

Ocean INSTITUTE

Biodiversity & Business

Marine biodiversity as a basis for
responsible business conduct

■ ANALYSIS



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Summary of the main points of the report

Degradation of the marine environment is not only an environmental challenge, but also poses financial risks to businesses that exert pressures on and/or depend on the ocean. These risks may arise from degraded and stressed ecosystems that weaken nature's ability to provide essential services, from increasingly stringent regulation, from supply chain requirements for reduced environmental impact, and from investor expectations regarding the documentation and management of marine-related pressures.

Marine biodiversity is no longer only an environmental concern; it is increasingly a condition for risk management, access to capital and long-term business viability.

Despite these risks, marine biodiversity remains significantly underreported in many companies' sustainability disclosures, limiting effective risk management and strategic prioritisation. This also presents a strategic opportunity: companies that are able to identify, document and reduce their pressures on the ocean can better meet growing expectations from authorities and financial actors, while strengthening their management of operational, reputational and market risks. In doing so, they can enhance their market position in a context where reducing pressures on the ocean is increasingly becoming a competitive parameter.

Marine biodiversity is under significant pressure

None of Denmark's 109 coastal water bodies achieve good ecological status, and only two of the 123 water bodies meet good chemical status. Monitoring data indicate stagnation or decline in key ecological parameters, including eelgrass, benthic fauna (e.g. mussels, polychaetes and crustaceans) and marine food webs. For example, reductions in benthic fauna weaken the food base for fish that depend on feeding on the seabed. This is particularly evident in fjords and coastal waters.

At the same time, commercial activities such as nutrient inputs, fisheries, underwater noise, marine aggregate extraction and shipping traffic collectively contribute to pressures that exceed the ecological carrying capacity of the sea in large parts of Danish waters.

These developments have consequences that extend far beyond the marine environment itself. The ocean plays a systemic role in maintaining planetary stability through climate regulation, carbon cycling, oxygen production, nutrient turnover and food provision. The degradation of marine ecosystems can therefore materialise as long-term societal and economic risks.

Purpose and approach of the report

The purpose of the report is to support behavioural changes among business operators so that the pressures on the marine environment can be reduced now and in the future. By highlighting and systematising the pressures generated by business activities and their potential impact on marine biodiversity, companies are given a better basis for decision-making to take more active responsibility for the state of the sea.

The report provides knowledge, concepts and tools that can help companies to:

- identify and understand their pressures on the marine environment,
- assess the risks and responsibilities associated with these pressures, and
- apply relevant methods and data sources to document pressures and impacts on marine biodiversity.

The report is aimed at companies whose activities directly or indirectly affect the marine environment, as well as actors with such activities in their value chains. It is based on the principle of double materiality and builds on existing research, reporting methodologies and practical analytical tools.

Key contributions

The report translates knowledge about the ocean into decision-relevant information in a business context:

1. Impacts

Companies' activities are linked to specific pressures on marine biodiversity. These are assessed in light of location and ecological vulnerability, enabling companies to identify which impacts are most likely to be significant.

2. Risks

The report demonstrates how the state of the ocean can affect businesses through operational disruptions, regulatory changes, legal liability, reputational damage and financial losses linked to environmental degradation or conservation measures.

3. Opportunities

The report shows how reducing pressures can create business value by lowering risk exposure, strengthening access to capital, enabling continued market access and enhancing competitiveness.

This is supported by an operational approach that focuses on:

- reducing pressures that companies can directly control,
- acting despite incomplete data where risks are known, and
- assessing activities in the context of cumulative pressures within the marine environment.

Perspective on change and case studies

The desired long-term change is a practice where:

- pressures on the marine environment are integrated into business decisions,
- decisions are based on the ecological condition and resilience of the sea,
- pressure is reduced in vulnerable areas before ecological limits are exceeded,
- responsible business behaviour at sea becomes a competitive parameter, and
- companies can engage in a more informed dialogue with the financial sector and authorities, supported by better data.

Companies can work purposefully to reduce biodiversity-related risks by first identifying and documenting their pressures on marine biodiversity to set specific reduction targets in the long term.

The perspective on change is illustrated through cases from Musholm and the Danish Pelagic Producers Organisation. They show how companies can work in a structured way with their pressures on marine biodiversity and how this can strengthen legitimacy, risk management and competitiveness in a market with increasing demands for responsibility.



Blue mussel reef, Great Belt
Photo: Tim Dencker

1. Introduction and purpose

The ocean is not just a resource, but part of a vulnerable and interconnected system whose biogeophysical boundaries set limits for human activity. As a systemic hub, the ocean supports processes that are critical to the stability of the Earth.

The ocean regulates the climate by absorbing heat and carbon, maintaining marine food webs, recycling nutrients from land and buffering chemical pollution. When the ocean's ecological limits are exceeded, these functions are weakened, increasing the risk of self-reinforcing degradation, including ecosystem collapse, altered ocean circulation and the loss of natural carbon stores – with potentially severe consequences for nature, society and the economy (Damania et al., 2025).

Nature is under significant pressure: six out of nine planetary boundaries are already considered to have been exceeded, and pressure continues to increase on several of the remaining boundaries (Richardson et al., 2023). This underscores the need to reduce pressures before irreversible thresholds are crossed.

For actors operating at sea, this implies that activities must be aligned with the capacity of ecosystems. In areas where ecological limits have already been exceeded, reductions alone may be insufficient to restore key functions, and additional pressures increase the risk of permanent loss of ecosystem services and climate resilience – with cascading consequences for society and business.

The Ocean Institute therefore seeks to strengthen the business community's understanding and management of these risks by supporting the integration of marine biodiversity considerations into companies' decision-making processes and enabling a timely transition in the use of the sea.

1.1 The state of the sea

Danish marine areas are generally not in good ecological condition. This means that they do not meet the threshold values for a healthy marine environment set out in the Marine Strategy Framework Directive and the Water Framework Directive. According to the latest national assessments, none of Denmark's 109 coastal water bodies have good ecological status, and 98% of water bodies are not in good chemical status (Danish Agency for Green Area Conversion and Water Environment, 2025). The situation is unsatisfactory both in terms of environmental pressures, including nutrients, environmentally hazardous substances, waste and noise, and in terms of the health of ecosystems, including species distribution, habitat condition and food web functioning (Ministry of Environment and Gender Equality, 2025b).

At the same time, the scale and intensity of human activities in and around the sea have increased significantly. These activities include fisheries, aquaculture, shipping, offshore wind, oil and gas installations, agricultural runoff, wastewater discharges, tourism and infrastructure (Jouffray et al., 2020). The combined pressures from human activities, together with anthropogenic climate change, are placing complex and accelerating pressure on the marine environment. This undermines the resilience of the ocean and impairs its ability to maintain key functions such as food provision and carbon storage (Halpern et al., 2015).

Negative impacts on the marine environment also represent a potential source of financial and business risk. At the same time, many companies are dependent, to varying degrees, on marine ecosystems and their functions, e.g. access to resources, stable operating conditions, transport routes and regulating ecosystem services. Overall, this means that both pressures and dependencies are relevant for decision-making in a risk management context, depending on sector, location and exposure.

1.2 Marine biodiversity as an underprioritised theme for businesses

Businesses' ability to document their footprint on the surrounding environment is a key source of knowledge about their business footprint, but also about the varying degrees of dependence that business models have on marine ecosystems and functions. This knowledge can inform companies' own decisions on strategy, risk management and capital allocation, and can also form the basis for assessments by external actors. This includes authorities, investors, civil society, competitors, value chain partners and researchers, who can use the information in connection with environmental initiatives, business strategy, resource management and financial planning, depending on the context and purpose.

Despite this dual relevance, several sources indicate that marine biodiversity is often underprioritised.

The World Benchmark Alliance's (WBA) first Ocean Benchmark from January 2026 provides cross-sectoral insight into how far companies have come in their documented management of marine biodiversity.

The Ocean Institute's review of data from Ocean Benchmark's measurement area "Ecosystems and Biodiversity" shows that companies can, to a certain extent, account for their overall intentions, policies and governance frameworks, while clear priorities, concrete goals and documented progress are rare. Overall, this points to a significant gap between stated ambitions and actual implementation.

Companies perform best on indicators relating to greenhouse gas emissions, with approximately 90% of companies having addressed their greenhouse gas emissions to a more or less satisfactory extent. By comparison, the proportion of companies that have addressed biodiversity-related indicators is between approximately 10 and 40%, even though many of the companies' activities take place on or in direct connection with the sea. The same picture applies in previous Danish studies on biodiversity more generally (Dansk Erhverv, 2024). The findings from the World Benchmark Alliance indicates that climate action is given higher priority in practice than ecosystems and marine biodiversity.

Other analyses point in the same direction. A study published in the journal *Nature* shows that even among the world's largest companies with activities on and near the sea, reporting on pressures on marine biodiversity is limited. The analysis covers annual reports from 75 global companies in eight key sectors of the marine economy and shows that while 96% report on energy consumption and climate-related emissions, approximately half report on pressures on marine biodiversity, and even fewer on more specific pressures such as oil spills, habitat changes and invasive species (Jouffray et al., 2025).

A large number of different indicators are used, only a small proportion of which relate to biodiversity, which can make comparison and overview difficult.

At the same time, an international survey of investors indicates that existing regulatory requirements and standards are not perceived as sufficiently clear or operational to support biodiversity reporting. Only 23% of respondents believe that the Corporate Sustainability Reporting Directive (CSRD) in its current form provides the information investors need, while 25% say no and 53% are unsure (Responsible Investor, 2025).

Overall, the absence of systematic and comparable reporting on pressures, impacts and dependencies on marine biodiversity means that both companies and investors may lack a sufficient basis for assessing marine-related risks. For companies, this may mean that important factors are not included in strategic decisions and risk management. For investors, it may increase uncertainty in the assessment of long-term sustainability and financial risks, thereby affecting capital allocation.

In a context characterised by regulatory uncertainty, the knowledge function of documentation becomes particularly central as a basis for decision-making. These patterns are also relevant in a context where companies' dependencies on marine ecosystems are increasingly expected to be included in the assessment of financial materiality and risk profile, including in the dialogue between companies, investors and lenders (see Chapter 6).

About the World Benchmark Alliance Ocean Benchmark

The World Benchmark Alliance has conducted the Ocean Benchmark based on its methodological framework (World Benchmark Alliance, 2024), which includes 125 companies selected from among the 750 companies participating in the World Benchmark Alliance's Nature Benchmark. The benchmark covers a range of sectors, including fisheries and seafood, maritime transport, offshore wind, shipbuilding, port operations, textiles and chemicals.

The Ocean Benchmark consists of 47 indicators divided into four main areas. The Ocean Institute's review is limited to the dataset for the Ecosystems & Biodiversity area, which accounts for 50% of the total score in the Ocean Benchmark and includes the indicators most directly related to companies' pressures on marine ecosystems. Within this area, all 18 biodiversity indicators are used, including indicators for chemical pressures (e.g. water pollution, plastics and waste), physical pressures (e.g. underwater noise, habitat disturbance and seabed loss), biological pressures (e.g. invasive species and pressures on marine food webs), as well as companies' work on nature-related risks, dependencies and the development of biodiversity strategies.

The analysis is conducted at the element level in the dataset. This means that it not only looks at whether companies address a given issue, but also how. The 125 companies are scored on whether they have established policies and management systems, conducted risk assessments, set targets, and whether they can document progress.

The Ocean Benchmark does not measure the actual ecological state of the marine environment or the actual pressures exerted by companies', but assesses companies' publicly available documentation of policies, management systems, risk assessments, targets and progress related to marine biodiversity.

A low score or failure to meet an element should therefore not be interpreted as an absence of pressures, but as an expression of a lack of transparency, systematic approach or documentation. The absence of data is in itself a key finding, as it limits the ability of companies and financial actors to identify, prioritize and mitigate marine-related risks.

Each element is assessed as met/not met based on publicly available documentation. Failure to meet an element should therefore not be interpreted as an absence of pressures, but as a lack of public documentation or systematic approach.

1.3 Purpose, target group and approach

The purpose is to establish a basis for behavioural change among business actors, now and in the longer term, for the benefit of the sea and society.

The purpose of the report is to provide knowledge and tools that enable companies to:

- strengthen their understanding of the pressures arising from their activities and the impacts these may have on marine biodiversity,
- make informed assessments of the risks and responsibilities associated with pressures on the marine environment, and
- use relevant analytical methods and data sources to support documentation of impacts in the marine areas where the company operates.

The report is aimed at companies whose activities directly or indirectly affect the marine environment. This includes operators with primarily marine-related activities such as shipping, ports, offshore energy, fishing and marine aggregate extraction, as well as companies that discharge pollutants into the sea, including wastewater utilities and industries that discharge wastewater or chemicals. The report is also relevant for companies with such activities in their value chains.

The work is based on the principle of double materiality, comprising an outside-in perspective that concerns economic risks to the company, and an inside-out perspective that concerns the company's impact on the environment, climate, human rights and governance (Nielsen et al., 2024), see Chapter 3.

The report is based on research, reporting methodologies and practical tools with a view to describing companies' pressures on marine biodiversity in a decision-relevant manner.

1.4 Definitions

Comparative analyses of concepts and definitions in key reporting initiatives show that there is considerable variation in the use of biodiversity-related terms (Lammerant & Verhelst, 2024).

Below are definitions of key concepts used in this report.

Activity: Any economic activity on or related to the sea that may directly or indirectly affect marine ecosystems. The term includes, among other things, the exploitation of living and non-living resources, transport and infrastructure, energy production, industrial, service and tourism activities, as well as activities in upstream and downstream stages of value chains with a maritime connection.

Biodiversity: The variation among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and ecosystems, as described in Article 2 of the Convention on Biological Diversity (Convention on Biological Diversity, 5 June 1992).

Sustainability: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987).

Pressure: Forms of pressure on the marine environment caused by a specific activity. Pressures can be direct or indirect and describe the actual pressure exerted.

Impact: The effect that a pressure can have on marine biodiversity. For example, the pressure of sediment disturbance can lead to reduced light penetration in the water column, inhibited growth of seagrass and thus degraded habitats for fish.

Nature-related opportunities: Business activities and strategic choices that create long-term value for the company by avoiding, reducing or reversing negative pressures on nature, strengthening the condition and function of ecosystems, and increasing the company's resilience, competitiveness and access to capital. (TNFD, 2025a).

Ecosystem services: The contributions that ecosystems make to human well-being (Haines-Young & Potschin-Young, 2018)

1.5 Scope and Limitations

The explanations and arguments presented in the report do not constitute authoritative assessments of the overall impacts of individual activities. Rather, the report serves as an operational guide that provides companies with a qualified basis for understanding and acting on ocean-related risks. The aim is to strengthen the marine environmental understanding framework so that companies can integrate marine-related considerations into their sustainability work and risk management.

An overview of potential marine-related risks associated with commercial activities at sea is presented in the matrix on pages 58–59. The purpose is to provide an overview of the pressures from specific activities, the biodiversity components that may be affected, and the impacts that these pressures may have on the marine environment. The report thus provides a qualified basis for further strategic work, but leaves the development of KPIs, quantitative weighting, significance scoring and specific business responses to the companies themselves.

Companies' ability to document their pressures and impacts on marine biodiversity does not define the role of the private sector in the blue transition. However, the level and quality of such documentation are critical in enabling financial actors to assess whether capital is being allocated to activities and business models that are compatible with long-term sustainability.

This is therefore a mutually dependent relationship, in which decisions made by businesses and the financial sector influence each other's ability to identify, prioritise and manage ocean-related risks (see Section 2.2 on the role of the financial sector in the blue transition).

This report is therefore not intended to stand alone. It is the first of three planned publications focusing on biodiversity and business. Subsequent publications will address the role of financial actors and how knowledge about ocean-related risks can be translated into concrete actions.



Jellyfish, Kattegat
Photo: Tim Dencker

2. The ocean and responsible business conduct

2.1 Corporate responsibility in the context of rising expectations

Expectations from legislators, financial actors, investors, civil society and international frameworks that companies should identify, understand and manage their pressures on nature have become clearer and more formalised in recent years.

At the global level, the Kunming–Montreal Global Biodiversity Framework marks an important shift. Target 15 explicitly expects large and multinational companies to identify, assess and disclose their dependencies, risks and pressures in relation to biodiversity (Convention on Biological Diversity, 2022). Similarly, in 2025, the UN Human Rights Council recognised that companies' responsibility to conduct risk-based due diligence also includes activities at and near sea, in accordance with the UN Guiding Principles on Business and Human Rights (Human Rights Council, 2025). In addition, the revised OECD Guidelines for Multinational Enterprises expand the understanding of corporate responsibility to include environmental due diligence (OECD, 2023).

In the EU, these expectations have been translated into concrete regulatory frameworks in recent years, including the Corporate Sustainability Reporting Directive (CSRD), the European Sustainability Reporting Standards (ESRS) and the Corporate Sustainability Due Diligence Directive (CSDDD). Together, these initiatives aim to strengthen transparency, accountability and risk management in responsible business conduct (Official Journal of the European Union, 2023). However, the ongoing adjustments to EU sustainability regulations, including a narrowing of the scope of companies covered and a reduction in certain reporting requirements, do not alter the fact that expectations for companies' management of nature- and ocean-related risks remain significant.

There is thus a trend towards a reduction or shift in detailed legal requirements, while expectations regarding corporate responsibility are increasing. This shifts the drivers of corporate responsibility towards financial and market-based expectations. Documentation of companies' pressures and dependencies is therefore no less relevant but may take on a new function as a basis for risk assessment, capital allocation and long-term business robustness.

Overall, the trend points to a shift whereby expectations regarding companies' handling of environmental pressures and impacts stem not only from regulation but increasingly from financial risk management, making documentation of pressures and dependencies a prerequisite for market access and thus also for companies' social legitimacy.

Banks, investors and lenders remain subject to financial regulation, which requires them to identify and assess climate and nature-related risks to the extent that these may affect credit risk, portfolio stability and long-term financial robustness. To meet these requirements, financial actors depend on credible, consistent and decision-relevant data from companies. This means that companies are expected to have a systematic overview of their pressures on marine biodiversity and related impacts on nature, even in cases where they are not directly covered by reporting or due diligence legislation. In this context, documentation can be understood not primarily as a compliance tool, but as a fundamental element in companies' access to capital, insurance and financial partnerships.

In parallel, a landscape of voluntary frameworks and initiatives is growing, further contributing to clarifying expectations for corporate responsibility in relation to the marine environment. With Ocean Benchmark 2026, the World Benchmark Alliance has, for the first time, conducted a systematic assessment of 125 companies with high dependence on the ocean. At the same time, the Carbon Disclosure Project (CDP) has expanded its questionnaire to include issues related to the marine environment, and the Science-based Targets Network (SBTN) is working on developing a framework for science-based targets for the ocean. Together, these initiatives indicate that companies are increasingly expected to work in a more structured way with ocean-related risks, dependencies and pressures. This development is also reflected in IPBES' analyses of companies' pressures on nature and dependencies (Jones M., 2026).

This development is also reflected in broader risk awareness. The World Economic Forum's (WEF) Global Risks Report 2026 ranks biodiversity loss and ecosystem collapse among the most serious global risks over the next ten years. At the same time, IPBES documents that biodiversity loss poses a systemic risk to businesses and that businesses both contribute to and are affected by this development (Jones M., 2026). This indicates that expectations for transparency and responsibility for ocean-related risks will increasingly form a central part of companies' social legitimacy.

Despite this development, knowledge, data and resources continue to pose a significant barrier for many companies. Several have taken initial steps by mapping dependencies, collecting data and formulating biodiversity policies, but work on ocean-related impacts is often still in its early stages. Companies that are already building a science-based and systematic understanding of their pressures and dependencies may be better equipped to address future risks and expectations.

2.2 The financial sector as an enabler of the blue transition

Although this publication focuses primarily on the pressures from businesses on marine biodiversity, the financial sector plays a key role in this context. Many of the activities that put pressure on the marine environment are financed directly or indirectly through investments, loans and ownership. Financial institutions therefore have both a responsibility and a strategic interest in identifying, assessing and managing the risks that the degradation of marine ecosystems and the exceeding of ecological limits may pose to their portfolios, credit exposures and long-term financial robustness.

The role of the financial sector can be viewed along three dimensions. Firstly, a regulatory responsibility, as financial actors are subject to sector-specific financial regulation that requires the identification and assessment of sustainability-related risks, including nature- and ocean-related risks. EU regulations such as the Corporate Sustainability Reporting Directive and the Corporate Sustainability Due Diligence Directive are primarily aimed at companies, but may indirectly affect the financial sector through requirements for data collection, risk assessment and dialogue with portfolio companies (Directive (EU) 2022/2464 of the European Parliament and of the Council, 2022; Directive (EU) 2024/1760 of the European Parliament and of the Council, 2024). Secondly, financial responsibility, as inadequate management of nature and ocean risks can lead to credit, market and reputational risks. Thirdly, a social responsibility, as the financial sector's capital allocation can influence which business activities are supported and thus developments in and around the sea.

Several financial actors are choosing to go beyond the applicable minimum requirements. For example, Storebrand Asset Management has excluded deep-sea mining from its investment portfolios, citing the precautionary principle, even though the activity is not yet prohibited at EU level (Storebrand, n.d.). Similarly, initiatives such as the Finance for Biodiversity Pledge, which now has over 200 signatories, show that there is a growing willingness to integrate biodiversity considerations into financial decisions (Finance for Biodiversity Foundation, n.d.).

However, strengthening the financial sector's role in the blue transition requires better and more consistent knowledge about how different types of business activities generate pressures on the marine environment and how these pressures can be documented and integrated into decision-making processes. This knowledge should be accompanied by greater clarity on the expectations that financial institutions can place on companies regarding the marine environment and biodiversity, both as part of due diligence in lending and through active capital allocation and stewardship.





Hermit crab, Lillebælt
Photo: Tim Dencker

3. Frameworks, methods and tools for identification

There are currently no fully harmonised and operational legal requirements specifying how companies should identify, assess and document their pressures on the marine environment. However, a number of reporting frameworks, standards and methodological approaches are being consolidated and taken together, can contribute to a more coherent focus on nature and biodiversity, including in a marine context.

Several of the most widely used frameworks, including the European Sustainability Reporting Standards, the Taskforce on Nature-related Financial Disclosures (TNFD) and the Global Reporting Initiative (GRI), are moving towards greater coherence, but continue to differ in their weighting of financial vs. impact-based materiality, in their requirements for location-specific data, and in their level of detail on biodiversity. These differences have implications for how the frameworks can be applied in practice, depending on the size, sector and exposure of the company.

The overview below summarises key reporting frameworks, standards, methods and tools currently used to identify and document companies' pressures on nature and the marine environment. Across the frameworks, there is a general trend towards increased focus on biodiversity and the link between the state of nature and companies' economic risks and dependencies (Lammerant & Verhelst, 2024). The frameworks differ in their purpose, legal status and scope of application and should therefore be understood as complementary rather than interchangeable.

Their applicability will depend on the size, sector, geographical exposure and business model of the company.

3.1 Data challenges for the ocean

Across the frameworks, there is a data imbalance between terrestrial biodiversity and marine ecosystems. Several standards, including the Voluntary Sustainability Reporting Standard for non-listed SMEs (VSME), require information on companies' activities in or near biodiversity-sensitive areas, but primarily offer detailed data points for terrestrial activities such as land use, paved areas and nature-oriented areas. Similarly detailed and harmonised data points for activities at sea are largely lacking.

As a result, reporting on the marine environment is often more general and less differentiated than reporting on land-based biodiversity. This can limit the ability to assess the extent and severity of pressures on marine ecosystems. For example, a purchaser of marine aggregate extraction will not necessarily be able to assess the extent of seabed or marine habitat loss based solely on the supplier's reporting under the VSME standard.

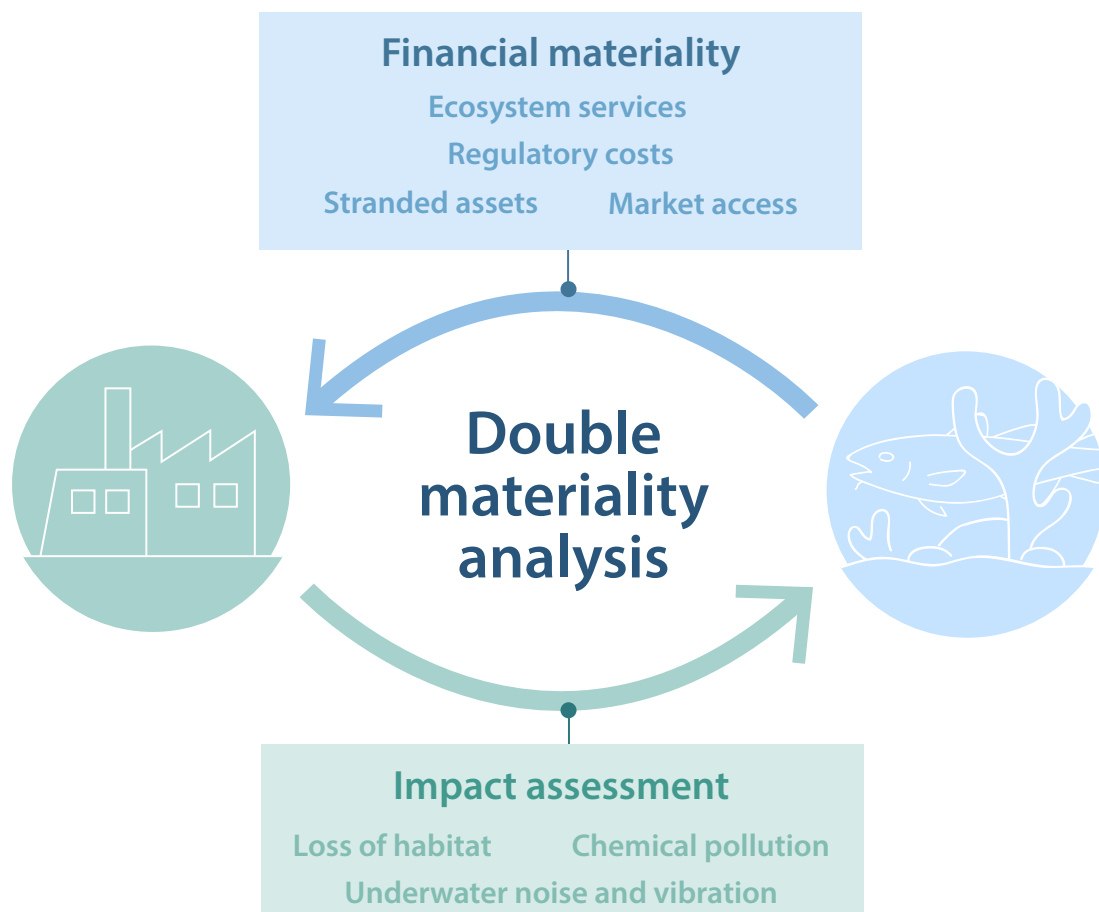
According to EFRAG, the difference in the level of detail between land-based biodiversity and marine biodiversity is due to the fact that land use indicators are more mature and harmonised than those for the sea. The data foundation for marine activities is still under development, and voluntary data points are expected to be added as the methodology matures.

In addition to the reporting frameworks, there are a number of methodological approaches that can help companies identify, prioritise and document pressures on the marine environment. These methods can be used as a supplement and a bridge to existing standards.

3.2 Marine biodiversity and double materiality

Double materiality is a structured approach to risk understanding, prioritisation and documentation. The approach involves companies adopting two perspectives: an outside-in perspective, which concerns the financial risks that external factors may pose to the company, and an inside-out perspective, which concerns the company's own impacts on the environment, climate, human rights and governance (Nielsen et al., 2024).

If the marine environment is considered significant from a financial perspective, an impact perspective, or both, the sea can be considered a double materiality matter. This means that the issue is relevant for both reporting and due diligence. A double materiality analysis can thus serve as a tool for identifying which sustainability issues should be prioritised and where special attention is needed in risk management and business conduct.



<p>European Sustainability Reporting Standard (ESRS)</p>	<p>The mandatory reporting framework for large and listed companies in the EU.</p> <p>Standard European Sustainability Reporting Standard E4 deals with biodiversity and ecosystems and requires information on significant risks, dependencies and pressures, as well as measures to avoid, reduce or restore negative impacts.</p> <p>The European Sustainability Reporting Standard is primarily aimed at reporting and documentation and does not in itself establish methods for identifying impacts.</p>
<p>Voluntary Sustainability Reporting Standard for non-listed SMEs (VSME)</p>	<p>A voluntary reporting standard for small and medium-sized enterprises.</p> <p>The standard allows for reporting on biodiversity and the marine environment in a more simplified and standardised form. At the same time, the framework sets a limit on the information that larger customers and financial actors can request. VSME contains relatively limited and less detailed data points for marine activities, which may limit the granularity of reporting in a marine context.</p>
<p>Global Reporting Initiative (GRI)</p>	<p>A voluntary reporting standard with a primary focus on companies' impacts.</p> <p>The Global Reporting Initiative 101 biodiversity standard is currently under revision and is expected to come into force in 2026. The revised standard places greater emphasis on location-specific reporting and allows for sector- and activity-specific reporting, including for fisheries, energy and resource extraction. The Global Reporting Initiative can be applied independently of EU legislation.</p>
<p>ISO 17298:2025 Biodiversity in strategy and operations</p>	<p>Supports the integration of biodiversity into corporate strategy and operations.</p> <p>It can be used to identify pressures, assess impacts and identify dependencies, establish internal processes and link biodiversity to risk management, environmental objectives and reporting. The standard is designed to be interoperable with the Taskforce on Nature-related Financial Disclosures' LEAP framework and can serve as a methodological supplement to both the European Sustainability Reporting Standard and the Global Reporting Initiative.</p>
<p>Taskforce on Nature-related Financial Disclosures (TNFD)</p>	<p>Methodological framework designed to support the identification, assessment and mitigation of nature-related financial risks.</p> <p>The Taskforce on Nature-related Financial Disclosures' LEAP approach (Locate, Evaluate, Assess, Prepare) is widely used as an analysis and decision-making tool.</p> <p>The Taskforce on Nature-related Financial Disclosures does not constitute a reporting standard but provides recommendations on how companies can structure their analyses and related reporting on nature-related risks and opportunities.</p>
<p>Carbon Disclosure Project (CDP)</p>	<p>The CDP is a global reporting system that collects environmental data from many companies.</p> <p>The CDP has expanded its questionnaires to include biodiversity, plastics and the marine environment and is working towards greater harmonisation with other international standards.</p> <p>The CDP is often used as a data source by investors and other external parties</p>
<p>World Benchmarking Alliance (WBA)</p>	<p>A global benchmarking initiative that assesses companies' publicly available documentation and management practices in relation to key sustainability issues, including marine biodiversity.</p> <p>The World Benchmark Alliance does not function as a reporting standard but can influence reporting practices by creating visibility and comparability across companies and sectors.</p>
<p>Science-based Targets for Nature (SBTN)</p>	<p>A framework for developing science-based targets for nature.</p> <p>The initial steps focus on identifying and prioritising significant impacts and geographical areas in order to build a data-driven basis for understanding how the company's activities interact with nature.</p> <p>Science-based Targets for Nature can be used to supplement both reporting and risk assessment.</p>



Goby on starfish, Lillebælt
Photo: Tim Dencker

4. The state of marine biodiversity

Geographical location and local environmental conditions are key factors in determining how anthropogenic pressures affect marine biodiversity. The same type of activity can have markedly different impacts depending on where it takes place and the ecological context in which it occurs. For example, pressures in coastal waters can have significant negative impacts on biodiversity, even when the activity is low-intensity in isolation (Vaughan et al., 2019).

Biodiversity in Danish marine areas

Intraspecific diversity (genetic variation): Within individual species, such as cod, there can be significant genetic variation, which influences the resilience of the population, to disease, temperature changes and other environmental pressures. Intraspecific variation can thus affect how vulnerable populations are to additional pressure (Rieder et al., 2025).underprioritised

Diversity between species (species richness): Danish waters are home to a wide variety of fish, marine mammals, birds, benthic animals, macroalgae and plankton. Species interact with each other in complex dynamics, where the richness and abundance of species play an important role in the ecosystem (Convention on Biological Diversity, 2022).

Ecosystems can be described as the interconnected systems of the sea: the interaction between living organisms, from algae and benthic animals to fish and marine mammals, and their physical and chemical environments.

This includes the seabed and water column and the processes that connect them, including food webs, light penetration, nutrient cycles, current conditions and oxygen conditions.

The ocean contains several different types of ecosystems, which can overlap and change over time in line with physical and biological dynamics. Together, these interactions determine how the ocean functions and how stable the ecosystem is in relation to human-induced pressures.

The diversity of ecosystems: At the ecosystem and habitat level, there are many different habitats in Danish marine areas, including rocky reefs, sandbanks, eelgrass beds, mussel beds and soft bottoms. Abiotic factors, such as salinity, ocean currents and sunlight, control the variation of each habitat and the specific species communities and ecosystem dynamics that are present (Hansen & Høgslund, 2024).

This chapter describes the most significant regional differences across Danish marine areas, as well as the current environmental status and development of these areas in relation to a number of parameters, documented through the Danish Marine Strategy, River Basin Management Plans and national monitoring (NOVANA). The purpose is to provide a technical basis that companies can use as an initial filter in their work to identify where pressures on marine biodiversity may be particularly significant.

Specifically, it can be used to:

- locate risk areas and prioritise efforts geographically
- differentiate pressures (e.g. fishing/dischage in the Belt Sea vs. the North Sea)
- assess the risk of negative consequences such as oxygen depletion, loss of habitat or species decline

4.1 Regional differences across Danish marine areas

Danish marine areas (Figure 1) exhibit significant geographical variation, which has a major influence on both the vulnerability of ecosystems and how different types of human activity can affect marine biodiversity. Variations in depth, salinity, water exchange and current conditions mean that the same type of pressure can have different ecological impacts depending on location.

The North Sea and Skagerrak are characterised by great depths, relatively high salinity and relatively rapid water exchange, with the North Sea located between the open ocean and the coastal zone. These conditions contribute to a high degree of physical dynamics, which can lead to a certain robustness to inputs of nutrients and certain types of local pollution. In the Skagerrak, cold, salty, nutrient-rich water meets the more brackish water of the Kattegat, creating a front between the water masses that contributes to high biological productivity in the Skagerrak. In addition, there are several large stone reefs and bubble reefs in these two areas.

At the same time, the areas are exposed to considerable pressure from intensive shipping traffic, fishing and the establishment of offshore wind and oil and gas activities. The high level of activity means that pressures can be spatially widespread and cumulative, even in relatively open marine areas.

The Kattegat acts as a transition zone between the salt water of the North Sea and the brackish water of the Baltic Sea. Stratification and significant water transport can increase vulnerability to nutrient inputs and oxygen depletion. In addition, the depths and habitats on the seabed of the Kattegat vary greatly, with both shallow, sandy areas with, for example, stone reefs or eelgrass beds, and deep trenches with muddy bottoms. The ecological status of the Kattegat is therefore characterised by a high degree of complexity, with both open marine areas and more coastal areas showing vulnerability to pressures and disturbances.

The Limfjord is a long, shallow strait with narrow channels connecting the North Sea and the Kattegat. The Limfjord has several natural habitats such as stone reefs, biogenic reefs, sandbanks, shallow bays and inlets, and eelgrass beds, which provide different types of habitats. The shallow areas, limited water exchange and nutrient inputs from land can increase the risk of algal blooms and oxygen depletion, as well as physical disturbance of the seabed.

The Belt Sea, including the Great Belt, Little Belt, Øresund and the Småland waters, contains several natural habitats such as stone reefs, sandbanks and coastal eelgrass beds. The Belt Sea generally has relatively shallow waters, longer residence times for water masses and more complex current conditions, as the exchange of water between the North Sea and the Baltic Sea must pass through the narrow straits. These characteristics can increase the risk of algal blooms and oxygen depletion, especially in fjords and other enclosed coastal systems. The ecosystems in these areas are often closely linked to inputs from land and can therefore be particularly sensitive to changes in nutrient loading and physical disturbance of the seabed.

The Baltic Sea around Bornholm is characterised by low salinity, great depth and strong stratification, where the water masses rarely mix completely. This means that oxygen in the deep areas of the Baltic Sea has difficulty reaching the seabed, which is therefore often affected by oxygen depletion for long periods. Biodiversity is generally lower than in more saline waters, which can lead to limited ecological resilience. The ecosystems in this area may therefore be particularly vulnerable to further pressures.

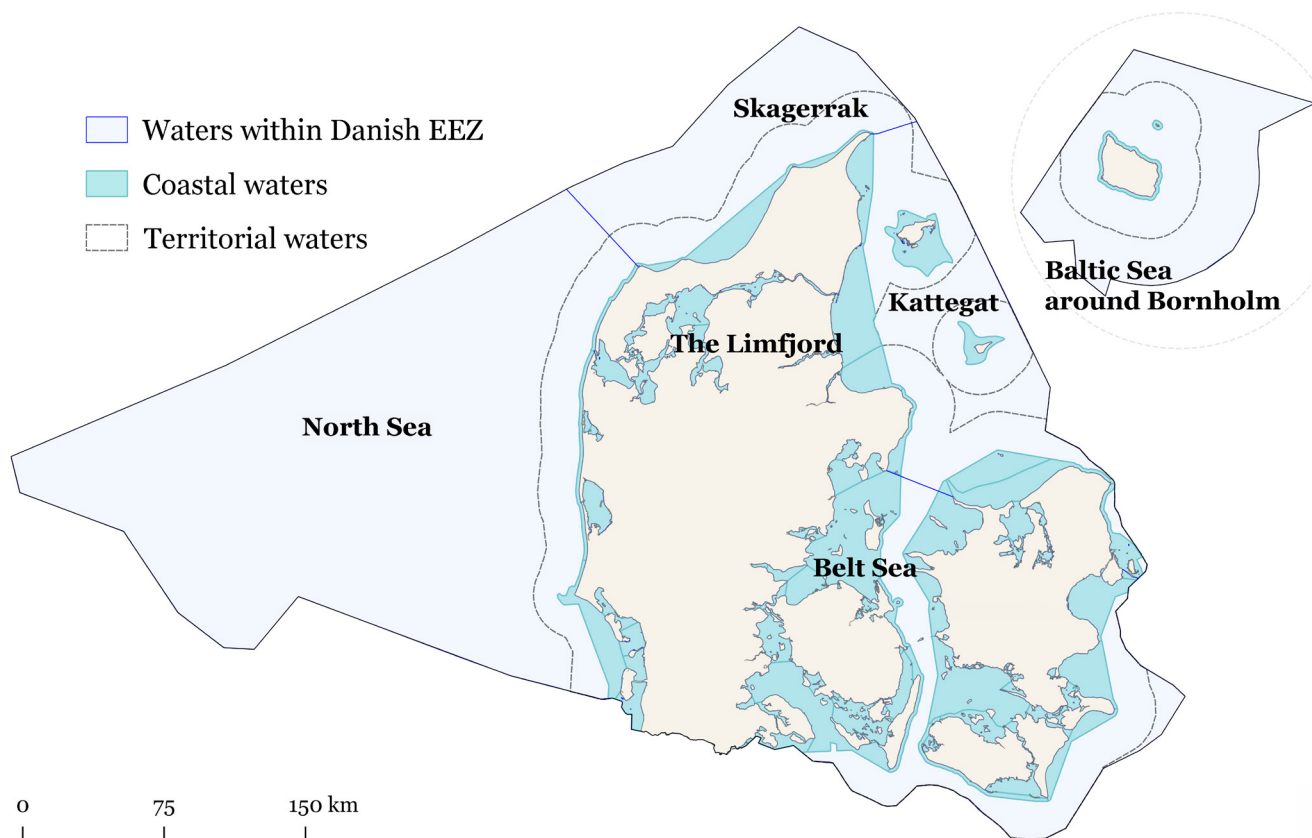


Figure 1 Division of marine waters within the Exclusive Economic Zone (EEZ) (Miljø- og ligestillingsministeriet, 2019; Miljøstyrelsen, 2025)

Regional differences mean that pressures such as nutrient inputs, fishing, marine aggregate extraction, shipping traffic and energy infrastructure do not necessarily have the same environmental consequences across Danish marine areas. For example, while the North Sea, Skagerrak and parts of the Kattegat can, under certain conditions, absorb physical disturbance better due to their dynamic hydrography, the Belt Sea and the Baltic Sea may be more sensitive to even relatively small changes in pressure, particularly in relation to nutrients, seabed disturbance and underwater noise.

For businesses, this means that they cannot only consider the type of pressure. It is also necessary to take into account location and local ecological context, including the sensitivity of the area, existing pressure levels and cumulative pressures. This geographical differentiation can thus serve as an initial filter for identifying where activities may pose an increased risk of negative impacts on marine biodiversity.

4.2 The current state of marine areas

The status assessments in The Danish Marine Strategy and River Basin Management Plans show that Danish marine areas generally do not meet the objectives for good ecological status, either in relation to pressures or the health of ecosystems. The assessments cover, among other things, nutrients, environmentally hazardous substances, waste and underwater noise, as well as biological quality elements such as species, habitats and food webs. For several descriptors, the status is also classified as unknown, reflecting limitations in the existing data (Ministry of Environment and Gender Equality, 2025a; Ministry of Green Growth and Climate, 2024).

Ecological status: The River Basin Management Plans show that none of the Danish coastal waters achieve good ecological status when all biological quality elements are taken into account. Phytoplankton, rooted plants (including eelgrass) and benthic fauna are predominantly in moderate to poor status in the vast majority of areas. These elements serve as key indicators of ecosystem function and resilience (Figure 2).

Chemical status: Only a small proportion of coastal and territorial waters meet the targets for priority substances. In the vast majority of areas, limit values for heavy metals and organic pollutants, among other things, are exceeded. Chemical pollution can have long-term effects on both species and food webs, even where the ecological effects are not immediately visible (Figure 2).

Development over time: National monitoring (NOVANA) documents a general stagnation over the past 10 years or so, or a decline in several key parameters, including water clarity, the extent of bottom vegetation and the condition of bottom fauna. At the same time, the spread of oxygen depletion in late summer has been increasing, especially in fjords and inland waters. This development indicates that a number of ecosystems have limited capacity to absorb further pressure (Hansen & Høgslund, 2024).

Overall, the status assessments indicate that many Danish marine areas are already under ecological pressure. In such areas, even additional pressures with limited geographical extent can increase the risk of permanent deterioration, e.g. in the form of habitat loss, changes in food webs, decline in key species or increased extent and duration of oxygen depletion (DCE – National Centre for Environment and Energy, 2023; Ministry of Environment and Gender Equality, 2025b). This reflects a similar pattern observed for biodiversity in Europe's marine areas (Vaughan et al., 2019).

For businesses, the current environmental status means that the assessment of potential pressures should be made in light of the area's existing pressure level and ecological resilience. In areas where the status is already unsatisfactory, the likelihood of significant impacts may be increased, even for activities that appear to be low-intensity when viewed in isolation. Knowledge of the local and regional environmental status can thus serve as a key input in companies' risk assessment and prioritisation of due diligence efforts.

Ecological state

The overall ecological state of the Danish coastal waters is evaluated in accordance with the EU's Water Framework Directive and based on the state of individual quality indicators:

Algae (phytoplankton), **bottom-dwelling animals** (seabed fauna), **seagrass** and **nationally specific substances** (not included here). The aim is an overall good ecological state by 2027.

■ Good
 ■ Moderate
 ■ Poor
 ■ Bad
■ Unknown



Chemical state

The chemical status of Danish coastal and territorial waters is assessed in accordance with the EU Water Framework Directive, based on whether selected hazardous substances exceed established environmental quality standards in sediment, seawater, and organisms (biota). Only 2 out of 123 coastal and territorial water areas are in good chemical state. The goal is for the chemical status in all water areas to be good by 2027.

■ Good
 ■ Not good



Figure 2 Overview of the ecological and chemical status of Danish coastal waters (Miljø- og Ligestillingsministeriet, 2025b)

4.3 Overall pressure, climate change and risk assessment

The effect of a given pressure depends not only on the individual activity, but also on the ecological context in which the activity takes place. Marine habitats, their interrelationships and functions, and their current status in relation to the cumulative pressure from other human activities are important factors in how pressures may materialise in marine biodiversity (Halpern et al., 2025). The assessment of impacts should therefore take into account cumulative effects within a relevant geographical area.

In practice, many Danish environmental impact assessments of cumulative effects are limited to assessing simultaneous or planned projects that overlap in time and space. A more comprehensive assessment should also include other relevant historical and existing pressures on an appropriate scale. These could include, for example, long-term bottom trawling, recurring nutrient inputs, discharge from wastewater treatment, aquaculture and the presence of environmentally hazardous substances in concentrations that exceed environmental quality requirements. Such pressures can collectively reduce the resilience of ecosystems and thus increase their vulnerability to further stress.

Climate change is also a significant amplifying factor of pressures on marine ecosystems. Changes in sea temperature, oxygen conditions, acidity and salinity affect species distribution, food web functioning and ecosystem stability. These changes are occurring at a rate that in some cases may exceed the adaptive capacity of ecosystems, thereby increasing the likelihood that pressures will materialise as permanent ecological losses (European Environment Agency, 2019; Halpern et al., 2025). Climate change should therefore be seen as an underlying risk factor that can change the conditions for both existing and future activities.

Against this backdrop, many Danish marine areas are in a state where pressures from marine-related commercial activities should, as a starting point, be considered high-risk and therefore prioritised in companies' risk management and due diligence processes. Coastal areas in particular are under considerable pressure, but all Danish marine areas are affected overall (Figure 3).

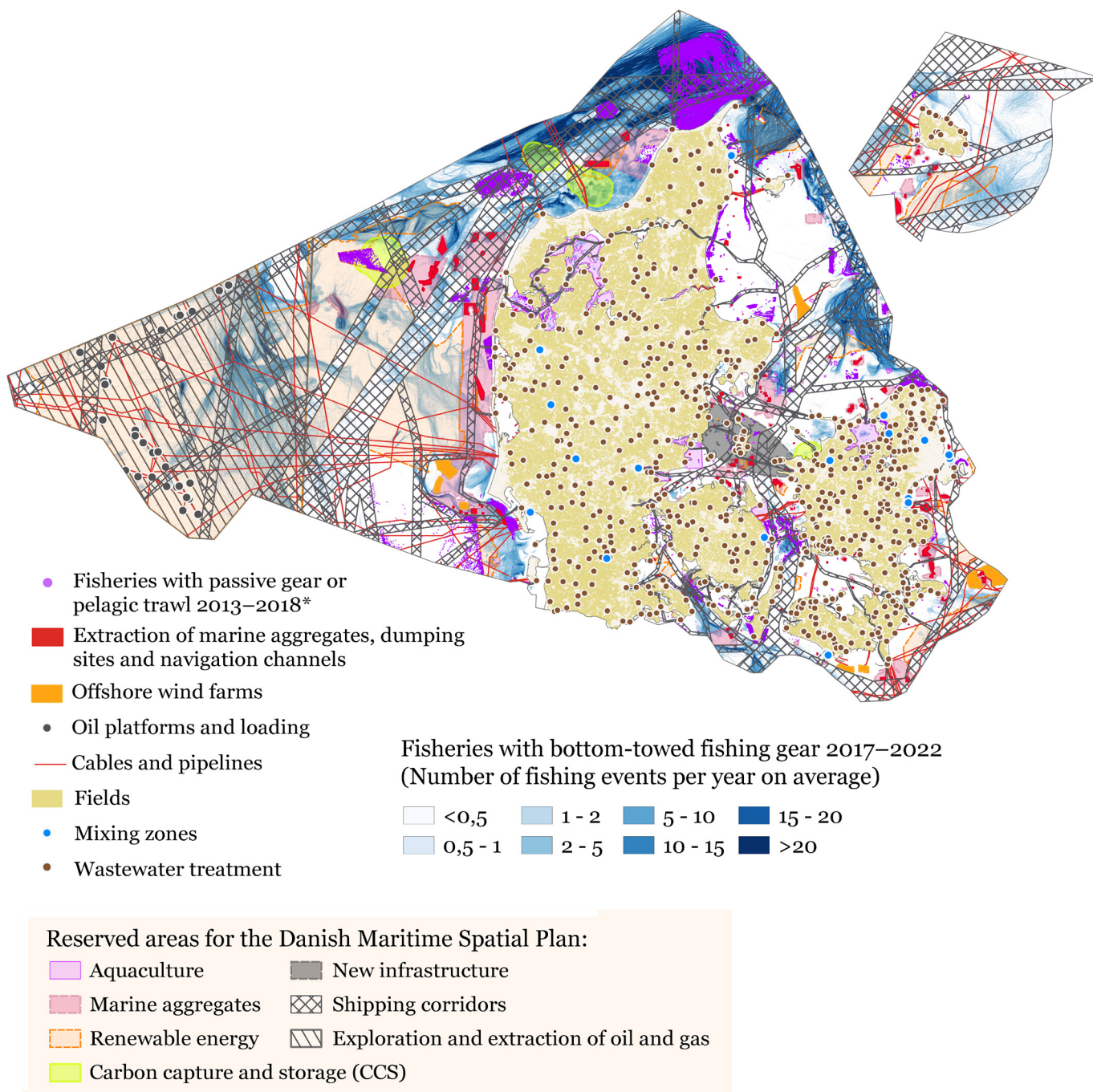


Figure 3 Overall pressure on the sea from current commercial activities, as well as areas reserved for a specific activity in Denmark's Maritime Plan (EMODnet, 2023; Danish Energy Agency, 2023; GEUS, 2025; Danish Agricultural Agency, 2025; Danish Maritime Authority, 2023; van der Reijden & Eigaard, 2023). *Fishing with passive gear or pelagic trawls is only marked within Natura 2000 areas designated before June 2023 (Danish Environmental Protection Agency, 2023).



Common bobtail squid (*Sepietta oweniana*) hunting in Kattegat

Photo: Tim Dencker

5. The effects of activities in the marine environment

This chapter provides companies with an overview of how specific business activities generate pressures on marine biodiversity and how these can lead to ecological impacts and how companies can identify and analyse their own footprint.

The chapter supports impact materiality work by:

- highlighting where and how the company's activities create pressures on marine biodiversity and related ecological impacts.
- linking pressures to ecological effects (impacts), and
- pointing to tools, data sources and approaches that can support systematic analysis

In addition, the chapter provides input for prioritising and setting reduction targets for pressures, so that companies can document and communicate their most significant environmental impacts on a decision-relevant basis, depending on sector, location and exposure.

5.1 Pressures and impacts as business responsibility

As mentioned in Chapter 4, biodiversity is not just about the presence of individual species, but about the sum of genes, species, habitats and ecological processes that together constitute the life and robustness of the ocean. When this interaction is subjected to repeated disturbances over time, the ocean's ability to withstand pressure and recover can be weakened.

Research indicates that such disturbances are linked to human activities. This is well documented at global level (Halpern et al., 2025), in Europe (European Environment Agency, 2019; Haapaniemi et al., 2016; OSPAR, 2023) and nationally (Andersen et al., 2020).

For marine-related companies, this means that pressures on the marine environment are relevant both as part of the company's responsible business conduct and as part of the company's risk management, as negative impacts can in some cases materialise as regulatory, physical and market risks.

Three operational principles are particularly important for companies:

1. **Pressures as a controllable leverage point**
Pressures constitute a key and controllable leverage point for companies. It is generally more operationally feasible to set reduction targets for specific pressures (e.g. underwater noise, nutrient loading, seabed disturbance) than for biodiversity status, which is shaped by multiple interacting drivers and natural variability.
2. **Incomplete data should not result in inaction**
Where there is scientifically robust evidence that an activity exerts a significant pressure, companies should act in accordance with the precautionary principle—even in the absence of complete baseline data. Assessments should be conducted with due regard to the type of activity, its location and the local ecological context.

3. **Cumulative effects as a shared risk context**

Reductions achieved by a single actor may have limited overall effect if other sources in the same area account for the majority of the pressure. Companies should therefore, where feasible, combine their own reduction efforts with collaboration and partnerships to develop coordinated solutions at the scale of ecologically defined areas.

5.2 Typical pressures from marine-related industries and their ecological consequences

Whether a pressure leads to significant ecological impacts depends on:

- The nature and intensity of the pressure (what the company does)
- The robustness and condition of the ecosystem affected (where it occurs)

Not all pressures necessarily cause damage to marine biodiversity. However, pressures are diverse, and their ecological effects in the marine environment can vary considerably in nature, extent and duration. The effect depends, among other things, on the type, intensity, frequency and duration of the pressure, as well as on the local ecological context. In vulnerable areas, or where several pressures occur simultaneously, the likelihood of ecological deterioration will therefore be higher (European Environment Agency, 2019).

Tables 1 and 2 illustrate how different types of physical, chemical and biological pressures can typically be translated into different types of ecological impacts. The overview is not exhaustive, but aims to provide a structured overview that can support companies in identifying and prioritising relevant pressures, depending on the type of activity, location and exposure.

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The growing awareness that underwater noise has a significant negative impact on marine mammals and fish has prompted several ship owners to implement noise reduction measures. Lloyd's Register supports this development by helping shipping companies to measure, calculate and reduce noise. Several energy-saving measures, such as air lubrication systems, have been shown to significantly reduce underwater noise.

— Per Trøjgaard Andersen,
Lead Specialist, Noise & Vibration, Lloyd's Register

Table 1 Examples of physical pressures and their impacts on the marine environment (defined in the Marine Strategy Framework Directive's status assessment).

Pressures	What is happening?	Why is this a problem?
Seabed loss/habitats	The seabed is removed or reclaimed in connection with, for example, sand extraction and port expansions, offshore wind farms, etc.	The habitats of animals and plants and the functions of ecosystems are weakened, e.g. filtration, nutrient cycling and carbon storage.
Physical disturbance of the seabed	Disturbance of the seabed can spread seabed material (sediment), e.g. during construction work and fishing with bottom-trawling gear, which stirs up sediment in the water.	This makes the water cloudy, suffocates seagrass and removes or scares away fish and benthic fauna, which lose their food and habitats.
Fragmentation of habitats in the sea	Fragmentation of habitats and reduction of connectivity can occur on the seabed as a result of fishing, resource extraction and oxygen depletion, which is a cascade effect of nutrient pollution and climate change.	This results in changes that prevent animals from moving freely, isolates populations and reduces nature's resilience.
Disruption of migration routes	Noise, light, vibrations or barriers disrupt migratory fish and marine mammals, for example.	Animals lose access to feeding and breeding grounds, which creates a risk of lower survival rates and a decline in viable populations.
Sediment pollution	Fine sediment particles from land, dredging or suspension from the seabed cover the seabed.	This makes the water cloudy and limits the amount of sunlight reaching the seabed, which can lead to poorer growth conditions for seagrass and seaweed. In addition, it can affect animals' feeding and breeding opportunities
Underwater noise	Continuous low-frequency noise from, for example, ships and fixed installations. Periodic high-frequency impulse noise during the establishment of offshore wind farms or ports	Underwater noise disrupts the communication and behaviour of fish and marine mammals, which can cause difficulties in finding food and in connection with mating and spawning. High-frequency impulse noise can permanently or temporarily damage animals' hearing if they are close to the noise source.

Table 2 Examples of biological and chemical factors and their impact on the marine environment.

Impact	What is happening?	Why is this a problem?
Eutrophication	Excess nutrients (typically nitrogen and phosphorus) from agriculture, sewage, etc. lead to increased algal blooms.	This leads to cloudy water and reduced light conditions. In addition, it can lead to oxygen depletion, as algae use oxygen when they decompose, which can be fatal to animals and plants.
Loss of biodiversity	When the sea is disturbed too much, sensitive species and habitats disappear.	Less variation in species → the ecosystem becomes weaker and less able to withstand changes (e.g. climate and pollution) and may eventually collapse, which can have irreversible consequences.
Changes to the food web (impact)	Human-induced pressures remove or weaken individual species (e.g. predatory fish or benthic animals).	Creates imbalance: e.g. more algae, fewer predators, or accumulation of certain species → the entire system is disrupted.
Environmentally hazardous substances	Toxins accumulate in species and food webs	Can damage species' reproduction, immune systems, food intake and thus their survival.

The impact depends on the intensity of the pressure and the robustness of the affected ecosystem. A pressure may be relatively unproblematic in a robust marine area but lead to permanent losses in a vulnerable area - especially where there is already oxygen depletion, high nutrient levels or pressure from several activities at once.

5.3 Localisation and sensitivity

Once the company has identified its pressures, the next step is to consider the ecosystem in which the company operates. Location is key, because the effect of the same activity can vary significantly between marine areas (TNFD, 2025a).

A robust ecosystem can absorb certain pressures that would cause lasting biological losses in a more vulnerable area. It is therefore relevant to combine knowledge about pressures with location-specific data on the state of the sea, biodiversity value and ecological robustness.

This section describes:

1. what characterises a sensitive marine area,
2. how companies can identify whether they are operating in or near such areas, and
3. which data sources may be relevant and how they are used in practice.

5.3.1 The concept of sensitive marine areas

Sensitive marine areas are locations where nature has low resilience or high biodiversity and ecosystem value, and where even limited pressures can have a disproportionately large effect. The concept is used in several reporting frameworks and can trigger stricter expectations for documentation, methodology and stakeholder involvement (European Commission, 2023).

A marine area may be sensitive without being formally designated as a protected area. The table below shows that sensitivity depends, among other things, on:

- the presence of vulnerable or protected species,
- habitats with a central ecological function (e.g. seagrass beds, biogenic reefs, spawning grounds)
- the role of the area in food webs and nutrient cycles, and
- cumulative pressure from existing activities.

Table 3 Definitions of sensitive marine areas in selected frameworks and tools: European Sustainability Reporting Standards, Taskforce on Nature-related Financial Disclosures and Global Reporting Initiative (Global Reporting Initiative, 2025; TNFD, 2023; UN Environment Programme, 2023)

Definitions	Term	Sensitive marine areas	Note
European Sustainability Reporting Standard	"biodiversity-sensitive areas"	Includes Natura 2000, UNESCO areas, Key Biodiversity Areas (KBA) and other marine protected areas (MPAs)	The demarcation is primarily linked to formal designations.
Taskforce on Nature-related Financial Disclosures (TNFD)	"sensitive sites"	Includes locations where activities affect areas that meets criteria for biodiversity significance, ecosystem integrity and ecosystem services etc.	Broader set of criteria that can accommodate both formal and biological conditions.
Global Reporting Standards (GRI)	"ecologically sensitive areas"	Uses largely the same criteria as the Taskforce on Nature-related Financial Disclosures (TNFD).	Builds directly on the definition used by Taskforce on Nature-related Financial Disclosures.

A definition that combines formal and biological criteria and recognises that degraded areas are particularly sensitive would, in the opinion of The Ocean Institute, be most useful.

Companies should therefore exercise particular caution when conducting activities in areas that either:

- have high biodiversity value or key ecosystem functions, or
- are already in poor condition and close to ecological limits.

5.3.2 Designation of sensitive marine areas in Denmark

There is no single, comprehensive, authoritative mapping covering all sensitive marine areas across Danish waters. In practice, companies can instead rely on a combination of international and national designations, as well as regional condition assessments, which together can serve as an initial screening basis for identifying where specific natural values or vulnerabilities may be present (Figure 4).

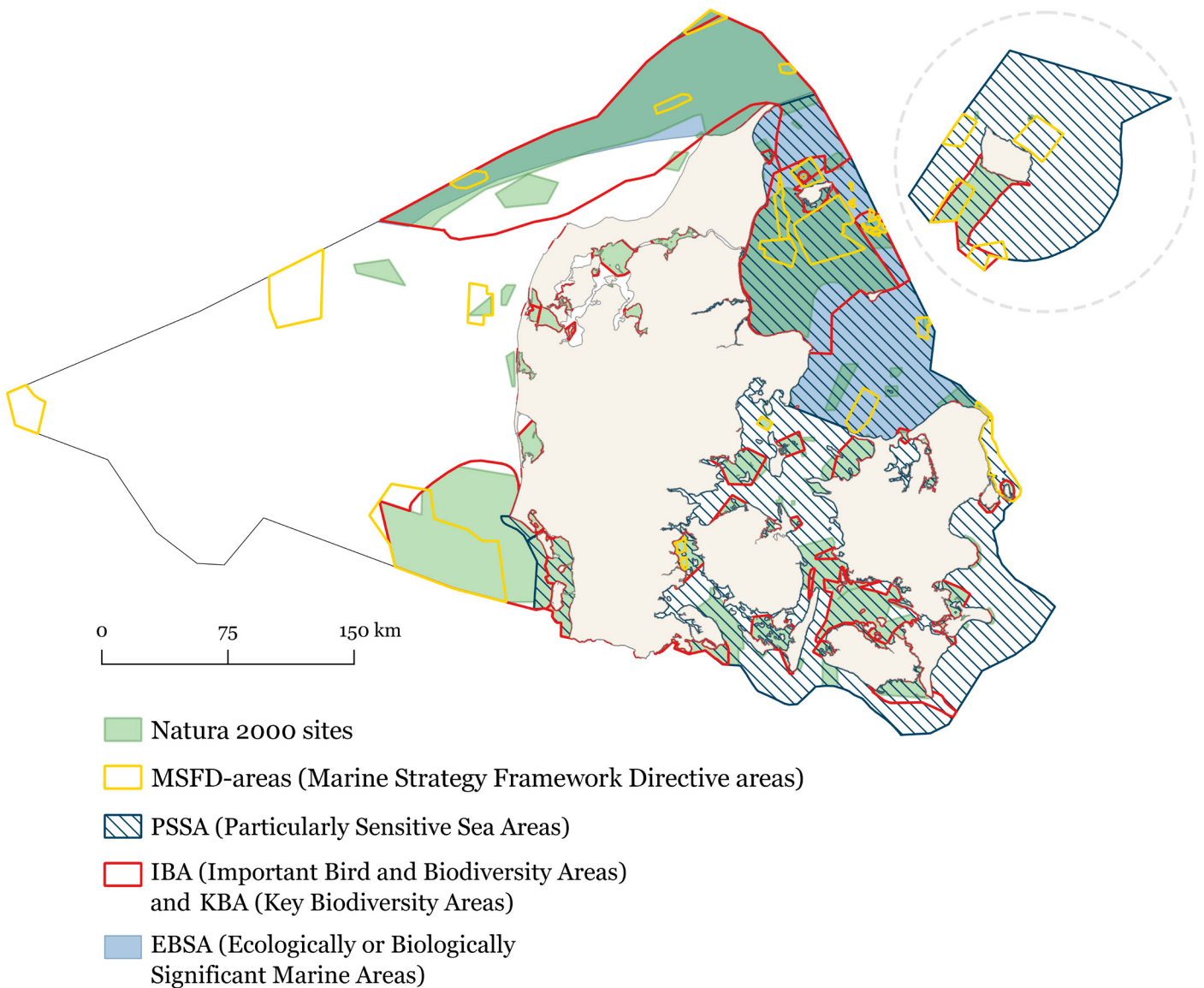


Figure 4 Categorization of sensitive marine areas in accordance with the Marine Strategy Framework Directive (Ministry of the Environment, 2024), the Habitats Directive and the Birds Directive (Natura 2000 sites), IMO (PSSA), IMMA (IUCN MMPATF, 2024), IBA/KBA and the Convention on Biological Diversity (EBSA).

These designations serve different purposes and have varying legal statuses. Some are linked to EU environmental legislation and its national implementation, whilst others are international designations that primarily serve as technical or administrative reference points, which may be relevant to certain activities but irrelevant to others (Table 4).

According to the EU's Marine Strategy Framework Directive of 2008, Denmark must, among other things, establish and manage an ecologically coherent and representative network of MPAs that covers the diversity of marine ecosystems (Official Journal of the European Union, 2008). The designation of the Danish Marine Strategy Areas is primarily intended to protect a number of species and habitat types that are not sufficiently represented in or protected by the Natura 2000 network (Ministry of the Environment, 2024).

Under Danish legislation, Natura 2000 sites have been designated, either as Special Areas of Conservation (SACs) (Council of the European Communities, 1992) or Special Protection Areas (SPAs) (European Parliament, 2009). SACs have been designated to protect specific marine animal species, such as porpoises or houting, or habitat types such as bubble reefs, stone reefs or sandbanks. SPAs have been designated to protect specific bird species.

In 2013, the International Union for Conservation of Nature (IUCN) established a specialist group on marine mammals (the Marine Mammal Protected Areas Task Force), whose main task is to designate and identify key areas to ensure the conservation of marine mammals – “Important Marine Mammal Areas” (IMMA) (Braulik et al., 2024).

The criteria for designating “Important Bird and Biodiversity Areas” (IBA) have been further developed into a global standard for identifying “Key Biodiversity Areas” (KBA). In 2016, the IUCN published the official KBA standard, which is based on the IBA methodology but encompasses all species and ecosystems, including those of global marine significance, not just birds. KBAs are identified on the basis of threatened or geographically restricted species and ecosystems, important biological processes, ecological integrity and irreplaceability (BirdLife International, 2023).

In connection with the Conference of the Parties (COP) meetings, guidelines have been drawn up under the Convention on Biological Diversity for designating ‘Ecologically and Biologically Significant Marine Areas’ (EBSAs), which are marine areas of high biological value. In Danish waters, the entire Kattegat and the deep trenches in the Skagerrak have been designated as EBSA areas, partly on the basis of the highly productive upwelling zone in the Skagerrak, which is important for fish, crustaceans and birds, as well as the diverse habitats in the Kattegat, which are important for several species of porpoises, vulnerable benthic fauna and birds (Convention on Biological Diversity, 2023a, 2023b).

The International Maritime Organisation (IMO) has defined ‘Particularly Sensitive Sea Areas’ (PSSA) in the MARPOL Convention, which are sensitive to shipping, and has designated areas in the Kattegat, the Belt Sea, the Baltic Sea and the Wadden Sea (IMO, 2005).

In a business context, it may therefore be relevant to understand both what the designation entails, why it has been established, and what documentation requirements typically arise when activities take place in or near such areas.

Table 3 Overview of national and international marine areas that have been designated as sensitive marine areas. The overview is not exhaustive and should be used as a starting point, supplemented with site-specific knowledge and relevant authority data.

Designation	Purpose	Examples of relevance to Danish waters	Source/framework
Natura 2000 sites	Protection of species and habitat types under EU nature conservation rules	Several marine areas designated for habitat types, birds and marine mammals	The EU Habitats and Birds Directives (national implementation)
Marine Strategy Framework Directive (MSFD) areas	Designation of areas to ensure the protection and coverage of biodiversity within individual ecosystems	Includes designations and demarcations in Danish marine management	Marine Strategy Framework Directive (MSFD) (Ministry of the Environment, 2023b, 2024)
Particularly Sensitive Sea Areas (PSSA)	Areas that are particularly vulnerable to shipping	Designations may include parts of the Baltic Sea and Wadden Sea regions	International Maritime Organization (IMO) under the auspices of MARPOL (IMO, 2005)
Ecologically or Biologically Significant Marine Areas (EBSA)	Scientific designations of areas of particular ecological/biological significance	Designations may include parts of the Kattegat/Skagerrak region	Convention on Biological Diversity (CBD) (Mackelworth et al., 2024)
Key Biodiversity Areas (KBA)	Standardised identification of globally important biodiversity areas	May overlap with designations in Danish waters	KBA Partnership (The KBA Partnership, 2018)
Important Bird and Biodiversity Areas (IBA)	Important areas for birds and biodiversity	May be relevant in coastal and marine areas with bird populations	BirdLife International (DONALD et al., 2019)
Vulnerable Marine Ecosystems (VME)	Identification of particularly vulnerable seabed ecosystems	May be relevant in the North Sea/Skagerrak depending on occurrences	International Council for the Exploration of the Sea (ICES) (ICES, 2025)
Important Marine Mammal Area (IMMA)	Areas important for marine mammals	May be relevant in the Baltic Sea, the inner Danish waters, the Kattegat, the Skagerrak and the North Sea	IMMA (IUCN MMPATF, 2024)

5.4 Tools and methodological approaches

There are a number of tools and methodological approaches that can support businesses in their efforts to identify and manage their pressures on the marine environment. Many of these tools were originally developed for land-based activities, and there are still relatively few that explicitly address marine ecosystems. However, the development of marine-specific additions is underway, and there is a growing focus on making existing frameworks more applicable in a marine context.

If you have not yet begun the process of identification, it may be helpful to make use of relevant tools. The Taskforce on Nature-related Financial Disclosures' LEAP approach (Locate, Evaluate, Assess, Prepare) and ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) are examples of tools that, when used together, can support a structured, step-by-step identification process.

ENCORE is a data tool that can serve as a first step towards creating an overview by linking business activities, ecosystem dependencies and pressures.

The Taskforce on Nature-related Financial Disclosures' LEAP approach demonstrates how a company can build a systematic process to locate, evaluate, assess and prepare for nature-related risks and integrate them into strategy and reporting.

5.4.1 The importance of baseline data

The Ocean Institute's review of relevant sustainability reports from 2024 shows that a lack of baseline data is a barrier to companies that have identified marine biodiversity as a material issue. In the marine environment, this is to be expected: pressures are often diffuse, cumulative and rarely linked unequivocally to a single actor. Furthermore, climate change affects the ocean in ways that gradually weaken the resilience of ecosystems and amplify the effects of human activities, cf. section 4.3. It can therefore be difficult to establish a static baseline that can accurately measure improvements in biodiversity.

However, the lack of a baseline should not lead to inaction. Where there is solid scientific evidence that an activity constitutes a pressure factor, it is both professionally and ethically sound to act in accordance with the precautionary principle.

In such situations, reduction targets for pressures may be a more operational approach than improvement targets for biodiversity status. Examples include:

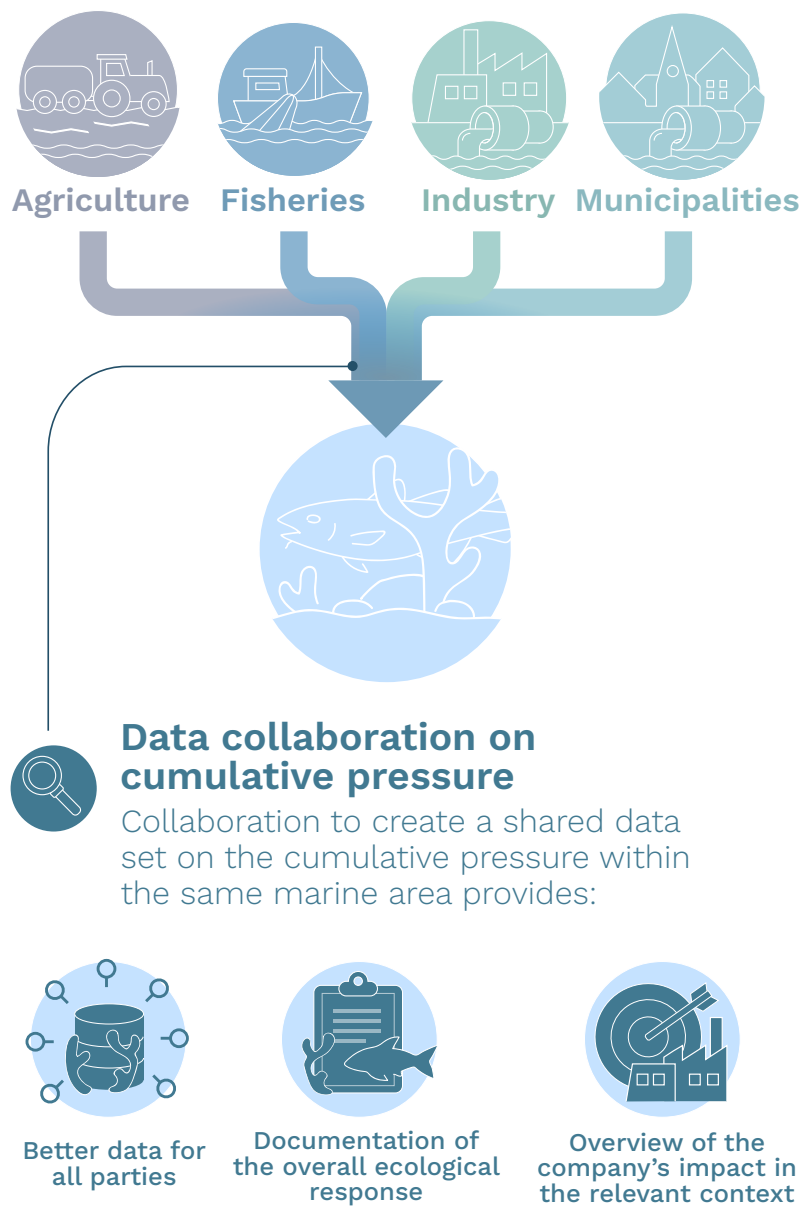
- reducing underwater noise from the fleet by X% by 2030,
- halving emissions of nutrients, environmentally hazardous substances or sediment by 2028,
- minimizing seabed contact or marine aggregate extraction in sensitive marine areas,
- transitioning to the use of low-disturbance gear rather than bottom trawling, where appropriate.

Baselines can be developed in parallel and iteratively while reduction measures are being implemented. Reducing pressure is often more measurable, controllable and directly influenceable by companies, and may therefore be the most realistic route to demonstrable improvement.

5.4.2 The importance of partnerships in ecologically sensitive marine areas

Reducing a single pressure factor in isolation may have limited effect if another source in the same area continues to account for the majority of the pressure. Companies should therefore both reduce their own pressures and engage in partnerships to develop joint solutions wherever possible.

When multiple actors reduce pressures in the same area, a more shared data set is created, making it easier to document the overall ecological response and place the company's own pressures in a relevant context (Halpern et al., 2015).



5.5 Data sources, interpretation and methodological pitfalls

To gain an overview of the pressure on the marine area affected by a company's activities, it is important to adopt a broader perspective than just the company's own operations. Impacts on the marine environment often arise as a result of the cumulative effects of human activity in an area, and the assessment should therefore cover both existing and planned activities.

An initial overview can be established using the Danish Environmental Portal, which provides access to information on current activities, permits and planned projects. The portal can be used as an initial screening tool to understand the overall context of pressure within which the company's activities take place.

Companies should then take into account general indicators of the current environmental status in the area. Relevant benchmarks could include, for example, the general ecological and chemical status as set out in river basin management plans and the Marine Strategy, regional status assessments from OSPAR and HELCOM, as well as information on MPAs or the presence of particularly vulnerable species. These indicators can be used as a starting point for assessing whether the activities are taking place in a marine area that is already under pressure or vulnerable.

When assessing the state of the marine environment, it is often necessary to look beyond the immediate project area. For many activities, the relevant scale of analysis will be the waters where the activity takes place, while other impacts – such as nutrients, chemicals or underwater noise – should be assessed at the level of entire sea basins. The choice of geographical scale depends on the scope of the activity, the nature

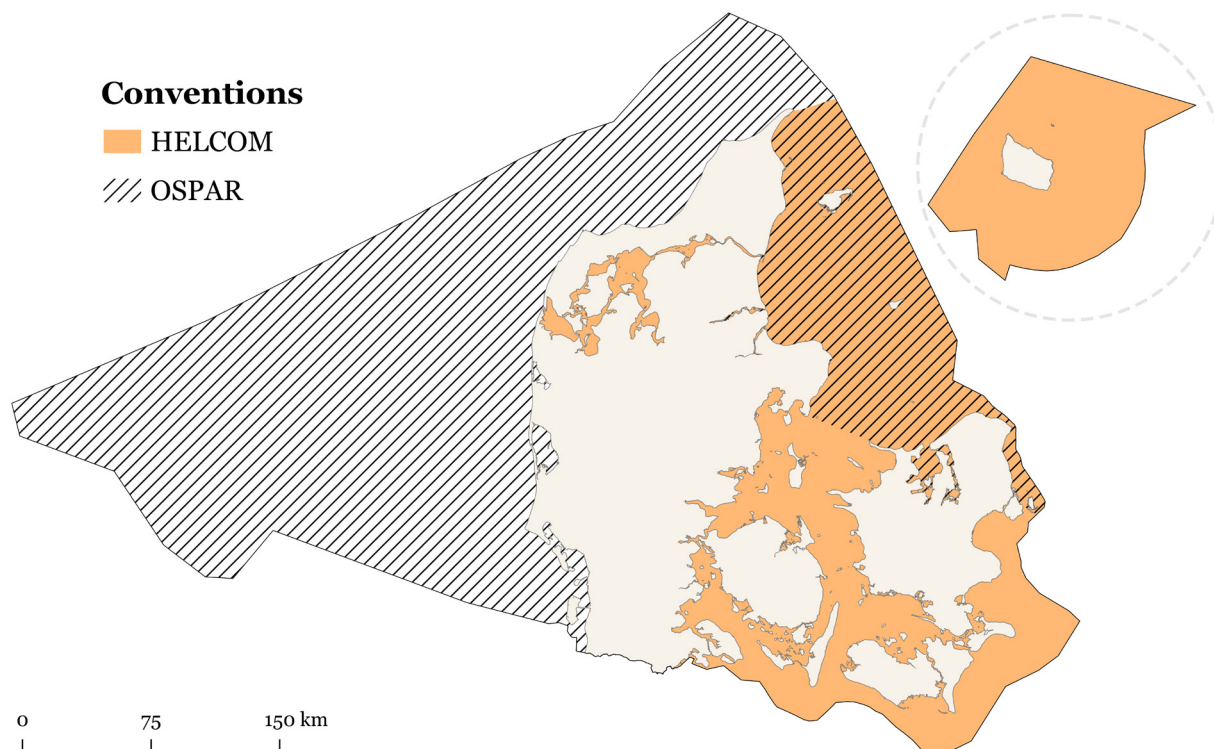


Figure 5: Division of the Danish marine area in relation to the regional marine conventions HELCOM and OSPAR

Table 4 Overview of data platforms and other relevant documents that can help to map the state of the sea in Danish waters and in the EU.

Data platform	Type of data	Relevant sectors	Source
The Danish Environmental Portal / GIS	Contains almost all chemical and biological data, collected by the national monitoring programme (NOVANA)	Covers the Danish sea area	https://miljoeportal.dk/
HELCOM Holistic Assessments	Regional environmental assessment	The Baltic Sea and its biogeographical region which also contains the inner Danish waters	HELCOM HOLAS III (Haapaniemi et al., 2016)
OSPAR Assessments	Regional environmental assessment	The North Sea and the biogeographical region which also includes Skagerrak and Kattegat	OSPAR assessment (OSPAR, 2023)
Vandplandata (River Basin Management Plan Data)	Assessment of ecological and chemical status	Environmental status in all Danish coastal waters	River Basin Management Plan of Denmark https://vandplandata.dk
MSFD Assessments	Assessment of the ecological status of the sea, based on 11 descriptors	Assessment covers all Danish waters	MSDF assessment (Miljø- og Ligestillingsministeriet, 2025b)
European Observation and Data Network (EMODnet)	Compiles existing European marine data	Provides an overview of Danish marine areas and surrounding.	https://emodnet.ec.europa.eu/en

5.5.1 Interpretation of data and pitfalls

Pressures in a diffuse context, such as the discharge of nutrients and chemicals, underwater noise or airborne particulate pollution, must be assessed differently from localised pressures. In such cases, the degree of control and the potential for environmental damage are decisive factors in the risk assessment.

Data is collected on an ongoing basis through national monitoring and on a project-by-project basis in connection with, for example, environmental assessments of offshore wind farms. In both cases, the data points represent a snapshot of a given area, and it is important to bear in mind that the absence of a species is not necessarily representative of that area. In other words, just because a species is not detected, it may well be present in the area anyway; this could be due to a number of reasons, such as the survey method, chance, seasonal variation, etc.

Companies should therefore combine quantitative data with expert knowledge, local insights and marine spatial planning, and focus on reduction targets for pressures where the baseline is complex. In situations where baseline data is complex or incomplete, focusing on reduction targets for pressures may be a more operational and responsible approach than waiting for a complete data set.

5.5.2 Environmental Impact Assessments (EIA)

Under the Act on Environmental Assessment of Plans and Programmes and of Specific Projects (EIA) (Executive Order on the Act on Environmental Impact Assessment of Plans and Programmes and of Specific Projects (LBK No. 4 31/03/2023)), an environmental impact assessment (EIA) is required when a project may have a significant impact on the environment.

The assessments are a valuable source of information regarding the project's anticipated pressures and the state of the marine environment within the specific area for which a licence is being sought.

However, an EIA will rarely constitute a sufficient source for understanding impacts or interdependencies in relation to marine biodiversity, and it is important to be aware of its weaknesses:

- The assessment's project-specific focus implies a logic whereby pressure is assessed locally within the defined area where the project is to be carried out. Consequently, the marine ecosystem's interconnections and the overall pressure on the area will typically be overlooked.
- The consideration of cumulative effects in EIAs is generally limited to other projects that overlap in time and space. Consequently, there is no actual database-driven assessment of the total pressures in the area affected by the enterprise, such as the effects of previous marine aggregate extraction, historical disturbances caused by bottom trawling, nutrient loading or underwater noise (Willstedt et al., 2017).

To obtain a complete picture of pressures and interdependencies, EIA data must therefore be supplemented with broader analyses, sector-specific knowledge and data on ecological status, cumulative pressures and historical pressures.



Photo: Sune Riis Sørensen, DPPO

SBTN is an international initiative aimed at supporting companies in setting science-based targets to reduce their pressures on nature and help keep the pressure on nature within ecological limits.

SBTN Ocean Pilot is a pilot programme focusing on the ocean and marine ecosystems.

The pilot aims to develop and test methods for how companies can identify, assess and prioritise their pressures and dependencies in marine environments in a systematic and site-specific manner.

The pilot project addresses specific challenges relating to the ocean,

including the lack of clear baseline data, cumulative pressures from multiple actors, and difficulties in linking individual activities to ecological effects. Therefore, emphasis is placed on geographical delineation, a common data foundation, stakeholder engagement and a focus on pressures where reductions can be documented.

The experiences from Ocean Pilot are being used to further develop Science-Based Targets for Nature's methodologies for the ocean and contribute to the broader development of frameworks for nature-related risk management, target setting and reporting.

The Danish Pelagic Producers' Organisation represents Danish fishermen who catch species such as herring, mackerel, sand eel and sprat, accounting for approximately 65% of fish landings in Denmark and around 10% of total fishing in the EU. For the Danish Pelagic Producers' Organisation, this is not merely a business foundation, but a social responsibility. "When you run a business based on such a large share of Danish society's natural resources, it comes with obligations. We will continue to honour that social contract," says Director Esben Sverdrup-Jensen.

This is precisely why the Danish Pelagic Producers' Organisation was the first trade association to join the Science-based Targets for Nature's Ocean Pilot. The aim is to develop methods for mapping and understanding the key pressures of fishing on marine nature, and ultimately to demonstrate how pelagic fisheries can actively contribute to improving the health of the ocean.

Strategic motives and rising expectations from the outside world

The commitment to Science-based Targets for Nature is based on a clear strategic assessment: the necessary documentation of marine impacts is becoming a competitive factor, and the Danish Pelagic Producers' Organisation intends to lead the way. The Science-based Targets for Nature pilot project follows on from several recent changes in the industry, including Marine Stewardship Council certification (MSC certification) in 2007, which sets standards for sustainably certified fisheries, and the transition to fully documented fishing by 2024, where all vessels now have video surveillance, sensors and AI monitoring on board – the first solution of its kind in Europe. Data can be made available to the authorities for monitoring and research.

One of the reasons for committing to the Science-based Targets for Nature initiative – in addition to the fact that financial stakeholders are increasingly demanding systematic evidence of the fishing industry's environmental impact and resilience – is the Danish Pelagic Producers' Organisation's desire to reinvest in the natural environment on which the fishing industry has depended for many years. In line with Science-based Targets for Nature Ocean, reinvestment is understood as actions that address our own pressures by reducing pressure and contributing to a better ecological status in the affected marine areas.

Although various methods for structuring data on the pressures on nature already existed, the Danish Pelagic Producers' Organisation did not use a single, comprehensive and consistent framework prior to the Science-based Targets for Nature pilot project. The organisation had access to large amounts of data, including through camera and sensor technology, but the data was not organised according to a common method that made it usable in a nature- and risk-based context. Science-based Targets for Nature provided a clear structure and a common technical framework, which made it possible to systematise, analyse and communicate the large volume of data in a way that effectively supports fishermen and financial stakeholders.

Insights and learning

Specifically, the Danish Pelagic Producers' Organisation has so far worked to map the pressures on fish stocks (fishing pressure, stock health and fisheries management, the pressures on environmental conditions, food webs, biodiversity and ecosystem functions), and dependencies on the productivity and resilience of the sea.

The pilot work has established an important foundation for future science-based targets. Ultimately, the ambition is for the Danish Pelagic Producers' Organisation to set targets for those fishing grounds which, based on the Science-based Targets for Nature work, are found to have the greatest environmental footprint.

They must monitor and report on these targets. This represents a step beyond legally regulated quotas.

As part of its assessment of the pressures of fishing, the Danish Pelagic Producers' Organisation has, amongst other things, used ICES data as a basis for stock assessments and gained experience with various analytical methods that can strengthen evidence-based work in the future. There is still a lack of tools regarding the general status of marine nature in fishing areas to assess the overall condition of marine nature in fishing areas, but these are under development.

For many fishermen, the transition to structured environmental management, documentation and externally defined requirements is not merely a technical change, but a cultural one. The fishing industry has strong traditions of autonomy and freedom, and the introduction of monitoring, data-based reporting and environmental management requires internal dialogue and mutual trust.

The Science-based Targets for Nature process has therefore also driven a cultural shift, with the Danish Pelagic Producers' Organisation working to establish a common ground: if the fishing industry is to have a strong future, it requires unity, documentation and proactive nature management.

Looking ahead: A fishing industry that documents its contribution to the health of the ocean

For the Danish Pelagic Producers' Organisation, Science-based Targets for Nature is not an isolated project, but a long-term development perspective for pelagic fisheries. It is not just about quotas, selective gear and certification, but also about documented pressures on ecosystems and scientifically defined targets for improvement.

"If we as a sector can demonstrate that we are helping to protect the health of the oceans, we can strengthen biodiversity and secure the future of the fishing industry,"
— Esben Sverdrup-Jensen.

This case study is a concrete, practical example of how an organisation works with framework tools and the systematisation of its own knowledge regarding the pressures on the ocean. The case study presents the Danish Pelagic Producers' Organisation's own account of its work with Science-based Targets for Nature Ocean Pilot and is included in this publication as a practical example to illustrate this report. The case represents a stakeholder perspective and does not reflect the professional assessment or recommendation of the Ocean Institute.



Shorthorn sculpin, Lillebælt
Photo: Tim Dencker

6. Dependencies and financial materiality

Businesses are not merely a source of pressures on the marine environment. They are also highly dependent on the ocean's ecological functions and physical stability. These dependencies form a key starting point for understanding nature-related risks and, consequently, for assessing financial materiality.

Marine ecosystems provide a wide range of services that underpin economic activity. For businesses with a direct or indirect link to the sea, these services are often implicit and only become apparent when they are compromised. These dependencies may relate to access to resources, marine space, climate regulation and extreme events, or the protection of infrastructure. When marine ecosystems deteriorate, these dependencies can manifest as concrete operational, regulatory or economic challenges.

6.1.1 Direct dependencies

Several sectors have a direct dependence on the ocean's resources and physical functions:

- Fisheries and aquaculture are dependent on healthy stocks, good water quality and stable temperature conditions. When the marine environment degrades, resource availability declines, directly affecting revenue and employment.
- Marine aggregate extraction and offshore energy are dependent on physical access to marine areas and stable seabed conditions. If coastal erosion, changing current patterns or increased storm frequency restrict access or increase operating costs, this dependence becomes financially material.

6.1.2 Indirect dependencies

- Many businesses with no direct activity in or on the sea are nevertheless economically linked to the state of the sea through supply chains or climate-regulating processes.
- The food sector is dependent on the ocean's role in regulating the climate – for example, the ocean's absorption of CO₂ and regulation of temperature and precipitation. If the ocean's carbon cycle is disrupted, this can have cascading effects for agriculture, supply chains and similar logistical arrangements.
- Tourism and coastal industries linked to tourism depend on attractive coastal areas and stable coastlines. Deteriorating water quality, loss of biodiversity or erosion can lead to a decline in visitor numbers.
- Shipping depends on access to navigable waters and functioning port infrastructure. Changes in sea level, sediment dynamics or land-use restrictions can affect logistics, supply chains and the need for investment.
- Wastewater companies depend on assimilative capacity of receiving waters, i.e. the ability of the sea and coastal waters to dilute chemicals and metabolise nutrients. If the ecosystem's capacity is impaired by, for example, eutrophication or excessive concentrations of chemicals, the same discharge can lead to greater environmental impacts, and thus stricter requirements and increased costs.

Table 5 Examples of dependencies and their possible consequences.

Activity	Dependency	Potential financial implications
Shipping	Access to the sea, ports and navigable waters	Increased security costs and the need for investment in infrastructure
Fisheries	Healthy fish stocks	Decline in catches and turnover
Wastewater companies	Assimilative capacity	If the ecosystem's capacity deteriorates (e.g. eutrophication, lower oxygen levels), the same discharge can cause greater damage → stricter requirements, higher operating costs.
Offshore wind	Stable seabed, low erosion, stable wind patterns	If the ecosystem's capacity deteriorates (e.g. eutrophication, lower oxygen levels), the same pressure can cause greater damage → stricter requirements, higher operating costs

6.2 When dependencies become financially material

Companies' dependence on the sea can develop into nature-related risks when the state of the sea deteriorates, or when society's response to this changes the economic conditions.

These risks describe how changes in the marine environment can have economic consequences for the companies through their effects on resources, production, market access, supply chains and liability.

This section presents the three main types of nature-related risks that companies should address: physical risks, transition risks and legal risks. When these risks can have a significant influence on the company's financial performance, position or future cash flows, they become financially material.

Biodiversity loss and ecosystem collapse are no longer merely environmental issues, but are now recognised as significant strategic risks. In the World Economic Forum's Global Risks Report 2026, 'biodiversity loss and ecosystem collapse' is ranked as the second most serious global risk over a 10-year horizon. The risk has thus moved significantly up the international agenda since 2024, and while geopolitical unrest, political polarisation and cyber security dominate the short-term outlook, biodiversity loss and ecosystem collapse are expected to be a key risk in the longer term. Those companies that understand and manage their pressures on marine biodiversity at an early stage will be in a stronger position in terms of risk mitigation, investment and their future market position (Dasgupta, 2021).

Understanding how dependencies on the sea become financially significant is therefore not just a matter of environmental concerns, but of safeguarding the company's business foundation.

6.2.1 Physical risks

Physical risks arise when changes in the ecological and physical state of the ocean often exacerbated by climate change, affect the environment in which the company operates. Weakened ecosystems and the resulting deterioration of ecosystem services can reduce the availability of resources, increase exposure to extreme events and affect the value of physical assets.

Examples of physical risks include:

- Disrupted supply chains, where both temporary and permanent changes may require diversification of inputs or changes to production.
- Increased damage and insurance costs resulting from more frequent extreme weather events and increased exposure of coastal infrastructure.
- Stranded assets that lose value due to environmental change or regulation.
- Negative impacts on companies' supply chains. The value chain may experience both temporary negative impacts as a result of extreme weather events, but value chains may also be permanently altered if, for example, ecosystems change to such an extent that it becomes necessary to ensure diversity within the value chain or even to use different inputs in production.
- Extreme weather resulting from climate change can increase the risk of physical damage, which is expected to raise companies' insurance premiums. This has been the case in the US, where insurance premiums have risen as a result of increasing costs for climate-related damage (CDP, 2025).
- The degradation of ecosystems can mean that production facilities are no longer suited to the available marine aggregate resources. When ecosystems degrade, this usually means that they can no longer provide the same resources as before. When companies have invested in production facilities on the basis that a certain quantity of marine aggregate extraction and other resources is available, the degradation of marine ecosystems can have a significant importance to the value of those investments (Dasgupta, 2021).

6.2.2 Transition risks (society, regulation, reputation)

Transition risks arise when societal norms, policies and market expectations change in response to the deterioration of the marine environment and the loss of biodiversity.

Civil society and the media are paying increasing attention to companies' pressures on the environment (Nielsen et al., 2024). When a company is associated with negative environmental impacts, such as damage to biodiversity or discharges into water bodies that are already in poor condition, the consequences can extend far beyond legal sanctions.

6.2.2.1 Regulatory risks

A growing focus on companies' pressures on the environment may lead to regulatory changes. If there is increasing public pressure on politicians to internalise environmental externalities such as CO₂ emissions, this could have significant financial consequences for individual companies' finances (McCraine et al., 2019).

This is already evident in the fact that both the EU and Denmark are continually tightening requirements for the protection and sustainable use of the marine environment, not least as part of the implementation of the EU's Biodiversity Strategy for 2030, the EU Green Deal, the EU Ocean Pact and national climate targets. These regulations have a direct influence on the business sector's access to and use of marine areas and may therefore entail regulatory costs.

A key objective is that 30% of the EU's marine areas should be protected by 2030, of which 10% should be strictly protected MPAs where exploitation is largely restricted or prohibited. Consequently, the green transition and the growing societal focus on marine protection entail increased costs for businesses, which can no longer operate in MPAs or which will have to finance measures to minimise the negative impact on MPAs.

Companies should keep abreast of developments and respond in good time to new requirements and changes in the regulatory framework. Failure to adapt may result in unexpected restrictions or additional costs.

Regulatory risks may, for example, relate to restrictions on access to natural and resource areas – particularly in ecologically sensitive marine and coastal zones – requirements for clean-up or compensation, stricter standards for public procurement, and changes to permit and licensing procedures, including possible halts to new permits (OECD Publishing, 2019).

6.2.2.2 Reputational risks

Similarly, the green transition of society can have economic consequences for businesses as a result of reputational damage. When businesses are associated with a negative pressure on the marine environment, this can lead to reputational risks in the form of consumer boycotts, difficulties in retaining and attracting qualified staff, or compromised relationships with suppliers, partners and investors, etc. (Nielsen et al., 2024)

Similarly, there are several international examples showing that damage to a company's reputation has led to falling share prices (Dasgupta, 2021), just as consumer demand for environmental action is becoming increasingly important to many CEOs (United Nations Global Compact & Accenture, 2025). These examples illustrate that companies' management of their environmental impacts, or lack thereof, is often viewed by the public as an expression of general corporate responsibility. At a time of increasing focus on the marine environment and biodiversity, a weakened environmental profile can lead to critical scrutiny from NGOs, investors and customers, thereby affecting the company's market access, employee retention and future investment opportunities.

Tabel 6 Marine-related dependencies / ecosystem services or dependencies for businesses (based on the ENCORE data tool).

Ocean-related dependencies / ecosystem services	Natural function	Typical industries dependent on it
Erosion and coastal protection	<ul style="list-style-type: none"> • Natural protection of the coastal zone (dunes, vegetation, reefs) • Attenuation of wave energy and storm surges 	Shipping, ports, offshore wind, agriculture (coastal), aquaculture
Water supply and accessibility	<ul style="list-style-type: none"> • Sufficient quantity and quality of surface and seawater • Groundwater balance (relevant for coastal facilities) 	Aquaculture, agriculture, wastewater, ports
Biological control and health	<ul style="list-style-type: none"> • Control of diseases and 'pests' • Genetic diversity and resilience • Natural competition and balance in ecosystems 	Aquaculture, fisheries, agriculture
Stability and resilience in the ecosystem	<ul style="list-style-type: none"> • The ability of ecosystems to recover from disturbances • Ecological resilience to extreme events 	All, but particularly offshore wind, fisheries and aquaculture
Natural protection of infrastructure	<ul style="list-style-type: none"> • Coastal erosion protection • Buffer against storm surges • Sediment transport and maintenance of port access 	Shipping traffic, offshore wind, port facilities
Excavation of marine aggregates	<ul style="list-style-type: none"> • Availability of sand, gravel and shells 	Marine aggregate extraction, port facilities, offshore installations
Cultural ecosystem services	<ul style="list-style-type: none"> • Natural landscape, biodiversity, recreational value • Cultural and local connection to the sea 	Coastal tourism, ports, fisheries, offshore wind (social acceptance)

6.2.3 Strict liability for environmental damage

Legal risks refer to the financial consequences of legal liability for environmental damage, irrespective of fault. This is known as strict liability.

EU and Danish case law shows that companies can be held financially liable for environmental damage, even when activities are carried out within the framework of a permit (Federal Ministry of the Republic of Austria, 2023).

Several judgments from the Court of Justice of the European Union (including C-529/15 and C-297/19) have established that companies are liable for damage to protected species, habitats and the aquatic environment irrespective of fault. This follows the principle of strict liability, where it is not decisive whether the company has acted negligently. The sole criterion is that damage has been caused as a result of the company's activities.

The time factor is also significant. Liability may arise long after an activity has taken place if the damage is only identified later, e.g. in the case of slowly accumulating pressures or the loss of species. This means that activities approved in the past do not necessarily exempt the company from subsequent liability.

These principles are reflected in Danish law through the Environmental Protection Act (Act No. 1093 of 6 June 1991) and the Environmental Damage Act (Act No. 923 of 17 June 2008), which implement the EU Environmental Liability Directive (2004/35/EC). Danish case law has established that a permit from a public authority does not necessarily exempt a company from liability if the damage proves to exceed what may be considered environmentally permissible. For example, in cases concerning groundwater pollution and the destruction of natural habitats, the High Courts have awarded liability for damages, even where the activities were carried out in accordance with applicable authorisations.

In both the EU and Danish contexts, environmental authorities have extensive powers to require the restoration of damaged nature, preventive measures, and, in certain cases, compensatory measures if the original condition cannot be restored. This can result in significant and unpredictable financial liabilities for businesses, particularly in cases involving insufficient documentation, inadequate baseline data, or cumulative effects.

6.2.4 Financial consequences

The above types of risk can have significant financial consequences for businesses – directly through operating costs and asset losses, and indirectly through changes in insurance terms, regulation and market conditions.

When businesses exert pressure on the marine environment, this can have a significant influence on their operations and financial performance, so-called nature-related risks (Dasgupta, 2021). A financially prudent company should therefore address these risks on a par with other financial risks, thereby reducing the economic consequences of nature-related risks. Nature-related risks can be classified into three broad groups: physical risks, risks related to societal transition, and legal risks related to liability for environmental damage. This is an agenda that is already dominating global boardrooms. For example, a survey of UN Global Compact members shows that 59 per cent of CEOs globally use various sustainability criteria as part of the internal evaluation of their organisations' performance (United Nations Global Compact & Accenture, 2025), just as 75 per cent of CEOs today are actively working on responsible value chains (United Nations Global Compact & Accenture, 2025).

Firstly, nature-related risks can lead to increased physical risks, which may have negative consequences for the company's finances. These physical risks materialise in that weakened ecosystems can adversely affect the supply reliability within the company's value chains. At the same time, physical risks can affect the value of the company's assets if the risk of material damage to them increases as a result of weakened ecosystems (Dasgupta, 2021), just as the availability and cost of insurance may change significantly (Dasgupta, 2021).

Secondly, a company's financial position may be adversely affected as a result of society's green transition. Companies that are particularly affected by new or amended regulatory frameworks, as well as those that are unable to adapt at the same pace as the rest of society, are expected to be particularly hard hit financially. As society transitions, it is necessary for individual companies to continuously adapt to new regulations, changes in demand, societal norms and technological developments (Dasgupta, 2021).

Thirdly, a company's nature-related risks may manifest as increased financial risk arising from legal proceedings concerning liability for environmental damage (Dasgupta, 2021), see section 6.2.3.

Common to all three types of financial risk described is that it is difficult to predict when and how they will materialise in practice, and in this context, historical and current data are often misleading when it comes to accurately assessing and pricing future risk. If historical data is used as the basis for assessing future risk, it is implicitly assumed that future conditions will resemble those of the past. As the climate and environment change, so too do the conditions within which companies operate, and this should be factored into the assessment of future risk (Dasgupta, 2021).

This argues in favour of companies adopting the precautionary principle in the management of both environmental and financial risks.

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Action for the ocean is not a trend

— it is a necessity

The collaboration with Musholm and DPPO demonstrates how companies with marine nature data from across the value chain can take responsibility where their environmental footprint is greatest.

By mapping the environmental footprint, we gain the insights needed to take targeted action, benefiting both the sea and the decision-making process.

It also makes good business sense: it reduces risk and can strengthen the company's market value.

— *Maren Moltke Lynggaard,*
Lead Advisor Ecology & Biology, WSP



Eelgrass, Lynæs
Photo: Tim Dencker

7. Opportunities, nature-positive contributions and communication

7.1 Nature-related opportunities

Whereas Chapter 6 described how companies' dependence on the sea can pose financial risks, this section focuses on the potential for value creation: how investments in more sustainable use of the sea can create economic value and competitive advantages.

Experience shows that companies which actively work to document, reduce or restore their pressures on the marine environment can achieve tangible business benefits, as illustrated by the case studies on the Danish Pelagic Producers' Organisation and Musholm.

In some cases, marine sustainability initiatives can present a direct business case, where a tangible reduction in pressures or investment in nature-enhancing measures leads to measurable economic benefits. This could, for example, be through reduced operating costs, more efficient use of resources or technological solutions that strengthen competitiveness in tenders and contract awards.



Positive contributions and nature-related opportunities are related, but fundamentally distinct concepts.

In other cases, the business case is indirect, with the value primarily linked to framework conditions and market position rather than to an immediate financial return. This may include, amongst other things:

- Access to capital and financing, as banks and investors increasingly prioritise projects with a documented low environmental impact, cf. the case studies on the Danish Pelagic Producers' Organisation and Musholm.
- Competitive advantage and market access, where documented consideration for the sea constitutes a customer requirement or a differentiating factor in tenders.
- Reputation and trust, where the company's ability to act responsibly towards the sea becomes part of its brand and stakeholder value.
- An enhanced ability to attract and retain talent, as studies indicate that younger employees are increasingly prioritising companies' sustainability efforts – including their approach to nature and biodiversity – when choosing where to work (Deloitte, 2025)

In other areas, it is not yet possible to build a robust business case. For example, it is difficult to make a business case for shipping companies to invest in noise-reducing technology, even though underwater noise is well documented as having significant impact on marine biodiversity (European Maritime Safety Agency, 2025). Because the pressure of noise has not been valued and factored into the price of maritime transport, the investment will not yield a direct commercial return.

Only when economic market forces fully value nature – for example, by making it clear what the loss and displacement of fish stocks due to underwater noise mean for ecosystems and the economy – will the true price of goods and services be able to reflect the total environmental costs (Sustainable Shipping Initiative, 2014). Until then, the incentive rests primarily on legal requirements, current policy instruments such as taxes, levies and quotas on CO₂, NO_x and others, investor expectations, and pressure from society rather than on a self-sustaining business logic.

7.2 Positive contributions to the ocean - opportunities and limitations

As companies are increasingly expected to identify and reduce their pressures on biodiversity and ecosystems, there is also growing awareness of how the business sector can make a nature-positive contribution to the marine environment. In a marine context, nature-positive contributions may, for example, include the restoration of coastal habitats such as seagrass beds, salt marshes, rocky reefs and biogenic reefs, where these have historically been present. It may also include nature-inclusive design in connection with offshore installations where local ecological conditions warrant it, or nature restoration as an extension of existing activities, such as mussel farming.

Nature-positive contributions may also consist of making marine data publicly available, provided that it can be demonstrated that the data has specifically supported research, management decisions or nature-enhancing measures.

However, the concept of nature-positive contributions is not unambiguous. Depending on which framework or standard is used – for example, the European Sustainability Reporting Standard E4, the Taskforce on Nature-related Financial Disclosures, the EU Taxonomy or the Kunming-Montreal Global Biodiversity Framework – both definitions and documentation requirements vary. Some frameworks distinguish between positive interactions (e.g. activities with a potential but not documented effect) and actual contributions to biodiversity improvement, where the documentation requirements are significantly higher.

Across different frameworks, however, there is one clear common denominator: nature-positive contributions cannot be used to offset negative pressures. Avoiding harm and reducing pressure on the marine environment is always the top priority. Positive actions should therefore be viewed as a supplement, which – where technically and methodologically sound – can enhance the company's overall contribution to marine biodiversity and ecological resilience (TNFD, 2025b). Particular caution should therefore be exercised when using the concept, and it should be ensured that any nature-positive contributions are long-term, measurable and not used as offsets.



Photo: Musholm A/S

Case: Musholm og Science-based Targets for Nature Ocean Pilot

Science-based Targets for Nature (SBTN) – Ocean Pilot

SBTN is a global initiative aimed at supporting companies in setting science-based targets to keep pressures on nature and help keep the pressure on nature within ecological limits.

SBTN Ocean Pilot is a pilot programme focusing on the ocean and marine ecosystems.

The pilot aims to develop and test methods for how companies can identify, assess and prioritise their pressures and dependencies in marine environments in a systematic and site-specific manner.

The pilot project addresses specific challenges relating to the ocean,

including the lack of clear baseline data, cumulative pressures from multiple actors, and difficulties in linking individual activities to ecological effects. Therefore, emphasis is placed on geographical delineation, a common data foundation, stakeholder engagement and a focus on pressures where reductions can be documented.

The experiences from Ocean Pilot are being used to further develop Science-based Targets for Nature's methodologies for the ocean and contribute to the broader development of frameworks for nature-related risk management, target setting and reporting.

Musholm states that they have always been closely connected to the natural environment on which their business is built. The company's production facilities and largest marine aquaculture facility are closely linked to Reersø Harbour; a daily reminder of how dependent they are on healthy marine environments. Over the years, Musholm has voluntarily undertaken nature restoration initiatives, including the removal of barriers and the re-meandering of watercourses at their fish farm in Jutland. These initiatives have been carried out on a case-by-case basis in collaboration with authorities and nature and environmental groups, focusing on concrete solutions and local engagement. With Science-based Targets for Nature, this can be achieved more effectively through a comprehensive strategy with a particular focus on the ocean.

By participating in the Science-based Targets for Nature Ocean Pilot, Musholm aims to ensure comprehensive documentation of the pressures on the ocean, both for its own business and throughout its value chain. This requires a methodological framework capable of collecting data, creating transparency and providing a more reliable basis for decision-making – both to better understand risks to the marine environment and to safeguard the company's long-term development opportunities.

The work in the Science-based Targets for Nature Ocean Pilot marks the start of a more general and strategic approach to nature-enhancing measures and sustainability initiatives that go beyond regulatory requirements and the company's own ASC certification. Musholm operates on the basis of a data-driven understanding of both its own pressures, such as nutrient discharge and potential changes to the seabed fauna, and of the company's dependence on stable marine conditions, water quality and natural resilience.

Stronger data, better decisions and new market positions

Science-based Targets for Nature has provided Musholm with a structured framework for collecting and analysing data. Tools such as ENCORE and WWF's Biodiversity Risk Filter have given the company a clearer understanding of where pressures are greatest and how production, environmental conditions and risks are interlinked. This has strengthened both technical capacity and internal decision-making.

The stronger data foundation has also resulted in tangible business benefits. Together with a joint venture partner, Musholm has recently won two tenders in Latvia, where the company assesses that its experience with documenting environmental impacts, ecological status and risks provided a competitive advantage. This has strengthened the company's position in export markets and demonstrated that systematic nature data is an increasingly important competitive parameter, as it is increasingly requested by customers.

Ambitious data is a complex task

Achieving full data transparency across the entire value chain is a major undertaking. Musholm points out that the Science-based Targets for Nature initiative is technical, time-consuming and requires significant internal resources – and that most companies need external guidance to achieve the level of data and analysis that the framework requires.

Musholm therefore hopes that the pilot phase can help ensure that future versions of Science-based Targets for Nature become more streamlined and operational, particularly when it comes to data reporting and validation.

At the same time, the company emphasises that the work – despite its complexity – provides a clear technical direction and better control over its own data, which in itself is a significant strength.

Data as the foundation for future-proof aquaculture

For Musholm, Science-based Targets for Nature is not a one-off project, but a first step towards a more future-proof aquaculture industry, where environmental considerations and business strategy are developed in parallel. The company expects that:

- documentation of pressures will become a key competitive factor,
- the sector will demand standardised, transparent, science-based methods,
- and that the experiences from Science-based Targets for Nature can form the basis for future targets and indicators for aquaculture.
- The public expects transformative approaches to nature conservation

If we as an industry can scientifically document our pressures in relation to the actual state of nature, we can take the necessary responsibility for the natural environment in which we operate and set concrete targets for nature-positive actions for the marine environment, says Teis Volstrup.

This case study is a concrete, practical example of how an organisation works with framework tools and the systematisation of its own knowledge regarding the pressures on the ocean. The case study presents the Danish Pelagic Producers' Organisation's own account of its work with Science-based Targets for Nature Ocean Pilot and is included in this publication as a practical example to illustrate this report. The case represents a stakeholder perspective and does not reflect the professional assessment or recommendation of the Ocean Institute.



Shipping



Offshore wind farms



Bottom-towed fishing



Offshore installations, including ports

	Shipping	Offshore wind farms	Bottom-towed fishing	Offshore installations, including ports
PRESSURE	<ul style="list-style-type: none"> Underwater noise Hazardous substances Introduction of invasive species Physical disturbance 	<ul style="list-style-type: none"> Physical loss of the seabed Physical disturbance Underwater noise Hazardous substances 	<ul style="list-style-type: none"> Physical disturbance Removal of biomass Resuspension of sediment Underwater noise 	<ul style="list-style-type: none"> Hazardous substances Physical loss of the seabed Physical disturbance Underwater noise
POTENTIALLY AFFECTED BIODIVERSITY	<ul style="list-style-type: none"> Habitats (water column) Marine mammals Fish Plankton Seabirds 	<ul style="list-style-type: none"> Habitats (seabed and water column) Marine mammals Fish Benthic species Plankton Seabirds 	<ul style="list-style-type: none"> Habitats (seabed) Marine mammals Fish Benthic species Seabirds Seagrass and seaweed 	<ul style="list-style-type: none"> Habitats (seabed and water column) Marine mammals Fish Benthic species Plankton Seabirds
POSSIBLE IMPACTS	<ul style="list-style-type: none"> Disturbance of marine mammals, fish and seabirds Disturbance of the water column Adverse effects on marine species which may, for example lead to changes in the animals' growth and reproduction Introduction and spread of invasive species Continuous low-frequency underwater noise can mask and disrupt animal communication, reproduction and behavior 	<ul style="list-style-type: none"> Loss and alteration of habitats and thus living environments and potential spawning and rearing grounds Changes to migration routes and foraging areas for birds (due to barriers across the water) Hydrological changes (current conditions and wind energy), such as increased stratification of the water column, which may increase the risk of oxygen depletion Spread of non-native species via foundations Disturbance of marine species (from electromagnetic and heat emissions from cables, from vibrations and as a consequence of oil spills containing environmentally harmful substances) 	<ul style="list-style-type: none"> Pressure on non-target species (by-catch) Removal of sensitive species (sharks, rays, etc. as by-catch) Disturbance of marine mammals, fish and seabirds (underwater noise and shipping) Repeated disturbance and damage to the seabed Alteration of the marine and seabed ecosystems and species composition Catching fish species that play a key role in the marine ecosystem Continuous low-frequency underwater noise can mask and disrupt animal communication, reproduction and behavior 	<ul style="list-style-type: none"> Loss and alteration of habitats and thus living environments and potential spawning and nursery grounds Changes to migration routes (barriers across the water) Introduction of new substrate to an area where it has not previously been present, thereby attracting new species Adverse effects on marine species due to environmentally hazardous substances Periodic high-frequency impulse noise can permanently or temporarily damage animals' hearing Continuous low-frequency underwater noise can mask and disrupt animal communication, reproduction and behaviour

	 Wastewater discharges	 Agriculture	 Extraction of marine aggregates	 Aquaculture
PÅVIRKNING	<ul style="list-style-type: none"> Hazardous substances Nutrients Thermal pollution 	<ul style="list-style-type: none"> Nutrients Hazardous substances 	<ul style="list-style-type: none"> Physical loss of the seabed Physical disturbance Resuspension of sediment 	<ul style="list-style-type: none"> Nutrients Hazardous substances Introduction of invasive species
POTENTIELT PÅVIRKET BIODIVERSITET	<ul style="list-style-type: none"> ■ Habitats (seabed and water column) ■ Marine mammals ■ Fish ■ Benthic species ■ Plankton ■ Seabirds ■ Seagrass and seaweed 	<ul style="list-style-type: none"> ■ Habitats (seabed and water column) ■ Marine mammals ■ Fish ■ Benthic species ■ Plankton ■ Seabirds ■ Seagrass and seaweed 	<ul style="list-style-type: none"> ■ Habitats (seabed) ■ Marine mammals ■ Fish ■ Benthic species ■ Seabirds ■ Seagrass and seaweed 	<ul style="list-style-type: none"> ■ Habitats (seabed) ■ Fish ■ Benthic species ■ Seagrass and seaweed
MULIGE INDVIRKNINGER	<ul style="list-style-type: none"> ■ Negative impacts on wildlife from environmentally hazardous substances (heavy metals, oil substances and pharmaceuticals, etc.) ■ Changes in animal behaviour due to environmentally hazardous substances ■ Changes in species composition due to eutrophication ■ Increased algal blooms and shading of seagrass and seaweed ■ Increased oxygen depletion ■ Disturbance of species (warming of seawater) 	<ul style="list-style-type: none"> ■ Changes in species composition due to eutrophication ■ Increased algal blooms and shading of seagrass and seaweed ■ Increased oxygen depletion ■ Adverse effects on marine species in the case of environmentally hazardous substances (pesticides, residues of medicines from slurry and sludge spread on fields) ■ Changes in animal behaviour due to environmentally hazardous substances 	<ul style="list-style-type: none"> ■ Loss and alteration of seabed and thus habitats (removal of sediment) ■ Repeated disturbance of the seabed ■ Changes to the seabed ecosystem and species composition ■ Periodic shading, e.g. of seagrass and seaweed, due to resuspension of sediment ■ Covering of benthic fauna and plants with resuspended sediment 	<ul style="list-style-type: none"> ■ Displacement of native species ■ Adverse effects on marine species due to environmentally hazardous substances (medicine residues, anti-fouling agents) ■ Changes in animal behaviour due to environmentally hazardous substances ■ Changes in species composition due to eutrophication ■ Increased algal blooms and shading of seagrass and seaweed ■ Increased oxygen depletion

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Authors: Lene Westergaard, Sune Agersnap, Mathilde Mammen og Liselotte Hohwy Stokholm

Graphics: Mads Lundgård og Pernille Schou Jacobsen

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Tænketanken Hav

Læderstræde 20, 1201 København K

CVR: 42479446

Tlf: +45 4498 8000

info@taenketankenhav.dk

www.taenketankenhav.dk

About the Ocean Institute

The Ocean Institute represents the sea. The Institute was established on the initiative of the VELUX FOUNDATION and was set up to contribute to a healthy and clean sea around Denmark, where the sea is used sustainably and with respect for animal and plant life.

The Ocean Institute provides analyses, proposes concrete measures and facilitates dialogue across all ocean-related interests – in politics, business and among the general public – for the benefit of the stressed marine environment.

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