

<sup>38</sup> Coral Reef Alliance: [Why care about reefs?](#)

<sup>39</sup> Sievers et al. (2019) [The Role of Vegetated Coastal Wetlands for Marine Megafauna Conservation](#).



## External factors

Relevant external factors fishing organisations should take into account include:

- **Climate change:** Changes in ocean currents and slowly warming waters can change the distribution and reproductive capacity of fish populations and change the structure of ecosystems. Ocean acidification destroys coral reefs and the shells of plankton and organisms, threatening relevant trophic webs. For inland fisheries, the effects of climate change include decreasing water supply and drought, causing rivers to dry up. Rising sea levels causes seawater to move further up inland waterways, changing the pattern of the seasons and typical weather, which can affect fish populations.<sup>40</sup>
- **Eutrophication:** Eutrophication mostly affects inland freshwater and coastal fisheries. It is caused by high levels of run-off of fertiliser and other pollutants into water bodies. This stimulates the growth of algae and causes algal blooms, depleting oxygen in the water, killing fish and other marine life. This can happen locally or hundreds of miles from the source along a river. Where possible, fishing organisations should identify other organisations – e.g. terrestrial farming or aquaculture farms – affecting the area in which they operate.
- **Other waste:** Waste and wastewater discharge from other industries can pollute coastal areas and negatively affect fish populations and other marine life, leading to lower availability of fish to harvest.<sup>41</sup>
- **Combined or cumulative fishing pressure:** Fishing organisations should consider what other organisations or vessels are fishing from the same stocks (or stocks integral to the ecosystem their stock is a part of). Usually this can be managed through governance systems (within their exclusive economic zones) and catch quotas (in overlapping jurisdictions or the high seas). However, if a fishery is not managed in this way – or is susceptible to illegal, unreported and unregulated fishing (IUU), or the management strategy is influenced by a lack of data and robust control rules – it can make the fishing stock more likely to be overfished and at risk of collapse.
- **Other sectors:** There are many external factors from other sectors that use oceanic and freshwater locations. In particular, there can be a danger of escapes from aquaculture, which can present a risk of invasive species to native populations, mangrove clearance for aquaculture can destroy important breeding and nursery sites for fish, and offshore renewable energy or marine tourism can take space from important fishing grounds if proper planning has not taken place.

## 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?*

For the quantification of negative and positive impacts and dependencies, organisations in the sector should refer to the TNFD's proposed fishing disclosure metrics in Section 3.

<sup>40</sup> WWF (2023) [Freshwater fish highlight escalating climate impacts on species, warns IUCN Red List](#).

<sup>41</sup> UNEP FI (2021) [Turning the Tide](#).



Suggested data sources and approaches to estimate key impacts include:

- **Fish stock status:** Organisations can look at a particular stock and fishery on the [FishSource](#) website, which scores fish stock health and the quality of the fishery's management. Organisations can also use [FAO country reporting](#), though this is less regularly updated.
- **Mortality of non-target species:** Organisations can use the [IUCN Red List of Threatened Species](#), the [Convention on the Conservation of Migratory Species of Wild Animals \(CMS\)](#), the [Convention on International Trade in Endangered Species of Wild Fauna and Flora \(CITES\)](#), the [ICES bycatch database](#), as well as national legislation, to establish what endangered species are in the areas that the organisation works in. Organisations working specifically in the oceanic tuna and billfish fisheries can also utilise the [Bycatch Management Information System](#) for more information on how to scientifically measure and manage bycatch.
- **Ghost gear:** Organisations can use the [Global Ghost Gear Initiative](#) data portal to see where specific (mapped) hotspots of known ghost gear are. Organisations should identify sensitive locations (as defined in L4) in which they have/are at risk of losing gear as the impact could be more severe in areas with higher concentrations of sensitive species (listed as vulnerable, endangered or critically endangered on the IUCN Red List, listed in CMS Appendix 1, and CITES Appendix 1 and 2), such as breeding, feeding and migratory areas.
- **Damage to seabed habitats:** Organisations should use the tools and datasets included in component L4 to determine where sensitive seabed locations are located to reduce the likelihood of trawling, dredging or using other types of potentially destructive fishing gear through them, such as the [Ocean+ Data Viewer](#).
- **Illegal, unregulated and unreported fishing (IUU):** Organisations can see movements of fishing vessels using [Global Fishing Watch](#) to track whether IUU is occurring or compare source lists/vessel lists with the [Combined IUU Vessel List](#). Note that much of IUU fishing occurs on legally licensed fishing vessels through misreporting of catch that is unverified.
- **Processing waste:** Organisations should measure the type and amount of pollutants in their waste and wastewater, considering the amount of organic matter, detergents, disinfectants, excess nutrients (such as nitrogen and phosphorus) and potential pathogens being released into water sources.
- **Marine aquarium trade:** Organisations further up the supply chain can see which jurisdictions their imports come from using data like the [Marine Aquarium Trade Data Portal](#) (or replicate their methodology of using import data). Organisations can also consult the [Global Register of Introduced and Invasive Species](#) to identify which species sold are considered as invasive in the country they are importing them in.

## 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 risks and opportunities

This section provides additional considerations to help the fishing industry with the Assess phase of the LEAP approach.

### A1: Risk and opportunity identification

Guiding question:

*What are the corresponding risks and opportunities for our organisation?*

**Table 9** provides a list of illustrative physical and transition risks for the fishing sector.

**Table 9: Illustrative nature-related risks for the fishing sector**

Risk type		Examples of risks/opportunities in the fishing sector	Magnitude indicator
Physical	Acute	Overfishing can lead to a drop in the availability of fish, which will impact the fishery's viability and a lack of supply to the downstream value chains if the stock is not recovered, as in the Grand Banks cod collapse, for example.	Decrease in revenue Decline in value of business assets due to availability of natural resources that sustain continuity Increased insurance costs
	Chronic	Overfishing can lead to the total collapse of a fish stock as fisheries are unable to recover.	Decrease in revenue Decline in value of business assets due to availability of natural resources that sustain continuity
		Destruction of sensitive locations such as breeding grounds and habitats leading to a decline in the spawning ability of species and therefore fish stock health.	Decrease in revenue
		Ocean acidification and rising ocean temperatures leading to a redistribution of or collapse in target fish stocks.	Decrease in revenue Increased operating costs
		Pollution of inland freshwater bodies leading to a decline in fish stocks.	Decrease in revenue



Risk type	Examples of risks/opportunities in the fishing sector	Magnitude indicator
Transition	Policy	Changes in policy driven by new international agreements, such as the Biodiversity Beyond National Jurisdiction (BBNJ) treaty agreed in March 2023, e.g. instigation of new Marine Protected Areas.
		New national or international laws coming into force surrounding the fishing sector, for example: <ul style="list-style-type: none"><li>● IOTC countries phasing out drifting FADs;<sup>42</sup></li><li>● Updates to IUU regulations which prevent insurers profiting from IUU operations;<sup>43</sup> and</li><li>● Ban on bottom trawling in MPAs put in place in Greece.<sup>44</sup></li></ul>
		Changes in regulated fish quotas by RFMOs or national governments.
		Change in the status of a fish stock e.g. from endangered to critically endangered on the IUCN Red List.
Transition	Market	Customers demanding more traceability in the supply chain.

<sup>42</sup> The Guardian (2023) [Deal to curb harmful fishing devices a ‘huge win’ for yellowfin tuna stocks](#).

<sup>43</sup> ORRAA (2024) [Insuring against illegal, unreported and unregulated \(IUU\) fishing - vessel viewer](#).

<sup>44</sup> Our Ocean Summit (2024) [Greece’s Commitments](#).



Risk type	Examples of risks/opportunities in the fishing sector	Magnitude indicator	
Transition	Technology	Substitution of wild-caught seafood with seafood grown in aquaculture systems or alternative fish proteins produced via precision fermentation (and other emerging systems).	Decrease in demand (and revenue) for wild-caught fish
Transition	Reputational	Evidence of excessive bycatch, particularly species listed as endangered or critically endangered on the IUCN Red List, or charismatic megafauna, leading to public backlash against the company.	Decrease in revenue
Transition	Liability	Evidence of IUU fishing by company-owned vessels or vessels in the company's supply chain. <sup>45</sup>	Increase in regulatory action e.g. fines Decrease in revenue
		Evidence of lack of compliance with local, national or international laws and regulations. <sup>46</sup>	Increase in regulatory action e.g. fines Decrease in revenue

## Opportunities

Table 10 provides a list of illustrative nature-related opportunities for the fishing sector.

**Table 10: Illustrative nature-related opportunities for the fishing sector**

Opportunity type	Illustrative opportunity in the fishing sector	Magnitude indicator
Markets	An increasing turn towards certified seafood by consumers who seek out certification labels like the Marine Stewardship Council (MSC).	Increase in revenue for organisations who are certified/sourcing from certified fisheries

<sup>45</sup> UNEP FI (2021) [Turning the Tide](#).

<sup>46</sup> UNEP FI (2021) [Turning the Tide](#).



Opportunity type	Illustrative opportunity in the fishing sector	Magnitude indicator
Resource efficiency	Use of measures to avoid bycatch, such as square mesh panels (which allow smaller and juvenile fish to escape), coverless trawls, cod-end configuration, gear restrictions (especially for setting nets around whale sharks and cetaceans), medina panels and others. <sup>47</sup>	Increase in overall health of the ecosystem, leading to better rate of sellable catch and increased revenue
Products and services	Recovering and reprocessing of fish waste into commercial by-products. Seafood processing discards including waste streams are rich in valuable ingredients having potential applications in food, pharmaceutical and allied industries. Besides environmental protection, valorisation of fishery wastes can be a key factor in conservation of marine resources and cost reduction of product development. <sup>48</sup>	Reduction in waste Increase in revenue for processors selling discards
Capital flow and financing	Availability of innovative financial instruments such as a Blue Recovery Bond, where investors provide capital to a fishery that supports a temporary period of reduced fishing to allow the fishery/marine ecosystem time to recover. <sup>49</sup>	Increase in revenue and stability of fisheries
Reputational capital	The organisation is increasingly perceived as a 'best-in-class' fishing organisation, leading to increased availability of capital flows.	Increase in revenue and investment
Ecosystem protection, restoration	For processing, pathogens can be destroyed during controlled anaerobic digestion (biogas) or aerobic treatment (composting). <sup>50</sup>	Increased environmental health standards Avoidance of regulatory issues

<sup>47</sup> MCS (2018) [Wild Capture Ratings Methodology](#).

<sup>48</sup> Venugopal and Sadidharan (2021) [Seafood industry effluents: Environmental hazards, treatment and resource recovery](#).

<sup>49</sup> Planet Tracker (2023) [Fishing for a Recovery](#).

<sup>50</sup> IFC (2007) [Environmental, Health, and Safety Guidelines for Fish Processing](#).



Opportunity type	Illustrative opportunity in the fishing sector	Magnitude indicator
and regeneration	The organisation increasingly ensures it does not target sensitive marine habitats and species to improve the ability of the ecosystem and stocks to recover.	Increased sustainability of long-term business activities and revenue
	The organisation ensures it does not incidentally or intentionally kill or injure important species, such as whales, <sup>51</sup> that help to buffer marine ecosystems from destabilising stresses – including climate change – by facilitating the transfer of nutrients and are important to ecosystem function on local and regional scales.	Increased viability of marine ecosystems – leading to increased sustainability of long-term business activities and revenue

## 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?*

Fishing organisations can leverage risk mitigation or opportunity management processes already in place for compliance with traceability measures such as the Global Dialogue on Seafood Traceability (GDST), fisheries certifications, fisheries improvement programmes (FIPs) or other relevant standards and adapt those as required.

A comprehensive directory of fisheries improvement programmes – and their details – can be found on [FisheryProgress](#), including a directory of consultants that may help with implementing a FIP if in scope for the organisation. In addition, organisations can find information on MSC-certified fisheries at [MSC Track a Fishery](#).

## A3: Risk and opportunity measurement and prioritisation

Guiding question:

*Which risks and opportunities should be prioritised?*

Organisations can use scenario analysis twinned with key data tools outlined in this guidance to understand which risks to prioritise based on the TNFD's prioritisation criteria for nature-related risks and opportunities (see [Table 13 in the LEAP guidance](#)). Some illustrative points to note:

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<sup>51</sup> Roman, J. et al. (2014) [Whales as marine ecosystem engineers](#).



- **Fish stock collapse:** Overfishing can lead to ecosystems crossing a tipping point and stocks of target (and non-target) fish collapsing. For example, the population of North Atlantic cod has not recovered since the collapse in the early 1990s. In part, this is because the ecosystem shifted from being vertebrate dominated to invertebrate dominated, which hindered the recovery of the cod population. The collapse had a huge impact on the Canadian fishing industry, and the livelihoods of fishers and fish plant workers.
- **Impact to society:** Millions of people rely on fishing as a main food source. The impact of overfishing can negatively affect their food security.
- **Climate change:** Organisations should take into account the risks and opportunities posed by climate change, such as changes in ocean currents, sea level rise, changes in the distribution of fish populations, changes in the stocks' breeding, feeding and migratory areas, and changes in the structure of habitats and ecosystems. Organisations should consider addressing risks and opportunities that contribute to mitigating or adapting to the impacts of climate change on environmental assets and ecosystem services, such as rising ocean acidity and temperatures by, for example, ensuring they do not fish in sensitive locations. Or by ensuring they do not incidentally or intentionally kill or injure important species, such as whales,<sup>52</sup> that help to buffer marine ecosystems from destabilising stresses by facilitating the transfer of nutrients and are important to ecosystem function on local and regional scales.

## 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.](#)

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<sup>52</sup> Roman, J. et al. (2014) [Whales as Marine Ecosystem Engineers.](#)



## 2.5. Prepare to respond and report

### 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 11 maps a non-exhaustive list of actions in the fishing sector based on TNFD's interpretation of SBTN's AR3T framework (and pending alignment with future development of SBTN's Step 4 guidance), which covers mitigation hierarchy principles when determining responses to identified nature-related issues.

**Figure 4: SBTN's AR3T framework**





**Table 11: Illustrative priority and transformative actions for the fishing sector mapped to the AR3T Framework**

Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
Ocean-use change	Improve traceability across operations, for example for: <ul style="list-style-type: none"><li>Small and large-scale fisheries: improve traceability and report catch. Use logbook systems or other catch recording systems;</li><li>Processing organisations: report for all TNFD metrics in Section 3 for your organisation's direct operations as well as your upstream seafood purchases; and</li><li>MAT organisations: ensure organisms are traceable to their original catch location.</li></ul>	Global Dialogue on Seafood Traceability (GDST)					
	Create an organisational plan to reduce the impact of fishing gear on the seabed and benthic habitats, ensuring it does not adversely impact benthic species and biodiversity. This could include: <ul style="list-style-type: none"><li>Gear switches;</li><li>Catch area changes; and</li><li>Protecting and restoring damaged habitats.</li></ul>						



Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
Harm to sensitive locations (L4)	Create an organisational plan to avoid posing serious or irreversible harm to sensitive locations (as defined in L4) through: <ul style="list-style-type: none"><li>Employing lower impact gear;</li><li>Catch area changes to stop fishing in sensitive habitats; and</li><li>Protecting and restoring damaged sensitive locations.</li></ul>						
	Support the implementation of ecosystem-based fisheries management principles in dialogue with the management entity for the fishery.						
	Assess the future impact climate change will have on the ecosystems your organisation interfaces with.						
Pollution/pollution removal: non-GHG air pollutants	Use closed-loop scrubbers on your organisation's vessels' engines.						
Pollution/pollution removal: waste - plastic pollution	Transition to gear made with recyclable or biodegradable/non-polymer/non-fossil fuel-based fishing gear and rope materials.						



Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	<p>Ensure that the organisation has a ghost gear/abandoned, lost, discarded fishing gear (ALDFG) management strategy, such as:</p> <ul style="list-style-type: none"><li>• By marking gear with port identification details and IMO ship identification number;<sup>53</sup></li><li>• As well as by retrieving gear, or if unable to retrieve it, reporting it to the relevant authority or to an organisation like the Global Ghost Gear Initiative. Organisations can report gear loss via the Global Ghost Gear app.</li></ul>	Global Ghost Gear Initiative					
Pollution: water pollution	Ensure that the organisation has a recovery and disposal plan in place to manage each category of waste defined under MARPOL.	MARPOL					

<sup>53</sup> IMO [ship identification number scheme](#).



Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
Pollution removal: soil pollutants	<p>Avoid using flags of convenience to bypass tighter decommissioning and recycling requirements.<sup>54</sup></p> <p>Consider the decommissioning plan for the fishing fleet and how it translates into company financial provisions.</p> <p>Put measures in place to avoid beaching or to ensure it is undertaken in a way that minimises impacts on environmental assets and ecosystem services.</p> <p>Publish the list of vessels registered and their flag through the FAO Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels (FAO Global Record), mandating International Maritime Organization numbers for all eligible vessels and national unique vessel identifiers for all other vessels.</p> <p>List vessels on industry-specific lists, e.g. for tuna fisheries, the <a href="#">ProActive Vessel Register</a> (PVR) and <a href="#">Vessels in Other Sustainability Initiatives</a> (VOSI).</p>	FAO Port State Measures					
Invasive species introduction/removal	Eliminate bilge and/or ballast water dumping, or for processing organisations, engage suppliers to eliminate bilge and/or ballast water dumping from their practices.						

<sup>54</sup> Environmental Justice Foundation (2020) [Off the Hook: How flags of convenience let illegal fishing go unpunished](#).



Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	Avoid imported bait, which may be more likely to contain invasive species.						
	Ensure the species exported or imported for the MAT are: <ul style="list-style-type: none"><li>• Not listed as invasive on the Global Invasive Species Database; and</li><li>• Not listed as invasive in the import jurisdiction.</li></ul>						
Resource use: Overfishing of target fish stocks	Avoid target species that are listed on: <ul style="list-style-type: none"><li>• CITES Appendix 1 and 2;</li><li>• CMS Appendix 1; and</li><li>• IUCN Red List as vulnerable, endangered or critically endangered.</li></ul>						
	Focus effort only on sustainably managed stocks, caught when at a level fluctuating around or above a level consistent with MSY or an appropriate proxy.  Put in place a strategy or plan to sustain the long-term productivity of affected species, including use of up-to-date scientific stock assessments and analysis of how climate change will affect the fishery. If there is no stock assessment due to insufficient data, an organisation can initiate and support such work.  Minimise post-harvest loss and use bait efficiently.						



Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
	Where possible and relevant, certify fisheries under the Marine Stewardship Council (MSC) Standard or other credible standards that abide by the FAO third-party assessment arrangements. <sup>55</sup>						
	Where possible and relevant, launch Fishery Improvement Projects (FIPs).						
	Create an organisational plan to avoid bycatch, by, for example: <ul style="list-style-type: none"><li>● Using bycatch reduction mechanisms in your gear (e.g. turtle exclusion devices, medina panels, bird scaring lines, pingers, switching gear to enable scallop potting with light, mesh size and trawler doors changes);</li><li>● If using bottom set gill or entangling nets within areas at risk of cetacean bycatch, use acoustic deterrent devices ('pingers');</li><li>● Use appropriate mesh sizes under the national legislation of the country where the catch is made or landed to minimise bycatch of fish under Minimum Conservation Reference Size (MCRS).</li></ul>						

<sup>55</sup> FAO (2023) [Principles and guidelines for the assessment and use of voluntary third-party assurance programmes](#).



Impact driver/ dependency	Example of organisation response to impacts on nature	Global frameworks alignment	SBTN action framework (AR3T)				
			Avoid	Reduce	Regenerate	Restore	Transform
Impact driver: fisheries management	Ensure there are no incidences of IUU fishing or bycatch in company-owned vessels or source fisheries. This can be implemented by: <ul style="list-style-type: none"><li>Ensuring all vessels fleet have Remote Electronic Monitoring (REM) technologies on board; and</li><li>Increasing the number of vessels with human observers.</li></ul>						
	If the organisation retains/lands sharks, ensuring it has an enforced fins naturally attached policy.						
	Ensure vessels use publicly accessible tracking technology e.g. Automatic Identification System (AIS) or Vessel Monitoring System (VMS).						
	Engage with innovative financing measures such as a Blue Recovery Bond.						
	Follow the principles of ecosystem-based fisheries management. Hence, the fishery is managed to ensure the integrity of the entire ecosystem, rather than solely focusing on maintenance of single species stock productivity.						
Resource use: water use	Adopt best practices to reduce water consumption for processing and transport, particularly in areas of water scarcity.						



## 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](#) 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). The upcoming seafood value chain science-based targets are being developed by the [SBTN Ocean Hub](#).

Illustrative examples of targets relevant to the fishing sector include:

- **Certification targets:** For example, setting a target for all fisheries the organisation operates in to be certified by the MSC or other relevant standard, or be in transition to certification via credible fishery improvement projects (FIPs) by a certain date.
- **Gear modification targets:** For example, setting a timeline to modify all gear with bycatch reduction mechanisms.
- **Eliminate overexploitation targets:** For example, working with the management entity and taking all measures possible to eliminate overexploitation of stocks through IUU.

## P3: Reporting

Guiding question:

*What will we disclose 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](#).

## 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. Datasets and tools to support application of the LEAP approach to the fishing sector

**Table 12: Additional tools for fishing sector organisations**

Tool name	Description (relevance to sector)	LEAP phase
<a href="#">FAO Major Fishing Areas</a>	Resource page on the FAO website outlining the boundaries of the major fishing areas and details on each one.	L1
<a href="#">EEZ Map</a>	A map of marine exclusive economic zones showing which countries have jurisdiction over which areas of the marine environment.	L1
<a href="#">FAO Regional Fishery Bodies Map</a>	A map of regional fishery bodies to show which organisations have control over which fisheries.	L1
<a href="#">UN/LOCODE</a>	The UN's list of codes for transport and trade locations worldwide.	L1
<a href="#">ICES statistical rectangles</a>	A statistical tool that subdivides the North Atlantic Ocean into areas that fishing organisations can use for reporting location and catch data.	L1
<a href="#">Global Fishing Watch</a>	A tool to monitor global fishing activity and find out where vessels could be fishing illegally in protected waters. In addition, the initiative has a <a href="#">vessel viewer tool</a> .	L1, E3
<a href="#">Paris MOU White Black and Grey List</a>	A list of vessel flags by risk, updated annually.	L1
<a href="#">Tokyo MOU White Black and Grey List</a>	A list of vessel flags by risk, updated annually.	L1
<a href="#">Global Dialogue on Seafood Traceability Key Data Elements</a>	Standard for global seafood traceability and its list of key data elements that organisations adhering to the standard are expected to collect.	L1, P1
<a href="#">Fisheries and Resources Monitoring System (FIRMS)</a>	The FAO database of fish stocks and their status.	L1
<a href="#">Ocean Biodiversity Information System (OBIS)</a>	The Ocean Biodiversity Information System mapper provides information on the distribution of marine species.	L1
<a href="#">MSC Chain of Custody Standard</a>	An MSC Standard that ensures an unbroken chain where certified seafood is easily identifiable, separated from non-certified products, and can be traced back to another certified business.	L1



Tool name	Description (relevance to sector)	LEAP phase
<a href="#">IMO Global Integrated Shipping Information System</a>	The International Maritime Organization's Global Integrated Shipping Information System, which includes a section on ship and company particulars, where users can search for ships by their IMO number.	L1, P1
<a href="#">Ecologically and Biologically Significant Areas (EBSAs) map</a>	The Convention on Biological Diversity's database of ecologically and biologically significant marine areas.	L4
<a href="#">Important Marine Mammal Areas map</a>	The Marine Mammal Protected Areas Task Force has put together this database mapping Important Marine Mammal Areas (IMMAs).	L4
<a href="#">Ocean+ Habitats</a>	A database showing the global distribution of the world's marine habitats.	L4
<a href="#">FAO Vulnerable Marine Ecosystems database</a>	The FAO database of vulnerable marine ecosystems.	L4
<a href="#">Mapping Ocean Wealth Explorer</a>	The Mapping Ocean Wealth data viewer is a live online resource for sharing understanding of the value of marine and coastal ecosystems to people. It includes global maps, regionally-specific studies, reference data and a number of apps providing key data analytics. One of the apps demonstrates the potential role of mangroves as an especially rich source of Blue Carbon in contributing to and enhancing climate mitigation ambition in countries with mangrove habitats.	L4
<a href="#">OSPAR List of Threatened and/or Declining Habitats</a>	A list of priority habitats and species for protection that have been identified by the parties and observers to the OSPAR Commission for the North East Atlantic.	L4
<a href="#">IMO Particularly Sensitive Sea Areas</a>	A database of Particularly Sensitive Sea Areas (PSSAs), which are areas that have been identified as needing special protection through action by the IMO due to ecological, socio-economic or scientific significance.	L4
<a href="#">Birdlife Important Bird Areas</a>	A map of areas that are particularly significant for birds, including seabirds.	L4
<a href="#">The Marine Protection Atlas</a>	A comprehensive global database of marine protection that identifies and tracks fully and highly protected marine areas.	L4
<a href="#">Protected Seas Navigator</a>	A comprehensive global map of marine life protections covering EEZs and the high seas.	L4
<a href="#">Coastal Risk Index</a>	The CRI is an open-source platform providing a detailed set of global flood maps, using hydrodynamic models, to understand current and future coastal flood risk and the flood reduction benefits of natural habitats. Social vulnerability data highlights where reefs and mangroves are critical to reducing risk for climate vulnerable coastal communities.	L4



Tool name	Description (relevance to sector)	LEAP phase
<a href="#">Convex Seascape Survey</a>	A project mapping the seabed for carbon-rich sediments.	L4
<a href="#">Turning the Tide: How to Finance A Sustainable Ocean Recovery</a>	Guidance for financial institutions to better fund a sustainable ocean recovery, including some key metrics and guidance on the fishing sector.	E2
<a href="#">WWF Water Filter</a>	Corporate and portfolio-level screening tool to help companies and investors to prioritise action on what and where it matters the most to address water risks to enhance business resilience and contribute to a sustainable future.	E2
<a href="#">WRI Aqueduct</a>	Presents an atlas of global water risk.	E2
<a href="#">FAO Fisheries and Aquaculture Country Profiles</a>	FAO's Fishery and Aquaculture Country Profiles provide a comprehensive overview of the sector for each country or areas/territories with an important fishery sector.	E3
<a href="#">FishSource</a>	A publicly available online database of fish stocks, their management and their status compiled from scientific sources in an easily usable format.	E3
<a href="#">Bycatch Management Information System (BMIS)</a>	An open resource looking at bycatch mitigation in oceanic tuna and billfish fisheries.	E3
<a href="#">Global Ghost Gear Initiative (GGGI)</a>	A cross-stakeholder alliance of the fishing industry, private sector, corporates, NGOs, academia and governments focused on solving the problem of lost and abandoned fishing gear worldwide, which includes a database on reported and found ghost gear.	E3
<a href="#">Ocean+ Data Viewer</a>	A spatial data viewer with a comprehensive list of datasets.	E3
<a href="#">Combined IUU List</a>	A site that provides the best available information on fishing and related vessels that appear on the illegal, unregulated and unreported (IUU) fishing vessel lists published by the Regional Fisheries Management Organisations (RFMOs) and other organisations.	E3
<a href="#">Aquarium Trade Data Portal</a>	A database mapping the aquarium trade flows into the United States (a major importer).	E3
<a href="#">Global Register of Introduced &amp; Invasive Species (GRIIS)</a>	A database that compiles annotated and verified country-wise inventories of introduced and invasive species.	E3
<a href="#">MSC Fisheries Standard</a>	A standard that is used to assess the management and sustainability of fisheries worldwide.	A1



Tool name	Description (relevance to sector)	LEAP phase
<a href="#">Planet Tracker Blue Recovery Bond Assessment Tool</a>	An interactive tool that allows users to assess whether a given fishery could benefit from a Blue Recovery Bond, where investors fund a temporary reduction in fishing in an effort to support long-term sustainability.	A1
<a href="#">MSC Track A Fishery</a>	A database of all the fisheries that are certified under the Marine Stewardship Council.	A2
<a href="#">Fishery Progress</a>	A global database of fisheries improvement projects (FIPs).	A2
<a href="#">MARPOL</a>	The International Convention for the Prevention of Pollution from Ships.	P1
<a href="#">FAO Port State Measures</a>	The first binding international agreement to specifically target illegal, unreported and unregulated (IUU) fishing. Its objective is to prevent, deter and eliminate IUU fishing by preventing vessels engaged in IUU fishing from using ports and landing their catches. In this way, the PSMA reduces the incentive of such vessels to continue to operate while it also blocks fishery products derived from IUU fishing from reaching national and international markets.	P1
<a href="#">ProActive Vessel Register (PVR)</a>	The ProActive Vessel Register (PVR) is one of four public vessel lists that the International Seafood Sustainability Foundation (ISSF) provides to foster transparency in tuna fishing. Fishing vessels can be registered on the PVR to show how they are following best practices that support sustainable tuna fisheries.	P1
<a href="#">Vessels in Other Sustainability Initiatives (VOSI)</a>	The Vessels in Other Sustainability Initiatives (VOSI) list is a transparency tool for the public — including seafood companies that want to understand which tuna vessels have made public commitments to more sustainable fishing beyond the commitments reflected on the PVR.	P1
<a href="#">SBTN Ocean Hub</a>	The area of the Science-Based Targets Network that is developing materials on target setting for the ocean realm.	P2
<a href="#">Setting Sail: Target Setting in the Sustainable Blue Economy</a>	A manual which enables institutions to set targets that align with the guidance and support the transition to a Sustainable Blue Economy, in line with the objectives of the Kunming-Montreal Global Biodiversity Framework and the Paris Agreement.	P2



### 3. Sector-specific disclosure metrics and related guidance - Fishing

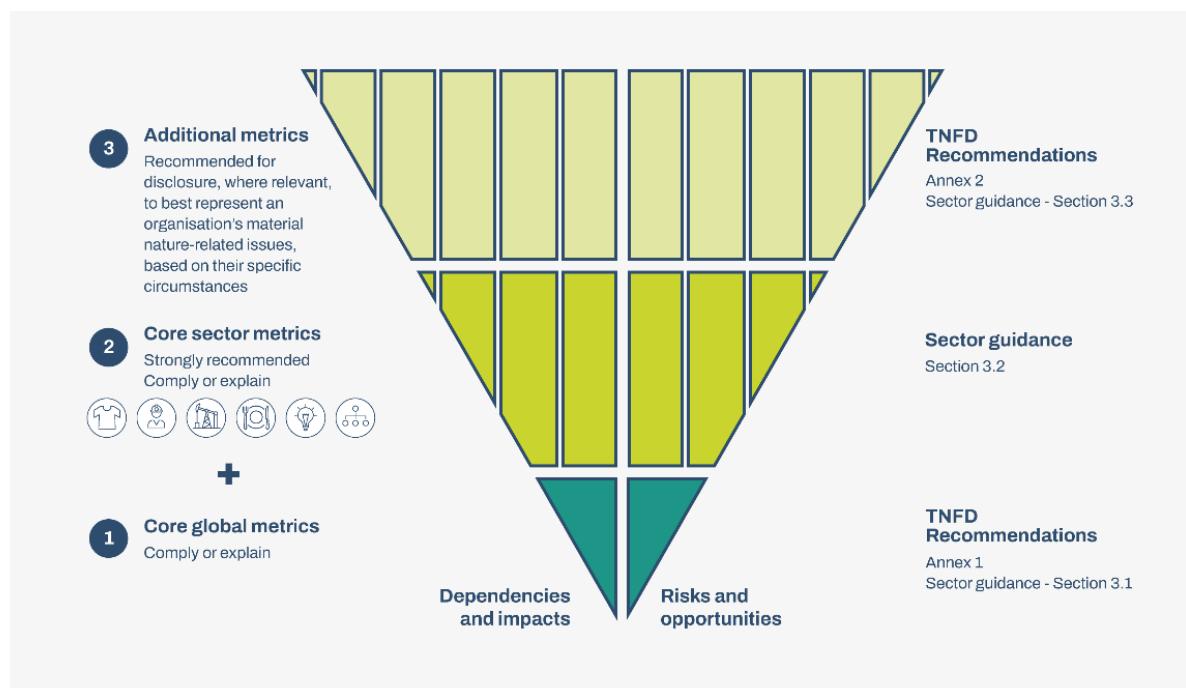
Sector-specific metrics form an important part of the TNFD's measurement architecture (see Figure 5). This reflects the diversity of business models across value chains and their interface with nature across and within sectors.

Sector-specific metrics help financial institutions to compare organisations within the same sector, which often face similar nature-related issues.

This section provides the proposed TNFD sector-specific metrics for the fishing sector. It includes:

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

**Figure 5: 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 fishing 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.



### 3.1. Proposed 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 fishing 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 fishing 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.

#### Box 1: Sensitive locations

When disclosing the locations where the impact driver occurs for each of the metrics below that meet the criteria for priority locations, in Table 13, Table 14 and Table 15 below, an organisation should refer to section L4: Interface with sensitive locations in this guidance as well as [the LEAP approach](#) (p.57-61) for guidance on identifying sensitive locations for fishing.

**Table 13: Proposed guidance on the application of the core global disclosure metrics**

Metric no.	Core global indicator	Core global metric	Proposed guidance for this sector	Source
<b>Driver of nature change: climate change</b>				
	GHG emissions.	Refer to IFRS S2 Climate-related Disclosures.	No further guidance.	TNFD
<b>Driver of nature change: Land/freshwater/ocean-use change</b>				



C1.0	Total spatial footprint	<p>Total spatial footprint (km<sup>2</sup>) (sum of)</p> <ul style="list-style-type: none"><li>• Total surface area controlled/managed by the organisation, where the organisation has control (km<sup>2</sup>);</li><li>• Total disturbed area (km<sup>2</sup>); and</li><li>• Total rehabilitated/restored area (km<sup>2</sup>).</li></ul>	<p>In reporting this core global disclosure metric, an organisation (including Marine Aquarium Trade organisations and vessel-based processors) should disclose the total area fished, broken down by the number of times the vessel visited the area in the reporting period.</p> <p>The total area fished, or total disturbed area, should be interpreted as the effort area where gear has been deployed into the water.</p> <p>A vessel-based or transshipment seafood processing organisation should report the spatial footprint of their upstream seafood purchases as outlined above.</p> <p>A land-based seafood processing organisation should a) report the global metric as it is for their land-based processing operations and b) report the spatial footprint of their upstream seafood purchases as outlined above.</p>	TNFD
C1.1	Extent of land/freshwater/ocean use change	<p>Extent of land/freshwater/ocean ecosystem use change (km<sup>2</sup>) by:</p> <ul style="list-style-type: none"><li>• Type of ecosystem; and</li><li>• Type of business activity.</li></ul>	<p>In reporting this core global disclosure metric, an organisation (including processing organisation and Marine Aquarium Trade organisations) should disclose the area (km<sup>2</sup>) fished using mobile bottom contact gear (e.g. bottom trawling and dredging), by the corresponding FAO major fishing area or sub-area/EEZ/sub-national permit area/RFMO or other</p>	TNFD



			international commissions.	
		Extent of land/freshwater/ocean ecosystem conserved or restored (km <sup>2</sup> ), split into: <ul style="list-style-type: none"><li>• Voluntary; and</li><li>• Required by statutes or regulations.</li></ul>	In reporting this core global disclosure metric, an organisation should disclose the area (km <sup>2</sup> ) of any voluntary or required projects the organisation is taking part in that contribute to conservation or restoration.	TNFD
		Extent of land/freshwater/ocean ecosystem that is sustainably managed (km <sup>2</sup> ) by: <ul style="list-style-type: none"><li>• Type of ecosystem; and</li><li>• Type of business activity.</li></ul>	Refer to core global metric C3.1 Quantity of high-risk natural commodities (tonnes) sourced under a sustainable management plan or certification programme, including proportion of total high-risk natural commodities.	TNFD
<b>Driver of nature change: pollution/pollution removal</b>				
C2.0	Pollutants released to soil split by type	Total pollutants released to soil split by type, referring to sector-specific guidance on types of pollutants (tonnes)	In reporting this core global disclosure metric, a land-based processing facility or Marine Aquarium Trade facility (e.g. aquaria and import/export holding facilities) should disclose the aggregate volume (m <sup>3</sup> ) discharged of untreated seafood effluents and disinfectants to soil, by type.  This metric is not applicable to fishing organisations and vessel-based processors.	TNFD
C2.1	Wastewater discharged	Volume of water discharged (m <sup>3</sup> ), split into: <ul style="list-style-type: none"><li>• Total;</li></ul>	In reporting this core global disclosure metric, an organisation should include:	TNFD



		<ul style="list-style-type: none"><li>• Freshwater; and</li><li>• Other.</li></ul> <p>Including:</p> <ul style="list-style-type: none"><li>• Concentrations of key pollutants in the wastewater discharged, by type of pollutant, referring to sector-specific guidance for types of pollutants; and</li><li>• Temperature of water discharged, where relevant.</li></ul>	<ul style="list-style-type: none"><li>• The volume (m<sup>3</sup>) of wastewater and sewage discharged to water bodies (m<sup>3</sup>);</li><li>• The volume (m<sup>3</sup>) of bilge water and/or ballast water discharged into water bodies (m<sup>3</sup>); and</li><li>• The aggregate volumes (m<sup>3</sup>) of anti-fouling hub treatments used and concentrations of key pollutants included.</li></ul> <p>This should be broken down by percentage:</p> <ul style="list-style-type: none"><li>• Treatment (treated or treated);</li><li>• Destination (surface water, seawater, groundwater, third party); and</li><li>• Pollutants (e.g. dissolved solids, suspended solids).</li></ul> <p>An organisation should disclose the number of incidents where the organisation's wastewater discharges exceeded local regulatory or international standards.</p> <p>Vessel and land-based processing facilities should disclose the aggregate volume (m<sup>3</sup>) discharged of untreated seafood effluents and disinfectants (specifying type) to water bodies.</p>	
C2.2	Waste generation & disposal	Weight of hazardous and non-hazardous waste generated by type (tonnes), referring	In reporting this core global disclosure metric, a fishing organisation (not applicable	TNFD



		<p>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"><li>• Waste incinerated (with and without energy recovery);</li><li>• Waste sent to landfill; and</li><li>• Other disposal methods.</li></ul> <p>Weight of hazardous and non-hazardous waste (tonnes) diverted from landfill, split into waste:</p> <ul style="list-style-type: none"><li>• Reused;</li><li>• Recycled; and</li><li>• Other recovery operations.</li></ul>	<p>to Marine Aquarium Trade and processing organisations) should disclose the number and proportion (%) of the vessels in its fleet that have been decommissioned or that will be decommissioned under their current decommissioning plan, broken down by:</p> <ul style="list-style-type: none"><li>• Vessels recycled overseen by the organisation; and</li><li>• Vessels shipped to a third-party vessel breaking service.</li></ul> <p>A fishing and processing organisation should disclose the total weight (kg) of fish carcasses discarded and the total weight (kg) and proportion (%) of that total that is juvenile fish.</p>	
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.</p> <p>For plastic packaging, percentage of plastics that is:</p> <ul style="list-style-type: none"><li>• Re-usable;</li><li>• Compostable;</li><li>• Technically recyclable; and</li><li>• Recyclable in practice and at scale.</li></ul>	<p>In reporting this core global disclosure metric, an organisation should include:</p> <ul style="list-style-type: none"><li>• Weight, number and proportion (%) of total fishing gear marked with port ID and vessel ID details (IMO vessel number or equivalent);</li><li>• Weight, number and proportion (%) of lost gear retrieved. If unable to be retrieved, absolute amounts and share (%) of lost gear reported to the relevant authority for the area or an international initiative (e.g.) Global Ghost Gear Initiative;</li><li>• Weight, number and proportion (%) of total fishing gear lost in sensitive</li></ul>	TNFD



			<p>locations.</p> <p>A Marine Aquarium Trade organisation should include their use of plastic/polystyrene-based containers.</p>	
C2.4	Non-GHG air pollutants	<p>Non-GHG air pollutants (tonnes) by type:</p> <ul style="list-style-type: none"><li>Particulate matter (PM2.5 and/or PM10);</li><li>Nitrogen oxides (NO<sub>2</sub>, NO and NO<sub>3</sub>);</li><li>Volatile organic compounds (VOC or NMVOC);</li><li>Sulphur oxides (SO<sub>2</sub>, SO, SO<sub>3</sub>, SOX); and</li><li>Ammonia (NH<sub>3</sub>).</li></ul>	No further sector specific guidance; refer to the core global disclosure metric.	
<b>Driver of nature change: resource use/replenishment</b>				
C3.0	Water withdrawal and consumption from areas of water scarcity	Water withdrawal and consumption (m <sup>3</sup> ) from areas of water scarcity, including identification of water source.	This core global disclosure metric is only relevant for fish processing - both vessel-based and land-based - and Marine Aquarium Trade import/export holding facilities. It does not apply to other fishing sector organisations.	TNFD
C3.1	Quantity of high-risk natural commodities sourced from land/ocean/freshwater	Quantity of high-risk natural commodities (tonnes) sourced from land/ocean/freshwater, split into types, including proportion of total natural commodities.	In reporting this core global disclosure metric, a fishing and processing organisation should include: <ul style="list-style-type: none"><li>the weight (tonnes) of target and other species caught or used, broken down by species caught by each gear type, stock and stock</li></ul>	TNFD



			<p>health score according to Fishsource,<sup>56</sup> indicating whether that species appears in CITES Appendix 1 and 2; CMS Appendix 1; or IUCN Red List as vulnerable, endangered or critically endangered; and</p> <ul style="list-style-type: none"><li>the weight (kg) of bait used, and the proportion (%) from juvenile fish.</li></ul> <p>Marine Aquarium Trade organisations may report the total number of fish sourced rather than the weight.</p> <p>In reporting this core global disclosure metric, a fishing organisation (including MAT) should disclose the total weight (kg) of catch per fishing trip caught by gear type in protected areas, broken down into:</p> <ul style="list-style-type: none"><li>MPAs, broken down by MPA type according to IUCN categories;<sup>57</sup></li><li>National statutes or regulations;</li><li>National policy structure;</li><li>International policy structure (e.g.) under the Biodiversity Beyond National Jurisdiction agreement;</li></ul>	
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<sup>56</sup> [Fishsource](#).

<sup>57</sup> See IUCN (2019) [IUCN Guidelines for applying the IUCN protected area management categories to marine protected areas](#), noting that all MPA types are included in the disclosure requirement as fishing is authorised in MPAs at varying frequencies and gear types depending on their level of protection e.g. highly selective and low-impact gear types in highly protected MPAs, and extensive extraction and other activities with high total impact in minimally protected MPAs. Organisations may refer to the [Protected Planet MPA guide](#) if needed as well.



			<ul style="list-style-type: none"><li>• Other relevant marine spatial planning (MSP) mechanisms; and</li><li>• UNESCO Marine Heritage sites.</li></ul>	
		Quantity of high-risk natural commodities (tonnes) sourced under a sustainable management plan or certification programme, including proportion of total high-risk natural commodities.	<p>In reporting this core global disclosure metric, an organisation should disclose the proportion (%) of its total catch that has been caught from sustainably managed stocks - caught when at a level fluctuating around, or above a level consistent with Maximum Sustainable Yield (MSY) or an appropriate proxy - and the proportion (%) of its total catch that has not been caught from sustainably managed stocks.</p> <p>If there is no stock assessment due to insufficient data, an organisation should disclose the proportion (%) of target stocks for which there is ongoing work to ensure that data is collected.</p>	TNFD
<b>Driver of nature change: Invasive alien species and other</b>				
C4.0	Placeholder indicator: Measures against unintentional introduction of invasive alien species (IAS)	Proportion of high-risk activities operated under appropriate measures to prevent unintentional introduction of IAS, or low-risk designed activities.	<p>In reporting this core global disclosure metric, an organisation should disclose the quantity (tonnes) and proportion (%) of bait used that is non-native bait.</p> <p>A Marine Aquarium Trade organisation should disclose the number and proportion (%) of total species exported/imported that are:</p> <ul style="list-style-type: none"><li>• Listed as invasive on the Global Invasive Species Database; and</li></ul>	TNFD



			<ul style="list-style-type: none"><li>• Listed as invasive in the import jurisdiction.</li></ul>	
<b>State of nature</b>				
C5.0	Placeholder indicator: Ecosystem condition	<p>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:</p> <ul style="list-style-type: none"><li>• Level of ecosystem condition by type of ecosystem and business activity;</li><li>• Impacts on mean species extinction risk.</li></ul> <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 sector specific guidance; refer to the core global disclosure metric.	
	Placeholder indicator: Species extinction risk	As above.	No further sector specific guidance; refer to the core global disclosure metric.	



## 3.2. Proposed core sector disclosure indicators and metrics

The proposed TNFD core sector disclosure metrics for the fishing sector are outlined below. These metrics are recommended by the TNFD to be disclosed by all report preparers in the sector on a comply or explain basis.

**Table 14: Proposed core sector disclosure indicators and metrics**

Metric category	Metric subcategory	Metric No.	Indicator	Proposed core sector metrics	Source
Impact driver	Pollution/pollution removal	F.C2.0	Spills	Number and aggregate volume (m <sup>3</sup> ) of oil spills and discharged fuel waste (as defined by MARPOL). (as defined by MARPOL).	MARPOL
Impact driver	Resource use/replenishment	F.C3.1	Bycatch <sup>58</sup> of sensitive species	Number of marine mammals, turtles, seabirds and other species listed as vulnerable, endangered or critically endangered on the IUCN red list, or listed in CMS Appendix 1, or CITES Appendix 1 and 2, killed or injured intentionally and incidentally by the fleet.	IUCN red list ; CMS Appendix 1 ; CITES Appendices 1 and 2
Impact driver	Resource use/replenishment	F.C3.2	Bycatch of sensitive species	<b>Marine aquarium trade</b> Number of organisms rejected at any point and/or lost during transport.	TNFD
Impact driver	Resource use/replenishment	F.C3.0	Bycatch of other species	Quantity (number), weight (kg) and proportion of total catch (%) of unwanted (bycatch) species, broken down by quota and non-quota species if the fishery operates in a	TNFD

<sup>58</sup> See [TNFD Glossary](#) for definition of bycatch.



				legislative quota system.	
Impact driver	Resource use/replenishment	F.C3.3	Incidences of IUU fishing	Number of reported incidences of IUU fishing <sup>59</sup> across the value chain.	TNFD

### 3.3. Proposed additional sector disclosure indicators and metrics

The proposed TNFD additional sector disclosure metrics for the fishing 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: Proposed additional sector disclosure indicators and metrics**

Metric category	Metric subcategory	Metric No.	Indicator	Proposed additional sector metrics	Source
Response	Dependency, impact, risk and opportunity management: Value chain	F.A22.0	Vessels registered and using tracking technology.	<p>The number and proportion (%) of vessels registered with international and national bodies, broken down by:</p> <ul style="list-style-type: none"><li>• The International Maritime Organisation (IMO);</li><li>• Relevant port authority;</li><li>• Recognised fishing authority; and</li><li>• Flag State shipping authority.</li></ul> <p>The number and proportion (%) of vessels as a share of its total fleet (or the total vessels it sources from) operated using publicly accessible tracking technology, specifying which technology e.g. Automatic Identification</p>	TNFD

<sup>59</sup> See [TNFD Glossary](#) for definition of IUU fishing.



				<p>System (AIS) or Vessel Monitoring System (VMS). For small vessels (under 15m), the number and proportion (%) of the vessels in its fleet using log book systems or other catch recording systems.</p>	
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.0	Appropriate mesh sizes	<p>The proportion (%) of vessels using appropriate mesh sizes under the national legislation of the country where the catch is made or landed to minimise bycatch of fish under Minimum Conservation Reference Size (MCRS).</p>	TNFD
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.1	Cyanide fishing	<p><b>Marine aquarium trade</b> The number and proportion (%) of suppliers engaged on eliminating cyanide fishing from their practices.</p>	TNFD
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.2	Discharge of bilge and/or ballast water	<p>The number and proportion (%) of vessels that have measures in place to prevent the discharge of bilge and/or ballast water.  <b>Processing organisations</b> The number and proportion (%) of suppliers or source vessels engaged on eliminating bilge and/or ballast water dumping from their practices.</p>	TNFD



Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.3	Gear modifications	The number and proportion (%) of vessels that have gear modifications to avoid posing serious or irreversible harm to sensitive locations.  The weight (kg) and proportion (%) of target catch caught with such modified gear.	TNFD
Response	Dependency, impact, risk and opportunity management: Value chain	F.A22.1	Observer coverage	The number and proportion (%) of vessels that have observer coverage, broken down by: <ul style="list-style-type: none"><li>• human observers; and</li><li>• remote electronic monitoring (REM).</li></ul>	TNFD
Impact driver	Pollution/pollution removal	F.A2.0	Disturbances	Volume (decibels) of noise generated from: <ul style="list-style-type: none"><li>• Fishing vessel operations; and</li><li>• Bottom-towed gear, i.e. bottom trawls, dredges.</li></ul>	TNFD
Response	Dependency, impact, risk and opportunity management: value chain	F.A22.2	Certification status	Quantity (number) and proportion (%) of vessels that are certified under MSC or other credible standards that abide by the FAO third party assessment arrangements, <sup>60</sup> and the frequency of certification audits (years).	MSC, FAO
Response	Dependency, impact, risk and opportunity management:	F.A22.3	Fisheries improvement programmes	Quantity (number) and proportion (%) of fisheries it utilises or sources from that are under a fisheries improvement programme (FIP).	TNFD

<sup>60</sup> FAO (2023) [Principles and guidelines for the assessment and use of voluntary third-party assurance programmes](#).



	Value chain				
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.4	Biodegradable fishing gear	The weight (tonnes) and proportion (%) of gear made from recyclable or biodegradable, non-polymer and non-fossil fuel-based fishing gear and rope materials.	TNFD
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.5	Bycatch reduction mechanism use	Quantity (number) and proportion (%) of vessels using bycatch reduction mechanisms in their gear (e.g. turtle exclusion devices).	TNFD
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.6	Closed-loop scrubbers	Quantity (number) and proportion (%) of vessels with closed-loop scrubbers on their engines.	TNFD
Response	Dependency, impact, risk and opportunity management: Changes to nature	F.A23.7	Recycled and reused water	<b>Processing organisations</b> Proportion (%) of water used in operations that is recycled or reused water.	TNFD



	(dependency and impact): mitigation hierarchy steps				
Response	Dependency, impact, risk and opportunity management: Changes to nature (dependency and impact): mitigation hierarchy steps	F.A23.8	Risk of cetacean bycatch	Quantity (number) and proportion (%) of vessels with bottom set gill or entangling nets in areas at risk of cetacean bycatch that are using acoustic deterrent devices (commonly referred to as “pingers”) or other such technology to deter sensitive species or free them from nets should they become entangled.	TNFD
Response	Dependency, impact, risk and opportunity management: Value chain	F.A22.4	Traceability of aquarium fish	<b>Marine aquarium trade</b> Proportion (%) of organisms sourced that are traceable to their original location.	TNFD



## 4. Glossary

Sector-specific concepts and definitions are defined in this section. The TNFD glossary will be updated to include these concepts once the fishing sector guidance is finalised, based on market consultation and feedback. Readers are recommended to visit the TNFD glossary for other terms used throughout the document.

Concept	Definition(s)	Source
Artisanal fisheries	Traditional fisheries involving fishing households (as opposed to commercial companies), using a relatively small amount of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption.	<a href="#">FAO Terminology portal.</a>
Blue carbon	The carbon stored in coastal and marine ecosystems, including in mangroves, seagrass and tidal marshes.	The Blue Carbon Initiative <a href="#">What is blue carbon.</a>
Bycatch	Bycatch is fish or other marine species caught unintentionally while trying to catch another type of fish. In some cases, bycatch cannot be avoided, and unwanted fish end up in the fishing net.	MSC <a href="#">What is bycatch and how can it be managed?</a>
Bycatch excluder device	A device inserted in a fishing gear (usually trawl, close to the cod-end, to allow escapement, alive, of unwanted species (including medusae) or individuals (juveniles) or endangered species (e.g. seals, turtles, dolphins).	<a href="#">FAO Terminology portal.</a>
Demersal	Living in close relation with the bottom [of the sea/ocean] and depending on it.	<a href="#">FAO Terminology portal.</a>
Exclusive Economic Zone (EEZ)	A concept adopted at the Third United Nations Conference on the Law of the Sea (1982), whereby a coastal State assumes jurisdiction over the exploration and exploitation of marine resources in its adjacent section of the continental shelf, taken to be a band extending 200 miles from the shore. The Exclusive Economic Zone comprises an area which extends either from the coast, or in federal systems, from the seaward boundaries of the constituent states (3 to 12 nautical miles, in most cases) to 200 nautical miles (370 km) off the coast. Within this area, nations claim and exercise sovereign rights and exclusive fishery management authority over all fish and all Continental Shelf fishery resources.	<a href="#">IPBES Glossary.</a>
Fishery	A fishery is an area where fish are caught for commercial or recreational purposes. It can be a defined body of water or a collection of fishing activity that has been agreed upon by countries and fishers. Different fisheries often have different target species of fish or shellfish.	MSC <a href="#">What is a fishery?</a>



Concept	Definition(s)	Source
Fishery improvement project (FIP)	A FIP brings together retailers, processors, producers and fishers to demand and leverage better management of marine resources by identifying environmental issues and implementing priority actions to address the root causes of fishery depletion.	Sustainable Fisheries Partnership <a href="#">Fishery improvement projects</a> .
Fishing effort	1) The amount of fishing gear of a specific type used on the fishing grounds over a given unit of time e.g. hours trawled per day, number of hooks set per day or number of hauls of a beach seine per day.  2) The overall amount of fishing (usually per unit of time) expressed in units such as boat days on the fishing ground, number of traps, or trawl hauls, or (gillnet length x soaking time). The effort may be <i>nominal</i> , reflecting the simple total of effort units exerted on a stock in a given time period. It may also be <i>standard</i> or <i>effective</i> , when corrected to take account of differences in fishing power and efficiency and ensure direct proportionality with fishing mortality. This usually relates to a specific fishery and gear. If more than one gear is considered, standardisation in relation to one of them is necessary. For biologists, a good measure of fishing effort is proportional to fishing mortality. For economists, it should be proportional to the cost of fishing.	FAO (1999) <a href="#">Guidelines for the routine collection of capture fishery data</a> .
Flag of convenience	Where beneficial ownership and control of a vessel is found to be elsewhere than in the country of the flag the vessel is flying.	Environmental Justice Foundation (2020) <a href="#">Off the Hook: How flags of convenience let illegal fishing go unpunished</a> .
Ghost gear	Fishing gear or parts thereof (including fish aggregating devices) that are abandoned, lost or discarded at sea. This is more formally referred to as “Abandoned, Lost, or Discarded Fishing Gear” (ALDFG)	MSC (2021) <a href="#">Supporting the prevention of gear loss and ghost fishing. Fisheries Standard Review Impact Assessment Report</a> , p.6



Concept	Definition(s)	Source
Illegal, unreported and unregulated (IUU) fishing	<p>Illegal fishing refers to fishing activities:</p> <ul style="list-style-type: none"><li>Conducted by national or foreign vessels in waters under the jurisdiction of a state, without the permission of that state, or in contravention of its laws and regulations.</li><li>Conducted by vessels flying the flag of states that are parties to a relevant regional fisheries management organisation (RFMO) but operate in contravention of the conservation and management measures (CMMs) adopted by that organisation and by which the states are bound, or relevant provisions of the applicable international law.</li><li>In violation of national laws or international obligations, including those conducted by cooperating states to a relevant RFMO.</li></ul> <p>Unreported fishing refers to fishing activities:</p> <ul style="list-style-type: none"><li>That have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations.</li><li>Conducted in the area of competence of a relevant RFMO that have not been reported or have been misreported, in contravention of the reporting procedures of that organisation.</li></ul> <p>Unregulated fishing refers to fishing activities:</p> <ul style="list-style-type: none"><li>In the area of application of a relevant RFMO that are conducted by vessels without nationality, or by those flying the flag of a state not party to that organisation, or by a fishing entity, in a manner that is not consistent with or contravenes the CMMs of that organisation.</li><li>In areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with state responsibilities for the conservation of living marine resources under international law.</li></ul>	FAO <a href="#">Illegal, unreported and unregulated (IUU) fishing</a> .
Industrial fisheries	Industrial fisheries are defined as a category of capture fishery that generally present (some of) the following characteristics: (i) high capital equipment and expenditure, (ii) highly level of mechanisation, motorisation and onboard processing, (iii) large vessel size (> 24 m and > 50 GT), (iv) based on a business more vertically integrated, with generally global market access, (v) operating offshore on a multi-days basis.	IPBES <a href="#">Glossary</a>



Concept	Definition(s)	Source
Marine Aquarium Trade	The marine aquarium trade supplies aquarium keepers with [live] ornamental species such as fish, corals, sea anemones, crustaceans, echinoderms and polychaetes.	Schwerdtner Manez et al. (2014) <a href="#">Fishing the last frontier: The introduction of the marine aquarium trade and its impact on local fishing communities in Papua New Guinea.</a>
Marine Protected Areas (MPAs)	A protected marine intertidal or subtidal area, within territorial waters, EEZs or in the high seas, set aside by law or other effective means, together with its overlying water and associated flora, fauna, historical and cultural features. It provides degrees of preservation and protection for important marine biodiversity and resources; a particular habitat (e.g. a mangrove or a reef) or species, or sub-population (e.g. spawners or juveniles) depending on the degree of use permitted. In MPAs, activities (e.g. of scientific, educational, recreational or extractive nature, including fishing) are strictly regulated and could be prohibited.	<a href="#">FAO Terminology portal.</a>
MARPOL	The International Convention for the Prevention of Pollution from Ships.	<a href="#">MARPOL.</a>
Maximum sustainable yield (MSY)	The largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.	MCS (2018) <a href="#">Wild Capture Ratings Methodology.</a>
Overfishing	When a stock is subjected to a level of fishing mortality that jeopardises its ability to produce MSY on a continuing basis.	MCS (2018) <a href="#">Wild Capture Ratings Methodology.</a>
Pelagic fish	Fish that spend most of their life swimming in the water column with little contact with or dependency on the bottom.	<a href="#">FAO Terminology portal.</a>
Regional fisheries management organisation	An intergovernmental fisheries organisation or arrangement, as appropriate, that has the competence to establish conservation and management measures.	FAO (2016) <a href="#">Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing.</a>
Shark finning	The practice of removing any of the fins of a shark (including the tail) while at sea and discarding the remainder of the shark at sea.	MSC (2023) <a href="#">MSCI Vocabulary.</a>



Concept	Definition(s)	Source
Stock	The living resources in the community or population from which catches are taken in a fishery. Use of the term fish stock usually implies that the particular population is more or less isolated from other stocks of the same species and hence self-sustaining. In a particular fishery, the fish stock may be one or several species of fish, but here it is also intended to include commercial invertebrates and plants.	FAO (1997) Fishery Resources Division and Fishery Policy and Planning Division. <a href="#">FAO Technical Guidelines for Responsible Fisheries</a> .
Target species	Those species that are primarily sought in a particular fishery and are the subject of directed fishing effort in a fishery. Target species may also be discarded due to landing size limits, over-quota, low quality as a result of depredation, scavenging or spoilage, or safety issues.	FAO (2021) Committee on Fisheries <a href="#">A third assessment of global marine fisheries discards</a> .
Transhipment	The transfer process of fish or fish products at sea or in port, from one fishing vessel to either another fishing vessel or to a vessel used solely for the carriage of cargo, for further transport. At-sea transshipments are of special concern in fishery management since, if not properly monitored, they can complicate the collection of accurate data and the traceability of product, creating a fertile environment for illegal, unreported and unregulated fishing activities.	International Seafood Sustainability Foundation <a href="#">Transshipment</a> .
Vessel	Any vessel, ship of another type or boat used for, equipped to be used for, or intended to be used for, fishing or fishing related activities.	FAO (2016) <a href="#">Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing</a> .



Concept	Definition(s)	Source
Vulnerable marine ecosystem s (VMEs)	<p>These are habitats that have been designated as such by a competent authority, based on the VME criteria, as defined in the International Guidelines for the Management of Deep-sea Fisheries in the High Seas.</p> <p>“A marine ecosystem should be classified as vulnerable based on the characteristics that it possesses. The following list of characteristics should be used as criteria in the identification of VMEs:</p> <ul style="list-style-type: none"><li>• Uniqueness or rarity</li><li>• Functional significance of the habitat</li><li>• Fragility</li><li>• Life-history traits of component species that make recovery difficult</li><li>• Structural complexity. (Paragraph 42, FAO DSF Guidelines).</li></ul>	FAO (2009) <a href="#">VME Criteria</a> .



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