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Summary

In the near future, additional measures will be needed to enhance nature conservation and to meet legal obligations, such as the new Nature Restoration Regulation (NRR) that has been in force since 18 August 2024, resulting from the EU Biodiversity Strategy 2030. In addition, stricter protection measures may be necessary under existing frameworks, such as the EU Birds and Habitats Directives (BHD) and the Marine Strategy Framework Directive (MSFD), to achieve their set objectives. In preparation for this, the Dutch Ministry of Agriculture, Fisheries, Food Security and Nature (LVVN) seeks guidance on the options for applying a stricter protection regime at sea, including an overview of species and habitats which can be expected to benefit most from a stricter protection regime, and where in the Dutch part of the North Sea this regime can best be applied. The current target, set for 2030, is to protect 30% of marine and coastal areas and at least 10% to be under strict protection. These EU targets are coherent with the global targets proposed to the 15th Conference of the Parties (COP15) of the UN Convention on Biological Diversity and with the objectives of the Bern Convention. As of the date of publication of this report, the percentages carry no legal obligation and have not yet been integrated into national policy.

This study adopted and further developed a risk-based approach to prioritize areas for biodiversity protection, balancing ecological benefits and socio-economic consequences. This approach assesses the cumulative impact of human activities, such as fisheries, marine traffic, wind farms, and oil and gas operations, on key marine habitats and species. By calculating the contribution of each of those activities to Impact Risk (IR) and identifying the reduction in IR achievable under different spatial management regimes, this study offers a systematic framework to align conservation efforts with Good Environmental Status (GES) and favourable conservation status (FCS).

The results highlight that, in descending order of importance, benthic trawl fisheries, static gear fisheries and "other activities" (which include mainly marine traffic) pose the greatest threat to the selected species and habitats, significantly affecting habitats like sublittoral sediment, European flat oyster (*Ostrea edulis*) and ross worm (*Sabellaria spinulosa*) beds, and species such as harbour porpoise (*Phocoena phocoena*), common scoter (*Melanitta nigra*), common eider (*Somateria mollissima*), great crested grebe (*Podiceps cristatus*), great black-backed gull (*Larus marinus*) and the fish community to represent the sensitive fish species. These impacts are most severe in Marine Protected Areas such as Dogger Bank (harbour porpoise, fish, sublittoral sediment), Frisian Front (ross worm, seabirds), Cleaver Bank (flat oyster), North Sea Coastal Zone (seabirds), Voordelta (seabirds), and Brown Ridge (ross worm, harbour porpoise), where stricter protection could be particularly effective.

This study concludes that there is no single "best" solution for strict protection in the Dutch Exclusive Economic Zone (EEZ). Instead, an approach is presented that allows action perspective in terms of the choice of priority area(s), the level of ambition, the desired degree of protection (e.g., exclusion of benthic trawl fisheries, all fisheries, all extractive activities or all human activities), and which species or habitats should be prioritized. The default recommendation is to implement pragmatic strict protection across all MPAs, as this would meet and potentially exceed the direction of 10% strict protection. However, alternative scenarios, tailored to decision-makers' preferences, can be developed using this risk-based approach (e.g. SCAIRM) as a decision-support tool.

By providing clear guidance on how strict protection measures can be implemented, this study offers an action perspective to policymakers. It can be applied in the context of stakeholder engagement and highlights the need for further and better data collection in alignment with EU directives and with the aim to achieve long-term conservation goals. Additionally, the approach supports the effective implementation of future marine biodiversity protection measures that are most effective and consider both the ecological impacts as well as socio-economic factors to ultimately achieve sustainable marine management.

1 Introduction

1.1 Background

Protection of global biodiversity

In 2010, the Parties to the Convention on Biological Diversity adopted the Strategic Plan for Biodiversity 2011-2020. This plan included the Aichi Biodiversity Targets. Its mission was to take effective and urgent action to halt the loss of biodiversity. The goal was to ensure that by 2020, ecosystems are resilient and continue to provide essential services. This would secure the planet's variety of life and contribute to human well-being and poverty eradication (UNEP/CBD 2010). One of the targets (Aichi Target 11) described that: "By 2020, at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes." (UNEP/CBD 2010). Building on the Strategic Plan for Biodiversity 2011–2020, the Kunming-Montreal Global Biodiversity Framework, sets out an action plan by 2030, in line with the 2030 Agenda for Sustainable Development and its Sustainable Development Goals. The target for 2030[1] is: "Conserve 30% of Land, Waters and Seas. Ensure and enable that by 2030 at least 30 per cent of terrestrial and inland water areas, and of marine and coastal areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories."

Protection of European biodiversity

In May 2020, the European Commission (EC) published the European Biodiversity Strategy 2030 (EC, 2020). In order to prevent further decline in biodiversity, the EC wants to expand and strengthen the current network of protected areas. The strategy contains specific commitments and actions to be delivered by 2030. The foundation of nature conservation within the EU was established through the Birds Directive (BD) and the Habitats Directive (HD). Complementing these, the Marine Strategy Framework Directive (MSFD) has been instrumental in addressing marine biodiversity. Building on this robust framework, the EU Biodiversity Strategy 2030 sets an ambitious target: to protect 30% of both land and sea across the European Union, ensuring the preservation and restoration of biodiversity. These protected areas must specifically focus on the protection of species and habitats and management measures and monitoring must take place to achieve the targets in the area. In addition, the EU Biodiversity Strategy 2030 sets a more specific requirement for at least 10% of both land and sea to be under strict protection. These strictly protected areas are a subset of the 30% of protected areas. Protected areas can be part of the Natura 2000 or MSFD network, but national protection schemes are also eligible. Through concrete commitments and actions, the plan is for EU countries to put in place effective measures to restore degraded ecosystems. As part of this plan, the Commission proposed the EU Nature Restoration Regulation (Regulation (EU) 2024/1991) which includes an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas, with binding restoration targets for specific habitats and species. The Nature Restoration Regulation (NRR) prescribes a number of matters as mandatory (such as the implementation of restoration measures for an increasing percentage of the surface area of specific habitats over time), but leaves room for the Member States to interpret other matters themselves (such as the precise content of the package of measures). EU countries are expected to submit National Restoration Plans to the Commission within two years of the Regulation coming into force (so by mid 2026). The National Restoration Plan should show how the targets will be

[1] https://www.cbd.int/gbf/targets

reached, including specific measures. EU countries will also be required to monitor and report on their progress.

Protection of North Sea biodiversity
The EU Biodiversity Strategy 2030 and the Nature Restoration Regulation, effective since 18 August 2024, build on and enhance existing European legislation involving nature conservation of the North Sea, i.e. the Marine Strategy Framework Directive (MSFD) and the Birds and Habitats Directives (BHD). The Nature Restoration Regulation contains additional and stricter obligations to protect and restore species and habitats that are currently protected under the BHD and MSFD.

1.2 Research question

In the near future, additional measures will be needed to enhance nature restoration and to meet legal obligations, such as the new Nature Restoration Regulation (EC, 2022a), resulting from the EU Biodiversity Strategy 2030. In addition, stricter protection measures may be necessary under existing frameworks, such as the BHD and the MSFD, to achieve their set objectives.

In preparation for this, the Ministry of Agriculture, Fisheries, Food Security and Nature (LVVN) requires insight into the possibilities for applying a stricter protection regime at sea. This includes an overview of species and habitats for which a stricter protection regime, at specific locations in the Dutch part of the North Sea, would be most effective, as well as an assessment of the potential socio-economic impacts of such measures and what a stricter regime would entail.

The central research question for this study is therefore: Which species and habitats in the Dutch part of the North Sea are most suitable for stricter protection measures, and what are the expected ecological benefits and potential socio-economic impacts of implementing such measures at specific locations?

1.3 Aim

The aim of this study is to describe which species and habitats would benefit most from a stricter protection regime, and where in the North Sea this regime can best be applied. To that end this study will identify the species and habitats that require additional protection measures and develop an approach that would allow evaluation of the level of protection achieved through spatial management measures, i.e. Marine Protected Areas (MPAs). This is conducted to ensure compliance with relevant legislations (e.g. BHD or MSFD) and goals stemming from the EU Biodiversity Strategy 2030 (EBS). This approach should include the relevant characteristics, e.g. predicted and current spatial distribution, sensitivity and recovery potential, of different species and habitats that determine the potential impact of all the relevant human activities and their pressures and hence the likelihood of not achieving environmental objectives such as good environmental status (GES) and favourable conservation status (FCS). This approach should also provide maps that identify the area's, and specifically already established MPAs, most likely to contribute to the protection of these species and habitats through the (stricter) mitigation of prevailing socio-economic activities.

This report applies a specific interpretation of 'strict protection' based on available scientific insights and existing frameworks. This definition is not (yet) politically approved and serves only as a starting point for further policy development and discussion. The final political interpretation or decisions may deviate from or be amended at a later stage.

2 Area-based conservation measures

2.1 Management approaches

Area-based conservation of marine and coastal areas includes Marine Protected Areas (MPAs) and other effective area-based conservation measures (OECMs). Area-based conservation, particularly of MPAs, is the primary approach used globally to address biodiversity decline and currently covers 8% of the world's oceans surface area (Gurney et al. 2023).

2.1.1 Marine Protected Areas (MPAs)

MPAs are conservation tools intended to protect biodiversity, promote healthy and resilient marine ecosystems, and provide societal benefits (Grorud-Colvert et al. 2021). MPA's can play a crucial role in meeting legal obligations under frameworks such as the Birds and Habitats Directive (BHD), the Marine Strategy Framework Directive (MSFD) and the Nature Restoration Regulation (NRR). Key findings described in the thesis of Breuer (2024) focussing on Marine Protected Areas in the Dutch North Sea, indicate that MPAs have various ecological and socio-economic benefits; some of which are increasing biodiversity, enabling population recovery by preserving adult fish and sensitive species, increasing climate change mitigation and resilience through habitat protection and restoration, promoting tourism and recreation revenue, fostering sustainable fisheries, making room for research, education and acting as a buffer for other ecosystem uses, ensuring ecological coherence and connectivity between populations, serving as refugia or refuge areas and acting as reference areas to study ecosystems with minimal human interference.

An important note is that the effectiveness of an MPA is hugely dependent on proper management (Breuer 2024). Although a MPA does not necessarily imply an area in which all human activities are excluded, in many cases it does imply that some, or most, such activities will be at least controlled or regulated (United Nations 2015).

The commitment first made by many Member States to a target for such protected areas was at least 10% of the areas under their jurisdiction by 2020, i.e. Aichi Target 11 (UNEP/CBD 2010), see section 1.1. The current target, set for 2030, is to protect 30% of marine and coastal areas and at least 10% of sea to be under strict protection (European Commission 2021). A recent assessment by Aminian-Biquet et al. (2024) showed that in 2022, MPAs covered 11.4% of EU waters, 0.2% were fully (i.e. strictly) or highly protected and 86% showed low protection levels or incompatibility with conservation. MPAs can be designated under EU regulations, i.e. the Habitats Directive and/or the Birds Directive (Natura 2000 areas) and under the Marine Strategy Framework Directive (MSFD areas). Under currently adopted policies 32.4% of the marine area on the Dutch continental shelf can count as MPA (Schmidt et al. 2023).

Furthermore, under the OSPAR Convention, efforts are being made to establish a network of MPAs in the northeast Atlantic Ocean (OSPAR Commission). This network-based approach highlights the significance of collaboration and connectivity in marine conservation efforts.

2.1.2 Other Effective area-based Conservation Measures (OECMs)

According to the definition adopted under the Convention on Biological Diversity, OECM means "a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio-economic, and other locally relevant values" (Convention on Biological Diversity 2018). OECMs may therefore include areas which have some form of legal protection that is not related to the protection of habitats and species (e.g. areas designated for water protection, flood prevention areas, agroforestry landscapes, military areas with

restricted access, fisheries restriction measures, underwater cables sites) but indirectly promote the conservation of biodiversity (European Commission 2022).

OECMs can be counted towards the EU conservation target if (European Commission 2022):

- the area is covered by a national or international legislative or administrative act or a contractual arrangement aiming to achieve long-term conservation outcomes;
- conservation objectives and measures are in place; and
- effective management and monitoring of the biodiversity in the area is in place.

In addition, under the OSPAR framework, efforts are being made to include OECMs within the OSPAR network of Marine Protected Areas. Currently, no OECMs have been designated in the Dutch EEZ.

2.1.3 Ecologically or Biologically Significant marine Areas (EBSA)

In order to support effective policy action by countries and competent international and regional organizations, it is critical to build a sound understanding of the most ecologically and biologically important ocean areas that support healthy marine ecosystems. In 2008, the ninth meeting of the Conference of the Parties to the Convention on Biological Diversity (Convention on Biological Diversity 2008) adopted scientific criteria for identifying Ecologically or Biologically Significant marine Areas (EBSA) in need of protection in open-ocean waters and deep-sea habitats. The EBSAs are special areas in the ocean that serve important purposes, in one way or another, to support the healthy functioning of oceans and the many services that it provides. The EBSA criteria are (Convention on Biological Diversity 2008):

i. Uniqueness or Rarity
ii. Special importance for life history stages of species
iii. Importance for threatened, endangered or declining species and/or habitats
iv. Vulnerability, Fragility, Sensitivity, or Slow recovery
v. Biological Productivity
vi. Biological Diversity
vii. Naturalness

Application of the EBSA criteria can thus help to prioritize areas most likely to benefit from protection. At the 16th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP16) in October 2024, updated modalities were adopted to describe and integrate EBSAs into CBD databases, strengthening their role in marine conservation and biodiversity targets.

2.1.4 Ecosystem-Based management including Marine Spatial Planning (EB-MSP) and Cumulative Impact Assessment (CIA)

The CBD initiative for area-based planning, including MPAs, to protect marine biodiversity, has broadened to inform ecosystem-based management including marine spatial planning (EB-MSP) within and beyond national jurisdictions (Dunn et al., 2014). Cumulative Impact Assessments (CIAs) and their recognition of the potential impacts on marine biodiversity caused by anthropogenic pressures (Halpern et al., 2015), have led to growing awareness and efforts to improve the governance required for EB-MSP.

The CIA method SCAIRM (Spatial Cumulative Assessment of Impact Risk for Management) (Piet et al., 2023) introduces Impact Risk (IR) as the key concept that allows cumulation across pressures. There is a wealth of categorical risk-based approaches that have estimated IR in various guises (Knights et al. 2015; Piet et al. 2015; 2017; 2019; Borgwardt et al. 2019). Piet et al. (2021) recently provided a roadmap towards a fully quantitative calculation of IR, defined as the change in equilibrium state (i.e. biomass or abundance compared to an undisturbed state) of the receptor caused by a stressor thus providing a major advancement from the previous estimates of IR as it now becomes tangible and can be readily understood and interpreted, e.g. in relation to IUCN criteria (IUCN, 2012), by any recipient of the assessment outcome. Vulnerability was defined by Weißhuhn et al. (2018) as the potential for loss (Adger, 2006; Brooks, 2003; Füssel, 2007; IPCC, 2014) based on exposure (=probability of a hazard), sensitivity (=susceptibility to this hazard), and adaptive capacity (=ability to cope with the hazard and its consequences) (Frazier, 2014; Füssel, 2007; Turner II,

2003). Adopting this definition then the IR as calculated by SCAIRM is identical to vulnerability (Piet et al. 2023) and can be applied as an EBSA compliant assessment outcome to guide EBA-MSP.

2.2 Strictly protected areas

2.2.1 EU guidelines

The EU has issued guidelines on what would be 'strict protection' and defined strictly protected areas as: "fully and legally protected areas designated to conserve and/or restore the integrity of biodiversity-rich natural areas with their underlying ecological structure and supporting natural environmental processes. Natural processes are therefore left essentially undisturbed from human pressures and threats to the area's overall ecological structure and functioning, independently of whether those pressures and threats are located inside or outside the strictly protected area" (European Commission 2022).

These guidelines contain references to, among other things, IUCN categories of protected areas (Day et al. 2012). The concept of strict protection is present in the IUCN 'Guidelines for Applying Protected Area Management Categories', and it is often associated with the definitions of categories Ia: strict nature reserve, Ib: wilderness area, and II: national park (as part of the zoning). According to the criteria for strictly protected marine areas in the context of the EU Biodiversity strategy, the definitions of categories Ia and Ib in the IUCN guidelines are largely in line with the objective of leaving natural processes essentially undisturbed to respect the areas' ecological requirements (Nature Conservation Unit, DG Environment 2024). The definition of category II allows for a process of zoning, in which strict protection does not necessarily apply to the whole protected area (Nature Conservation Unit, DG Environment 2024). Strictly protected areas are a subset of MPAs, characterized by minimal human influence on natural processes, where only highly restricted activities are permitted. In these areas, natural processes are allowed to proceed without the disturbance caused by human activities in those areas but acknowledging that some disturbance may still occur from dispersing pressures originating outside the areas, e.g. contaminants or invasive species. In these areas, however, certain limited and well-regulated activities that do not disturb or do enhance natural processes are allowed. This may include scientific research, natural disaster prevention, control of invasive species, and controlled recreational activities, provided that they fit within the conservation objectives of the area and are assessed on a case-by-case basis (Cheilari 2023).

2.2.2 MPA Guide

In addition to the EC guidelines (2022), the MPA guide by Grorud-Colvert et al. (2021) can be used to assess the current level of protection achieved in designated marine areas as well as the future level of protection after the implementation of additional spatial restrictions of human activities and their pressures. As such it can be applied to categorize MPAs by the level of protection they offer. The MPA guide framework, although not part of the EC guidelines for strict protection, may serve as a valuable tool for gaining insight into improvements in protection levels, thereby demonstrating efforts to achieve set goals. The MPA guide has been introduced as a science-driven framework to address the confusion caused by the many different MPA types occurring in international agreements and their different expected outcomes and aid design and evaluation of effectiveness of MPAs (Grorud-Colvert et al. 2021).

Grorud-Colvert et al. (2021) distinguish different categories of protection: 'fully protected', 'highly protected', 'lightly protected', 'minimally protected', based on the presence/occurrence of seven activities and their impacts. According to Grorud-Colvert et al. (2021), full protection means that fishing, mining, dredging & dumping and anchoring are not allowed and the maximum permitted impact due to the presence of infrastructure, aquaculture and non-extractive activities must be minimal (**Figure 1**).

Figure 1 *Level of protection based on maximum allowed impact of seven potential activities in MPAs (Grorud-Colvert et al. 2021).*

2.2.3 Approach for strict protection in previous Dutch studies

Complying to the above-mentioned EU Strict Protection Guidelines (European Commission 2022) and the Full Level of Protection of the MPA guide (Grorud-Colvert et al. 2021), the following criteria were applied by Schmidt et al. (2023) to identify strictly protected marine areas in the Netherlands:

1. Areas with an Access Restriction Decision (TBB) and specific fishing restrictions in Natura 2000 areas (VIBEG, Ministry of Economic Affairs, 2017) with a permanent closure (year-round).
2. A limited number of activities are permitted because they are necessary for management and maintenance, fauna management, or research and monitoring.

It should be noted that a brief evaluation of strict protected areas was carried out by Schmidt et al. (2023) due to the limited time available. The authors note that a more detailed evaluation may lead to a different outcome regarding the composition of the list of strictly protected areas and the resulting total area of strictly protected marine area. Schmidt et al. (2023) only focussed on fishing restrictions and "closed areas" (areas only allowing management and maintenance activities), whereas the MPA guide offers a more elaborated approach that includes other activities than fishing. In the underlying study the MPA guide will thus be applied providing a wider conservation perspective compared to Schmidt et al. (2023). This is further described in Chapter 3 (Assessment approach) of this report.

2.2.4 Approach for strict protection by other North Sea countries

The North Sea basin comprises EU Member States (Belgium, Denmark, Germany, the Netherlands) as well as non-EU countries (Norway and the United Kingdom). The Greater North Sea region also includes the Skagerrak, Kattegat and the English Channel and therewith also Sweden and France. Besides the Netherlands, these other EU member states are also subjected to the specific requirement under the EU Biodiversity Strategy 2030 for at least 10% of their marine waters to be under strict protection.

On 16 April 2024 an online Networking Event on the 10% strict protection target of the EU Biodiversity Strategy 2030 in the marine environment took place, hosted by the Nature Conservation Unit of DG Environment (NatureBureau, CEEweb 2024). Participants indicated there is still a scope for misinterpretation in terms of strict protection. There are still many doubts about what activities should be allowed and which should not. Moreover, there is a need for discussion between Member States about their national criteria and to share concrete examples of strictly protected sites and how these have been designated/are being managed, controlled, and monitored (NatureBureau, CEEweb 2024).

The approach of **Belgium** to get to 10% "strict" protection sits within the ongoing fisheries measures negotiation (Pecceu et al. 2021). In Belgium, strict protection refers to the exclusion of all bottom-contacting gears. The Belgian fisheries restriction zone is still under preparation and negotiation and is expected to be presented as a delegated act to the EU in 2025. In addition, Belgium works on nature restoration, focussing on gravel beds, flat oyster beds, Sabellaria beds and Lanice aggregations in silty sands[2].

Denmark reported in their Biodiversity pledge that 11 Marine Atlantic areas in the Danish EEZ will be under strict protection (Source: EU Reportnet 3.0[3]). These are all new national designated protected area which will not be part of Natura 2000. The measures and conservation objectives have not been decided for the areas yet. In their presentation at the Networking Event on the 10% strict protection target (Falk Kallenbach 2024), Denmark indicated that the following activities are allowed in their strictly protected areas:

- Shipping (and activities necessary for shipping)
- Cables
- Nature restoration
- Limited recreational fisheries from land/boat (2 fishing rods per person, max. 4 fishing rods per boat)
- Marine archeological conservation
- Recreational activities such as bathing
- Hunting
- Military activities

Germany also applies fisheries measures to declare 10% of their sea as strictly protected. The fisheries management measures[4] are located in the German EEZ in the North Sea Natura 2000 sites Sylt Outer Reef and Eastern German Bight. In Germany, 25% of the total area of the Amrum bank is targeted to achieve 10% strict protection, excluding all types of fishing year-round in the northern part of the Sandbank within the Natura 2000 site Sylt Outer Reef. Similar to Belgium, the official areas for achieving 10% strict protection are currently under negotiation and will be presented to the EU in the near future.

In **Sweden**, on land (terrestrial) strict protected areas are related to IUCN category I – IV, together with legal protection for nature values (Aunapuu 2024). It is noted that this relation between IUCN categories and strict protection cannot be used for protected areas in the aquatic environment because the regulations for aquatic values often are less specific than for terrestrial values (Aunapuu 2024). Sweden describes strictly protected areas in the marine environment as (Tingström 2024):

- Sites with fisheries ban
- Additional MPAs designated by County Administrative Boards

[2] https://www.health.belgium.be/nl/natuurherstel-onze-noordzee

[3] https://reportnet.europa.eu/public/dataflow/703

[4] Joint Recommendation regarding Fisheries Management Measures under Article 11 and 18 of the Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy (CFP-Regulation) within the Natura 2000 sites Sylt Outer Reef, Borkum Reef Ground and Dogger Bank as Special Area of Conservation under the Habitats Directive 92/43/EEC of 21 May 1992, and the Natura 2000 site Eastern German Bight as Special Protection Area under the Birds Directive 2009/147/EC of 30 November 2009 (https://www.thuenen.de/media/institute/sf/Aktuelles/Diverses_A_S/Natura2000/JR_2018-10-29_final.pdf).

- Purpose/Objective for the protected area is key – case by case
- Zones within an MPA could be counted as strict protected if necessary conservation measures are in place

As indicated in their presentation at the Networking Event on the 10% strict protection target (Le ministère de la Transition Écologique et de la Cohésion des Territoires 2024), **France** currently focusses on highly protected areas (where pressures generated by human activities that may compromise the conservation objectives are eliminated or significantly reduced) as opposed to strict protection (where natural processes are left essentially undisturbed). There has been no identification of strictly protected areas in France.

2.3 Protected areas in the Dutch part of the North Sea

The development of an ecological network of protected areas is one of the main instruments to maintain and restore the ecosystem in the North Sea in order to achieve legal conservation objectives. In the Dutch part of the North Sea, a network of protected marine areas is being created, covering the diversity of the various ecosystems (Government of the Netherlands 2022). The current protected areas in the Dutch North Sea are designated under the Habitats Directive and/or Birds Directive (Natura 2000 areas) and under the MSFD (MSFD areas), see **Table 1**. There are currently no marine areas in the Netherlands with other effective area-based protection measures (OECM) (Schmidt et al. 2023).

In the Dutch North Sea, the ecologically valuable coastal areas were first designated as protected Natura 2000 areas around 2009 (North Sea coastal zone, Raan Flats and Voordelta). It was until 2016 that Natura 2000 areas were designated further from the coast (i.e. Frisian Front, Dogger Bank and Cleaver Bank) and in 2021 another offshore Natura 2000 area was added (Brown Ridge). The areas have been designated for various Habitat Directive species, habitat types and/or Bird Directive species. Most of the coastal and offshore areas have a management plan in effect. The management plan for Brown Ridge is scheduled for preparation in 2025-2029.

Under the MSFD, MPAs are expected to contribute to the achievement of good environmental status (GES). Within the framework of the MSFD for the Dutch part of the North Sea 2012-2020 targets have been set under D6 (seabed integrity) to improve the quality of the deeper silt-rich parts of the Dutch North Sea, as well as a target to protect 10 to 15% of the seafloor from significant human disturbance (Ministerie I en M en EZ 2015). To reach these targets, the relatively deep and silt-rich areas in the Frisian Front and Central Oyster Grounds were proposed as 'seafloor protection area'. The follow-up (2022-2027) MSFD program of measures (Government of the Netherlands 2022) has not only extended the areas in the Frisian Front and Central oyster Grounds but also introduced a stricter protection regime (no fishing allowed) for specific parts of the areas and included the Borkum Reef Grounds. In the future, the Southern Dogger Bank will also be protected under the MSFD.. These are ecologically valuable areas specifically designated to protect seabed integrity. The MSFD programme of measures (which was established as part of the North Sea Programme 2022-2027) also includes the measures that contribute to maintaining or achieving GES, see the paragraph further below under “Specific restriction and/or measures in MPAs on the Dutch North Sea”.

None of the MPAs in the Dutch North Sea (Natura 2000, MSFD) are considered as strictly protected areas by Schmidt et al. (2023), based on their interpretation of the EC (2022) definition and (a limited) application of the MPA guide (see sections 2.1.1 and 2.1.2 above). The Natura 2000 designation mainly indicates the reason (i.e. bird species for the Birds Directive, other species or habitat types for the Habitats Directive) for choosing an area but without restrictions on the use of or access to the marine protected area. Such regulations are usually part of the management plan. These are drawn up/active for approximately six years and are revised thereafter. For the Voordelta and Raan Flats the management plans for 2015-2021 (Rijkswaterstaat 2016b; 2016a) have been extended in March 2022 and the management plan for the North Sea Coastal Zone for 2016-2022 (Rijkswaterstaat 2016c) has been extended in November 2022 for another 6 years (or until an update is in place). The offshore areas Frisian Front, Dogger Bank and Cleaver Bank have management plans that are in place for the period 2023-2029 (Rijkswaterstaat 2023b; 2023a; 2023c). For the Brown Ridge, a management plan is currently in preparation. There are three categories distinguished for

activities within the offshore MPAs, that indicate the conditions under which the activities are allowed (Rijkswaterstaat 2023d):

- Permit requirement: seismic research, new mining drilling, mineral extraction, air force shooting activities, laying and removing cables and pipelines, project-based research and monitoring;
- Without a permit requirement: shipping, disaster and incident management;
- Exemption from the permit requirement under certain conditions: Normal mining operations; navy shooting activities; clearing explosives; echo survey, military use of sonar systems, maintenance of markers/buoys, cables and pipelines, regular research and monitoring.

Separate rules apply to fishing outside the 12-mile zone, where the permits are regulated under the European Common Fisheries Policy (EU Vo 1380/2013). Certain parts of these areas are closed to international fishing to contribute to achieving nature objectives (see also the text below). These international measures, in the form of fishing restrictions, are outlined in a delegated act issued by the EU and thus have direct legislative effect. The management plans refer exclusively to these international measures (Rijkswaterstaat 2023d).

Table 1: *List of marine protected areas in the Dutch part of the North Sea designated under Birds and Habitats Directives (Natura 2000) and/or Marine Strategy Framework Directive (MSFD) regimes (Si = Sea-floor integrity; BD = Birds Directive area; HD = Habitats Directive area; BHD = Birds and Habitats Directives area). Multiple entries for one site refers to different zones. Areas are presented in hectares (ha) and as a percentage of the total sea area in the Netherlands (%). Number of decimal places shown is such that even the smallest areas do not read zero (adapted from Schmidt et al. 2023)*

Site name (English)	Site name (Dutch)	Designated	Type	Area (ha)	Area (%)*
Borkum Reef Grounds	Borkumse stenen	MSFD	Si	68384	1.1%
Brown Ridge	Bruine Bank	N2000	BD	136624	2.2%
Cleaver Bank	Klaverbank	N2000	HD	154301	2.5%
Dogger Bank	Doggersbank	N2000	HD	473620	7.6%
Southern Dogger Bank	Zuidelijke Doggersbank	MSFD	Si	52831	0.9%
Frisian Front	Friese Front	N2000	BD	122498	2.0%
Frisian Front	Friese Front	N2000+MSFD	BD+Si	165777	2.7%
Frisian Front subarea 2	Friese Front subarea 2	MSFD	Si	36495	0.6%
North Sea Coastal Zone	Noordzeekustzone	N2000	BHD	144435	2.3%
Central Oyster Grounds	Centrale Oestergronden	MSFD	Si	206280	3.3%
Raan Flats	Vlakte van de Raan	N2000	HD	17515	0.3%
Voordelta	Voordelta	N2000	BHD	83512	1.3%

* the extent of marine area in the Netherlands (including the North Sea, the Southwestern Delta and the Wadden Sea) covers a total of 6,230,278 ha

Specific restriction and/or measures in MPAs on the Dutch North Sea
Although, according to the definition used within this report, none of the MPAs can be considered strictly protected, there are some areas (i.e. zones within the MPAs) where access restriction decisions are in force: areas near the coast, **Table 2**; and, more recently, restrictions in the Exclusive Economic Zone (EEZ), Table 3 and **Figure 2**.

Because the quality of benthic habitats is insufficient and physical disturbance is considered the main threat to benthic habitats, seabed protection areas have been established (within the North Sea Coastal Zone, Raan Flats, Voordelta, Dogger Bank, Cleaver Bank, Frisian Front and Central Oyster Grounds) in which seabed-disturbing fisheries are excluded (OFL 2021). In the North Sea Agreement, the following agreements were made about area-based measures (Government of the Netherlands 2022)[5]:

- Existing agreements about designating and protecting offshore nature areas are implemented and enforced.
- In 2023, 13.7 percent of the ecologically valuable areas in the Dutch North Sea will be completely free from seabed disturbance caused by fishing. This percentage will rise to 15 percent in 2030. Within this area, a section the size of 2.8 percent of the North Sea will be closed to all forms of fisheries.
- Enlargement of the area on the Dogger Bank closed to seabed-disturbing fishery by 557 km^2.
- Ban on Scottish and Danish seining in the management zones of the Dogger Bank.
- Enlargement of the management zones on the Cleaver Bank, as a result of which an additional area of 552 km^2 will be closed to all forms of seabed-disturbing fishery.
- The MSFD areas Central oyster Grounds and Frisian Front will be enlarged by 1062 km^2 and 1014 km^2, respectively. The part that overlaps with the BD area Frisian Front will be closed to all forms of fisheries. This part will be expanded to 1649 km^2.
- The new seafloor protection area Borkum Reef Grounds has a surface area of 683 km^2.[6]
- Designation of 100 km^2 area for oyster recovery within the no fishery zone of the Frisian Front.

Additional area-based measures for birds from the North Sea Agreement are (Government of the Netherlands 2022):

- The Brown Ridge was designated as a Natura 2000 area under the Birds Directive in 2021.

The conservation measures in these areas will be implemented via the Article 11 procedure from the Common Fisheries Policy. This procedure has been followed for the fisheries management measures currently in place for the areas in the EEZ (see text box below). In addition to the agreements in the North Sea Agreement, the area-based protection in the Natura 2000 area 'North Sea Coastal Zone' will be changed (Government of the Netherlands 2022). The areas where an existing ban on seabed-disturbing fishery already applies and the areas to which a general ban on fishing applies will be changed, in accordance with the measures that will be included in the vision for the future of shrimp fisheries, which is expected in 2025..

[5] The above figures are based on the North Sea Agreement (2022). In the partial revision of the North Sea Programme 2025, some areas and percentages will be adjusted. For the most up-to-date information, please use the (final) partial revision of the North Sea Programme.

[6] This reflects an updated area discussed during the North Sea Consultation (NZO) discussions in 2022. Earlier references, such as in the North Sea Agreement (NZA), cited a different area of 653 km², which was later revised.

Process under Article 11 of the Common Fisheries Policy

For closing protected areas to fishing in the EEZ, a process under Art. 11 of the Common Fisheries Policy (CFP) must be followed, as this falls under the exclusive competence of the European Commission. To date, the Netherlands has submitted three joint recommendations (JRs) to the European Commission. On 17 June 2019, the Netherlands together with Belgium, Denmark, France, Germany, Sweden and United Kingdom submitted a joint recommendation regarding fisheries management measures in the Dutch areas Cleaver Bank (NL2008002 Klaverbank SAC), Frisian Front (NL2016166 Friese Front SPA, subarea 1), and the marine protected areas of Frisian Front subarea 2 and Central Oyster Grounds. These measures came into force on 8 March 2023 by decision of the European Union (European Commission, 2023). In the Frisian Front and Central Oyster Grounds, where the seabed is protected by the MSFD, and the Cleaver Bank, which is protected by the Habitats Directive (reefs, habitat type 1170), the use of bottom contacting gear is not allowed. In the part of the Frisian Front that has been designated a Birds Directive Site to protect the common guillemot, gillnets and entangling nets are not allowed from the 1st of June to the 30th of November each year. A second joint recommendation for the Dogger Bank together with Germany was submitted in October 2023, with these measures not yet in force. Additionally, a third joint recommendation for Borkum Stones, Frisian Front, Cleaver Bank, Central Oyster Grounds, Brown Bank, and Southern Dogger Bank was submitted in December 2024, with these measures also not yet in force. These measures will contribute to compliance with the obligations under Article 6 of the Habitats Directive, Article 4 of the Birds Directive and Article 13(4) of the Marine Strategy Framework Directive (European Commission. 2023).

Table 2: *Areas and/or zones in the Dutch coastal North Sea with additional protection based on access restriction decisions that could be considered as strictly protected according to Schmidt et al. (2023)*

Area/zone name	MPA	Area (ha)	Part of total Dutch marine waters* (%)
Petten (VIBEG 2)	North Sea Coastal Zone	3087.5	0.050%
Stortemelk (VIBEG 2)	North Sea Coastal Zone	1982.5	0.032%
Terschelling zuid (VIBEG 2)	North Sea Coastal Zone	5251.0	0.084%
Ameland (VIBEG 2)	North Sea Coastal Zone	1768.0	0.028%
Rottum (VIBEG 2)	North Sea Coastal Zone	1234.8	0.020%
Bollen van de Ooster	Voordelta	1428.7	0.023%

* Marine waters in the Netherlands are North Sea, Wadden Sea, Eastern Scheldt and Western Scheldt with a total area of 6,230,278 ha (Schmidt et al. 2023). Note that the North Sea (5,877,439 ha) covers 94% of the marine waters, the Wadden Sea (271,801 ha) 4% and the Eastern- and Western Scheldt (36,981 and 44,055 ha, respectively) each 1%.

Table 3: Areas and/or zones in the Dutch offshore North Sea with fisheries conservation measures (areas and their size are from OFL (2020)). See also ***Figure 2***

Area/zone name	MPA	Area (ha)	Part of total Dutch marine waters* (%)
Friese Front I	Frisian Front	36565.8	0.6%
Friese Front II	Frisian Front	165797.9	2.7%
Centrale Oestergronden	Central oyster grounds	206328.8	3.3%
Klaverbank	Cleaver Bank	124090.0	2.0%

* Marine waters in the Netherlands are North Sea, Wadden Sea, Eastern Scheldt and Western Scheldt with a total area of 6,230,278 ha (Schmidt et al. 2023). Note that the North Sea (5,877,439 ha) covers 94% of the marine waters, the Wadden Sea (271,801 ha) 4% and the Eastern- and Western Scheldt (36,981 and 44,055 ha, respectively) each 1%.

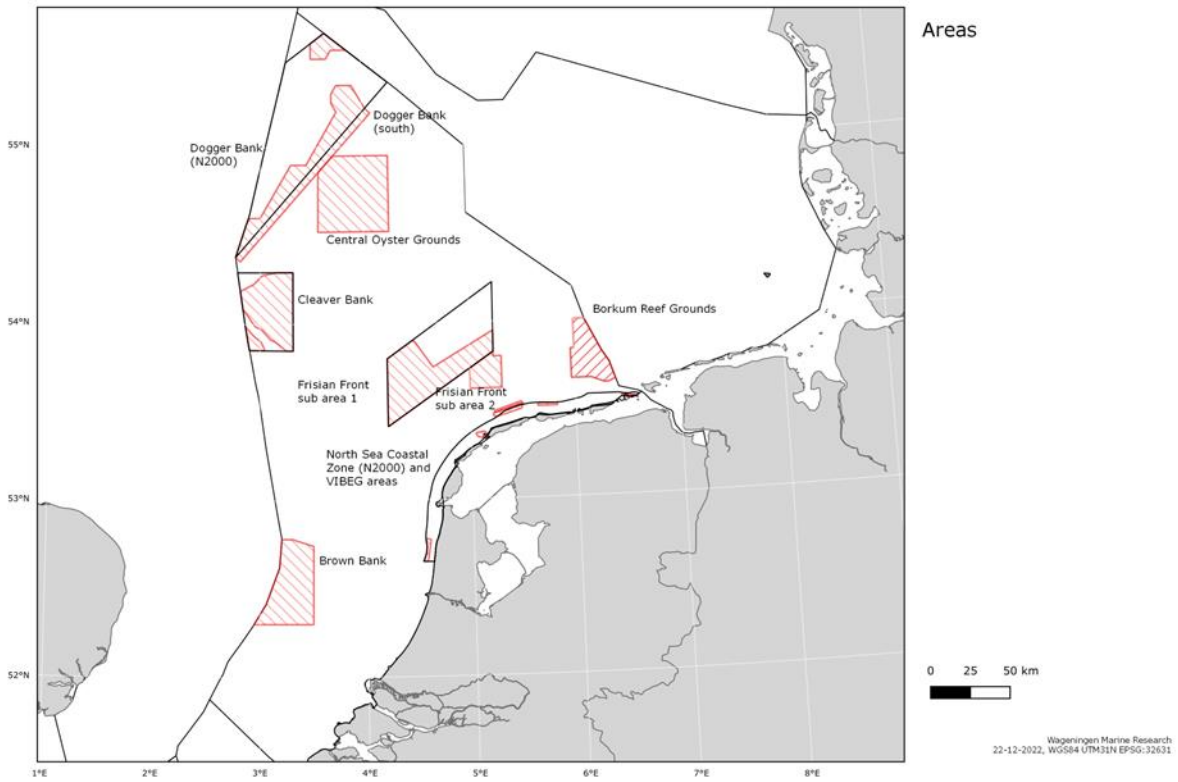

Figure 2: *Planned marine protected areas and fishery management zones in the Dutch part of the North Sea (Jongbloed et al. 2023). Not all fishery restrictions are yet in effect.*

3 Assessment approach

To prioritize areas for biodiversity protection and to identify potential areas for strict protection, while ensuring alignment with existing legal obligations under frameworks such as the Birds and Habitats Directive (BHD) and the Marine Strategy Framework Directive (MSFD), we adopted a risk-based approach. This approach estimates the potential impact of all human activities and their pressures on relevant species and habitats. It reflects the risk of not achieving key policy objectives for their status, such as Good Environmental Status (GES) and favourable conservation status (FCS). This risk-based approach is then applied to assess the reduction in risk that can be achieved through various spatial management regimes. The application of this formal risk-based assessment approach should ascertain an unambiguous assessment of the various spatial management regimes. The assessment approach consists of the following steps:

1. Identification of relevant species and habitats, based on their protection by the legal frameworks: BHD, MSFD and the EU Nature Restoration Regulation.
2. Selection of species and habitats based on the most recent MSFD (Article 8/9) and BHD (Article 12 and Article 17, respectively) status assessments. The species/habitats with the lowest conservation status should be prioritized.
3. Develop and apply an approach that unambiguously identifies which MPAs under various protection regimes (including strict protection) would contribute most to the conservation and recovery of the selection of species and habitats from the previous step.
4. Identification of species and habitats for which spatial distributions are available as this is a key requirement for area-based conservation measures. If spatial information is not available the default approach is to assume an even distribution across the Dutch EEZ and apply the SCAIRM (a CIA method, explained in detail in paragraph 3.2.1) to the ecosystem components to which the specific species and habitats belong. The aim is to work with a selection of species/habitats that covers all the main ecosystem components according to the MSFD. The aggregation across all ecosystem components assuming an equal weighting is an indication of the additional protection achieved for biodiversity in general.
5. Use Impact Risk calculated by SCAIRM as according to Piet et al. (2023) this captures what is arguably the main Ecologically or Biologically Significant Areas (EBSA) criterion to a "Vulnerability, Fragility, Sensitivity, or Slow recovery" to determine the restoration potential of the potential MPAs. As this is based on the selected species or habitats this also fulfils other EBSA criteria. A bigger decrease in Impact Risk indicates a higher restoration potential.
6. To align the approach with approaches in other North Sea countries we distinguish regimes of
    a. passive restoration, i.e. exclusion/mitigation, of fisheries as well as other activities according to the MPA guide (Grorud-Colvert et al. 2021).
    b. active restoration focussing on flat oyster beds and Sabellaria beds.
7. Estimate for each selected species/habitat the restoration potential per MPA and the regime applied to achieve strict protection. The combination of the conservation status and the restoration potential is then applied to indicate the species/habitats that can be expected to benefit most from strict(er) protection.
8. Identify what proportion of the socio-economic activities will be affected by the various protection regimes
9. Provide advice for the candidate 10% strict protection MPAs to align with legal obligations under frameworks such as the Birds and Habitats Directive (BHD), the Marine Strategy Framework Directive (MSFD) and existing measures.

These steps are further elaborated in the sections below.

3.1 Selection of protected species and habitats

This study focusses on the species and habitats that fall under the frameworks: BHD, MSFD and the EU Nature Restoration Regulation. Species and habitats protected under the BHD in the Dutch marine waters have been recently evaluated by Schmidt et al. (2023), which is used to derive a list of species and habitats protected under the BHD. To address the MSFD, the most recent Initial Assessment (Ministerie I en W en LVVN in prep.) is utilized, as well as the programme of measures (Government of the Netherlands 2022). The EU Nature Restoration Regulation is based on the Regulation (EU) 2024/1991 including Annexes (European Commission 2024). In addition to these frameworks, the species and habitats that have been identified as in need of protection by the OSPAR Commission by inclusion on the OSPAR List of Threatened and/or declining species and habitats (Agreement 2008-06) are also considered relevant.

This study is limited to the marine (open water) part of the Dutch North Sea conform the land-sea border (baseline) that is set where the sea falls dry at low tide (low water line). Species and/or habitats for which the distribution does not cover the open water of the North Sea are excluded, for example, dunes, intertidal (littoral) habitats, bird species that are wading- or grazing feeders.

Urgency for strict(er) protection of species and habitats based on status assessments
For each of the species and habitats, the relevance for extra protection is assessed based on their conservation status as reported under the BHD and MSFD. There are no status assessments available for the recent EU Nature Restoration Regulation. Only the species and habitats that do not meet their policy objectives, i.e. bad/unfavourable environmental status (i.e. conservation target is not reached), are considered for additional strict protection. These species and habitats are then divided in two groups based on the evaluation by Schmidt et al. (2023) and underlying assessments: a) species and habitats urgently needing additional conservation measures and b) species and habitats in need of additional conservation measures (without urgency).

Mapping the species and habitats
As the potential strict protection management regimes are implemented in specific areas they can only be assessed for those species and habitats for which spatial distributions are available. As one of the characteristics of species in bad/unfavourable environmental status is that they often occur at low abundance and are therefore rarely observed in the monitoring programs that are at the basis of the spatial distribution maps. A default fall-back option applies where the ecosystem components (species groups, habitats) to which they belong (European Commission 2017) are assessed assuming an even distribution across the Dutch EEZ. For those species the outcome of the assessment is therefore entirely based on the degree to which the main threats affecting "their" ecosystem component (species group, habitat) are reduced through the protection regimes.

3.2 Level of protection based on Impact Risk

The MPA Guide by Grorud-Colvert et al. (2021) distinguish different categories of protection: 'fully protected', 'highly protected', 'lightly protected', 'minimally protected', based on seven activities and their impacts. In this study of the Dutch North Sea, we follow the MPA guide in that for each of the selected species/habitats the resulting decrease in Impact Risk (IR) from the exclusion of each of these seven activities from the different MPAs is assessed using the CIA method SCAIRM. By using SCAIRM, the cumulative impact of human activities on marine biodiversity in the North Sea can be expressed in terms of IR. By combining exposure to various pressures with information on the resilience and resistance of vulnerable species and habitats, areas can be identified where the potential cumulative impact on the ecosystem is highest. This can be used to select areas where a stricter protection regime can be effectively applied to the benefit of local biodiversity, and to select promising locations where a strict protection regime (the 10% target to align with legal obligations under frameworks such as the Birds and Habitats Directive (BHD) and the MSFD) can be achieved. The areas with strict protection are assumed to result in a complete or almost complete absence of human influence on natural processes (i.e. a very low IR). In these areas, natural processes can continue without disruption by human activities.

3.2.1 Cumulative Impact Analysis (CIA)

In SCAIRM, Impact Risk (IR) is the key output that allows cumulation across different pressures and is defined as the change in equilibrium state (i.e. biomass or abundance) of the receptor caused by a stressor (Piet et al., 2021a; 2023). IR can be estimated per impact chain as Exposure*Effect Potential (Figure 3) and can be assessed using the spatial distributions of the stressor (i.e. activities-pressure), the spatial distributions of the receptor (i.e. ecosystem component) and several population dynamics parameters. Risk-based approaches have often been at the basis of CIAs for marine management (Stelzenmuller et al., 2018). The exposure-effect approach is the preferred risk-based approach when assessing existing and (more or less) continuous or frequently occurring pressures (Smith et al., 2007 and Knights et al., 2015). The calculation of exposure and effect potential in SCAIRM includes many known concepts often used in the context of environmental risk assessments (Piet et al. 2023). The exposure in space and time was defined as the likelihood that the receptor (i.e. ecosystem component) is co-occurring with the stressor (i.e. pressure caused by an activity) (Piet et al., 2021). The effect potential can be assumed conceptually identical to sensitivity (Laffoley et al., 2000) also defined as the susceptibility to hazard (Weißhuhn et al. (2018)), and is a function of resistance and resilience (Tillin et al., 2010). Data from Piet et al. (2023) for the Greater North Sea is used as input for this study regarding the effect potential, assuming the Greater North Sea population dynamics parameters are similar for the Dutch part of the North Sea. To assess the exposure the spatial overlap is calculated by using data from EMODnet, human activities (European Marine Observation and Data Network n.d.) and species specific distribution data.

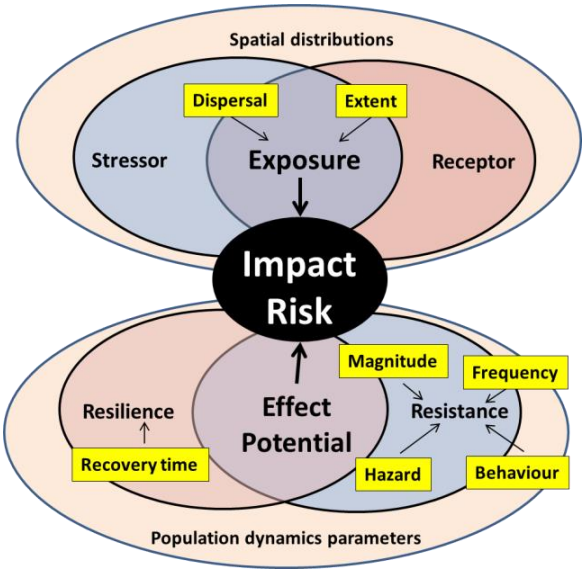

Figure 3: *Calculation of Impact Risk from Exposure and Effect Potential which, in turn, can be estimated from respectively the spatial distributions of the stressor (i.e. activities-pressure) and receptor (i.e. ecosystem component) and population dynamics parameters resilience and resistance if quantitative information is available. If lacking, these can be estimated from the boxed terms using categorical scores based on expert judgement. (Piet et al., 2023).*

More information on SCAIRM can be found in Annex 1.

3.2.2 Application of the MPA Guide to determine the protection level

The risk-based assessment approach includes all human activities that potentially impact the selected species and habitats. The protection level as determined by the strict protection definition, or rather the inverse i.e. level of human impact, is then determined following the MPA guide by Grorud-Colvert et al. (2021). This works with different levels of protection, ranging from "fully protected" (where no extractive or destructive human activities are allowed) to "minimally protected" (where human activities can continue almost undisturbed). The MPA guide includes a decision tree to determine the protection level of an MPA, or zone within a multi-zone MPA, based on activities that are allowed or not, and hence effectively excluded (Figure 4).

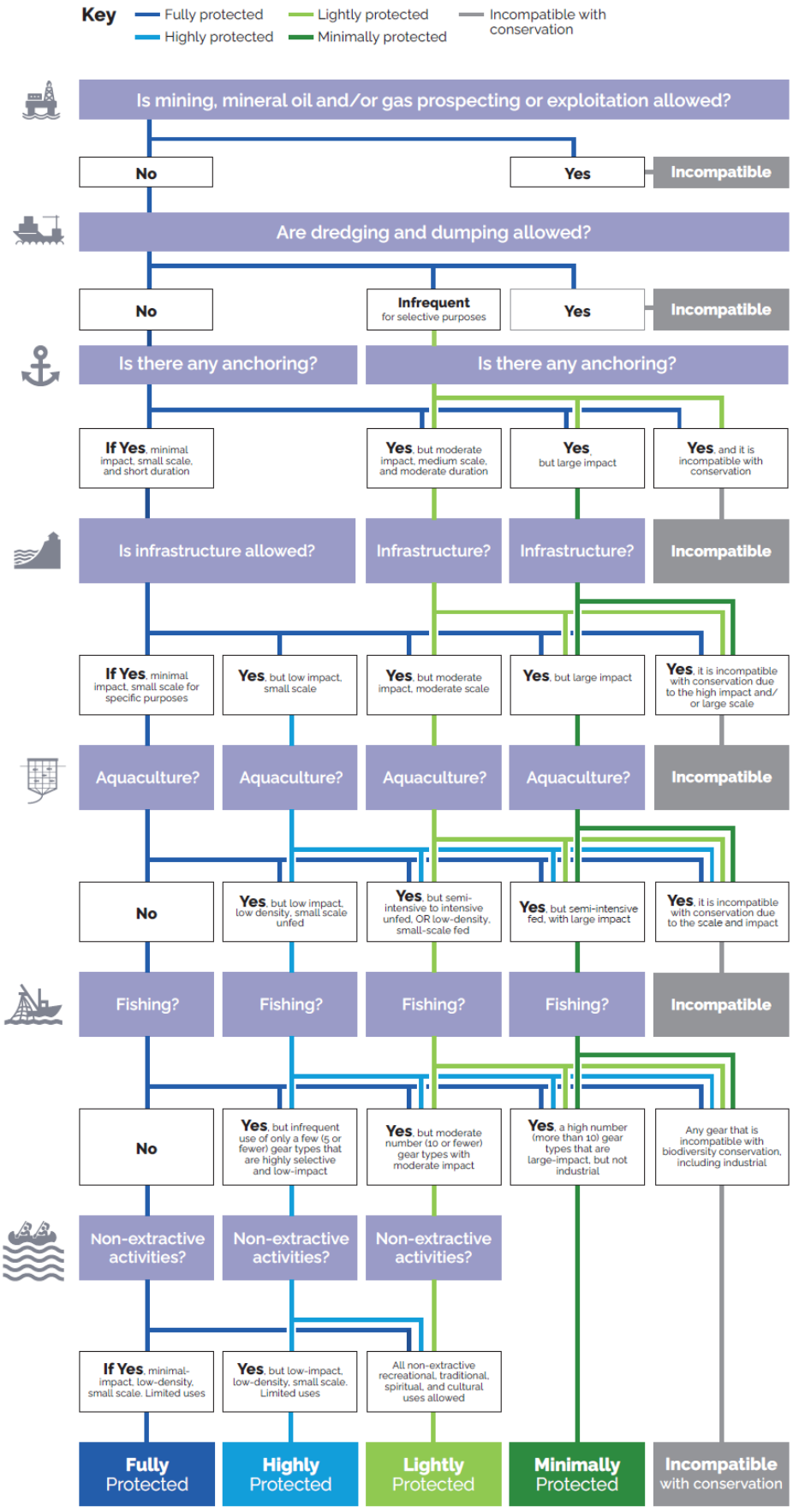

Figure 4: *Decision tree to determine the protection LEVEL of an MPA, or zone within a multi-zone MPA, based on activities that are allowed or disallowed. Answers to questions in this decision tree lead sequentially to categorizing a MPA or MPA zone into one of four LEVELS of protection: Fully, Highly, Lightly, or Minimally, based on maximum allowed impact of seven different types of activities (Grorud-Colvert et al. 2021).*

The MPA guide thus facilitates a categorization of the degree of protection, from minimally to fully (i.e. strictly) protected. SCAIRM is essentially a risk-based assessment calculating the risk that the specific habitat or species is impacted, i.e. Impact Risk (IR) by specific human activities, and where. This makes it possible to estimate the achieved reduction in IR from excluding specific activities (such as mineral extraction, fishing, aquaculture or dredging activities) in selected strict protection zones, i.e. MPAs.

The current level of protection for each MPA (including zones within MPAs) is assessed based on the Impact Risk as output from SCAIRM. Subsequently, potential levels of protection are explored by analysing the change in Impact Risk by excluding activities in (part of the) MPAs, using the MPA guide (Grorud-Colvert et al. 2021), see **Table 4**.

Table 4: *Maximum allowed impact of seven potential activities in MPAs at different levels of protection (adapted from Grorud-Colvert et al. 2021)*

Activity group	Full protection	High protection	Light protection	Minimal protection
1. Mining	No impact	No impact	No impact	No impact
2. Dredging & dumping	No impact	No impact	Moderate impact	Moderate impact
3. Fishing	No impact	Minimal impact	Moderate impact	High impact
4. Anchoring	Minimal impact	Minimal impact	Moderate impact	High impact
5. Infrastructure	Minimal impact	Low impact	Moderate impact	High impact
6. Aquaculture	Minimal impact	Low impact	Moderate impact	High impact
7. Non-extractive activities	Minimal impact	Minimal impact	Moderate impact	Moderate impact

While The MPA Guide (Grorud-Colvert et al. 2021) provides best practices for protected area management, it doesn't address every possible activity. Shipping, for instance, isn't explicitly covered because the right of innocent passage is mandated under international law and regulated by International Maritime Organization treaties, making it difficult for MPA authorities to restrict vessel movement. Nevertheless, in this report, shipping and military activities are included in the analysis to provide valuable insights into how these activities impacts relate to various species and species groups.

3.2.3 Spatial visualization and selection

By spatially mapping pressures and ecosystem components (such as species and habitats), areas can be identified that are most vulnerable and therefore have the highest priority for strict protection. By selecting only the MPAs in which the protection regimes will be applied the potential level of protection can be estimated for each of the species/habitats.

3.2.4 Proposed MPAs for 10% strict protection

Larger MPAs are generally expected to offer greater additional protection, provided they operate under a similar protection regime. However, the exclusion of the various socio-economic activities to achieve those levels of protection also come at a cost. As it is not in the remit of this study to consider the actual socio-economic costs, the selection of MPAs was based on the average potential protection per unit area within the MPA. This provides an indication of the efficiency in terms of the potential protection achieved versus the potential socio-economic costs and is considered more informative than the total potential protection for the entire MPA.

4 Results

4.1 Protected species and habitats

For proof of concept, a pragmatic choice is made where only those species were selected for which restoration is most needed. The criteria for this selection are outlined in Annex 4, primarily based on their current conservation status and their potential presence on the Dutch Continental Shelf. Additionally, the urgency of restoration measures and the potential for population or habitat recovery are considered. These factors are derived respectively from the conservation status and its trend, as well as the potential for reducing impact risk.

4.1.1 Habitats

The North Sea habitats that fall under the protection regimes of the HD, MSFD, NRR and/or OSPAR and that are not in good status are included in **Table 5**. The NRR (Annex II) covers all EUNIS-habitat types. For the habitat types that are not covered by the HD, good condition is not yet defined and hence the status is not (yet) reported. The MSFD covers all broad habitat types in the Descriptor D6 (Sea-floor integrity), for which GES is described as a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected (Commission Decision (EU) 2017/848 of 17 May 2017). Thus, the MSFD D6 can be considered as an overarching framework for the benthic habitats, although a specific target has been set to improve the quality of the deeper silt-rich parts by proposing the Frisian Front and Central oyster Grounds as 'seafloor protection area' (Ministerie I en M en EZ 2015). The burrowing megafauna in these areas may be part of the biotope 'Sea Pen and Burrowing Megafauna Communities', which is included in the OSPAR list (**Table 5**). In the Dutch part of the North Sea sea-pen (*Pennulata phosphorea*) is absent and this habitat type only consists of burrowing crustaceans (Bos and Tamis 2020). The OSPAR list indicates two other specific habitats (flat oyster beds and Sabellaria reefs) that are in need of protection (OSPAR 2008).

The HD includes two habitat types that are relevant for the open water of the North Sea: permanently submerged sandbanks and reefs. Permanently submerged sandbanks (H1110) occur in the shallow parts of the sea, and is protected in the Voordelta (H1110a&b), the North Sea Coastal Zone (H1110b) and the Dogger Bank (H1110c). Reefs (H1170) are marked by the presence of hard substrate (large stone/shell banks) that rises above the sediment surface. Habitat type 1170 is protected in the Cleaver Bank. Only one habitat, permanently submerged sandbanks, is categorised as urgently in need for protection measures.

For (spatial) analysis all benthic habitat types that are classified as sediment (i.e. not specified for their biotopes and excluding hard substrates) are grouped as "sublittoral sediment". This group also covers the soft sediments (NRR), permanently submerged sandbanks (HD) and benthic habitats (MSFD). To address specific biotopes (OSPAR List), habitat maps for flat oyster and Sabellaria (Sas et al. 2023) are used.

Table 5: *Protected North Sea habitats that are not in good status. Protection frameworks are: the Habitats Directive (HD) (Adams et al. 2020), the Marine Strategy Framework Directive (MSFD) (Ministerie I en W en LVVN in prep.), the Nature Restoration Regulation (NRR) (European Commission 2024) and/or the OSPAR List of Threatened and/or declining species and habitats (Agreement 2008-06) (OSPAR List). Habitats marked by an asterix (*) are considered "urgent" (i.e. urgently in need for protection measures as indicated by Schmidt et al. (2023))*

Name (English)	Name (Dutch)	Framework	Status
Permanently submerged sandbanks*	H1110C - Permanent overstroomde zandbanken	HD	Unfavourable -bad
Reefs	H1170 - Riffen	HD	Unfavourable -bad
Benthic habitats (using indicator species and diversity)	Benthische habitats (ahv indicatorsoorten en diversiteit)	MSFD (D6)	GES not reached
Pelagic habitats (using zooplankton and phytoplankton)	Pelagische habitats (ahv zoo- & fytoplantkton)	MSFD (D1)	GES not reached
Ostrea edulis beds	Platte oesterriffen	OSPAR list	Unknown
Sabellaria spinulosa reefs	Zandkokerwormriffen	OSPAR list	Rare (exact status unknown)
Sea-pen and burrowing megafauna communities	Zeeveer en gravende megafauna gemeenschappen	OSPAR list	Poor
Seagrass meadows on infralittoral sand (Atlantic Ocean)	Zeegrasvelden op infralitoraal zand (Atlantische Oceaan)	NRR Annex II	Not available
Reefs with bivalves in the circalittoral zone (Atlantic Ocean)	Riffen met tweekleppigen in de circalitorale zone (Atlantische Oceaan)	NRR Annex II	Not available
Calcareous algae meadows on infralittoral coarse sediment (Atlantic Ocean)	Kalkwiervelden op infralitoraal grof sediment (Atlantische Oceaan)	NRR Annex II	Not available
Fauna communities on circalittoral rocks (Atlantic Ocean)	Faunagemeenschappen op circalitoraal gesteente (Atlantische Oceaan)	NRR Annex II	Not available
Hydrothermal and cold submarine vents (6 types depending on zone and substrate)	Hydrothermale en koude submariene bronnen (6 typen afhankelijk van zone en substraat)	NRR Annex II	Not available
Soft sediments (not deeper than 1,000 meters) (14 types depending on zone and substrate type)	Zachte sedimenten (niet dieper dan 1000 meter) (14 typen afhankelijk van zone en substraat)	NRR Annex II	Corresponds to MSFD D6: GES not reached

4.1.2 Fish

Based on various policies, e.g. HD or NRR, and status assessments a selection of fish species are identified (**Table 6**). Improvement for these species is unlikely to come from the established MPAs and/or spatial information on their distributions is missing because these are rare species which hardly (if at all) are found in monitoring programs (e.g. basking shark and angelshark). However, considering the fact that the fish community was identified in the MSFD as not in GES because several of the "sensitive" fish species are still declining, the analysis was focussed on fish in general. This implies the assumption, instead of applying species-specific spatial distributions, that fish occur evenly throughout the Dutch EEZ which allowed an assessment entirely based on the degree to which the main threats affect fish in general.

Table 6: *Protected fish species of the North Sea that are not in good status. Protection frameworks are: the Habitats Directive (HD) (Adams et al. 2020), the Nature Restoration Regulation (NRR) (European Commission 2024) and/or the OSPAR List of Threatened and/or declining species and habitats (Agreement 2008-06) (OSPAR List). Note that the NRR includes all species protected under the HD, as well as additional species listed in Annex III of the NRR. Species marked by an Asterix (*) are considered "urgent" (i.e. urgently in need for protection measures as indicated by Schmidt et al. (2023))*

Name (English)	Name (Dutch)	Name (scientific)	Framework	Status
Allis shad	Elft	*Alosa alosa*	HD, OSPAR List	Not assessed
Twaite shad*	Fint	*Alosa fallax*	HD	Unfavourable - bad
Houting	Houting	*Coregonus oxyrinchus*	HD, OSPAR List, NRR Annex III	Unfavourable - inadequate
Basking shark	Reuzenhaai	*Cetorhinus maximus*	NRR Annex III	Unfavourable - inadequate
River lamprey	Rivierprik	*Lampetra fluviatilis*	HD	Unfavourable - inadequate
Salmon*	Zalm	*Salmo salar*	HD, OSPAR List, NRR Annex III	Unfavourable - bad
Angelshark	Zee-engel	*Squatina squatina*	NRR Annex III	Unfavourable - bad
Sea trout	Zeeforel	*Salmo trutta*	NRR Annex III	Not assessed
Sea lamprey*	Zeeprik	*Petromyzon marinus*	HD, OSPAR List	Unfavourable - bad

4.1.3 Marine mammals

According to the most recent HD assessment (Adams et al. 2020), marine mammals in the North Sea are in good status. However, the update of the Dutch MSFD part 1 (Ministerie I en W en LVVN in prep.) indicates an unfavourable status for harbour porpoise, as the criteria incidental bycatch (D1C1) exceeds the threshold value. In this context, the harbour porpoise was selected for spatial analysis. The harbour porpoise was listed as a threatened and/or declining species in the international North Sea (OSPAR 2008).

Table 7: *Protected marine mammal species of the North Sea that are not in good status. Protection frameworks are: the Habitats Directive (HD) (Adams et al. 2020), the Nature Restoration Regulation (NRR) (European Commission 2024) and/or the OSPAR List of Threatened and/or declining species and habitats (Agreement 2008-06) (OSPAR List).*

Name (English)	Name (Dutch)	Name (scientific)	Framework	Status
Harbour porpoise	Bruinvis	*Phocoena phocoena*	HD, OSPAR List	Unfavourable[#]

according to the HD (Adams et al. 2020) the status is favourable. However, the update of the Dutch MSFD part 1 (Ministerie I en W en LVVN in prep.) indicates an unfavourable status for harbour porpoise

In addition: Adams (2020) defined the status for marine mammals based on data collected before 2019. However, while the harbour seal population had been growing constantly at an average of 8% since 2003, the population showed significant trend changes from 2013 onwards as growth suddenly came to a halt. After 2020 it started to decrease and has continued to do so until the last count in 2024. Though varying from year to year average decrease is in the Dutch Wadden Sea for the past 4 years is 5%. It is clear from the count results that for over 10 years, almost none of the pups survive to adulthood (Galatius et al. 2024). The status of this species is currently not favourable (S. Brasseur, personal communication, January 2025). Bycatch or any other cause of death of harbour seals is not monitored in the Netherlands.

4.1.4 Birds

Bird species that have an unfavourable status in the North Sea and are thus in need of (stricter) protection are common scoter, eider, great black-backed gull and great crested grebe (**Table 8**). The MSFD follows the OSPAR assessment of the abundance (Dierschke, et al. 2022) and breeding productivity (Frederiksen, et al. 2022) of birds on the international North Sea. The OSPAR assessment shows that only the group of water column feeders are above the criteria for sustainable populations, all other groups fail to meet the criteria. Species specific assessment results are included in Annex 2. The status of the black-legged kittiwake, that is on the OSPAR List of Threatened and/or declining species and habitats (OSPAR 2008) is favourable in the Netherlands. Based on the advice for the approach towards the EBD 2030 (Schmidt et al. 2023) common scoter and common eider are categorised as urgently in need for protection measures.

The bird species included in **Table 8** are all selected for (spatial) analysis. These species are protected under the HD and NRR and represent three different groups of the MSFD.

Table 8: *Protected bird species of the North Sea that are not in good status. Protection frameworks are: the Birds Directive (BD) (Adams et al. 2020), the Nature Restoration Regulation (NRR) (European Commission 2024) and/or the OSPAR List of Threatened and/or declining species and habitats (Agreement 2008-06) (OSPAR List). Note that the NRR includes all bird species protected under the BD. Species marked by an Asterix (*) are considered "urgent" (i.e. urgently in need for protection measures as indicated by Schmidt et al. (2023))*

Name (English)	Name (Dutch)	Name (scientific)	Breeding (b)/non breeding (nb)	Group	Framework	Status
Common scoter*	Zwarte zee-eend	*Melanitta nigra*	nb	Benthic feeders	BD & NRR	Unfavourable -bad
Common eider*	Eider	*Somateria mollissima*	nb	Benthic feeders	BD & NRR	Unfavourable -bad
Great black-backed gull	Grote mantelmeeuw	*Larus marinus*	nb	Surface feeders	BD & NRR	Unfavourable -bad
Great crested grebe	Fuut	*Podiceps cristatus*	nb	Water column feeders	BD & NRR	Unfavourable - inadequate

4.2 Level of protection based on Impact Risk

Here we present the results for each selected species/habitat, the restoration potential per MPA and the regime applied to achieve strict protection. The Impact Risk (IR) is a relative risk metric: lower values represent minimal disturbance, whereas higher values show an increased risk of local decline or disappearance. The IR indicates the proportion of the original population or habitat quality that may persist under current pressures. The IR is therefore an indication of risk and not a precise forecast of present or future numbers or conditions of species and habitats.

The regimes according to the MPA guide (**Table 4** in section 3.2.2) were applied, thereby excluding certain activities from the MPAs accordingly. A specification of the spatial information included per category is provided in Annex 5. For some activities (aquaculture, anchoring) there was no spatial information. The results presented here (**Table 9** and the sections below) involve for each selected habitat and species a baseline (i.e. no exclusion and activities as available from EMODnet (European Marine Observation and Data Network n.d.)) and the restoration potential (i.e. additional protection) from the exclusion of activities.

Most protection could be achieved from the exclusion of fisheries, various non-extractive activities (e.g. recreational, traditional, and cultural activities) and "other activities" (maritime traffic, military dumped munitions, and waste at ports) whereas little additional protection could be achieved from the exclusion of mining or infrastructure (Table 9). It should be noted that the fisheries management measures that are recently in place in the offshore MPAs are not taken in to account as the utilized dataset from EMODnet covers a period prior to March 2023.

Table 9: *Amount of Impact Risk (%) reduction per selected species/habitat caused by the removal of a single MPA guide activity group within the combined MPAs.*

Exclusion of specific activity groups	Sublittoral sediment	Flat Oyster (Ostrea edulis)	Ross worm (*Sabellaria spinulosa*)	Fish	Harbour porpoise	Great black-backed gull	Common scoter	Common eider	Great crested grebe
Mining	0.23	0.13	0.35	0.00	0.21	0.10	0.65	0.05	0.03
Dredging and Dumping[2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anchoring[1]									
Infrastructure	0.00	0.00	0.00	0.01	0.45	0.00	0.01	0.01	0.00
Aquaculture[1]									
Benthic trawl fisheries	8.44	8.51	16.10	6.63	2.31	2.01	10.37	12.59	0.61
Pelagic trawl fisheries	0.14	0.02	0.15	1.87	1.13	0.23	1.58	0.69	0.03
Static gear fisheries	0.49	0.18	0.96	0.20	2.41	2.04	11.68	13.44	1.03
Suction/hydraulic fisheries	0.26	0.04	2.06	0.00	0.02	0.00	0	0	0
Non-extractive activities	0.01	0.01	0.01	0.01	1.01	0.59	1.42	3.52	0.19
Other activities[3]	0.06	0.03	0.09	0.04	1.32	2.20	4.99	5.19	0.82

1 due to a lack of data not included in this assessment
2 Based on dredge dumping areas. Due to a lack of data extraction of dredged material is not included in this assessment
3 Including steaming activities of military, fisheries and cargo vessels, military dumped munitions and waste at ports

4.2.1 Habitats

Sublittoral sediment

The baseline IR for the entire Dutch EEZ is 32.8%, with 10.3% occurring within marine protected areas (MPAs) and 22.5% outside of these zones. The Dogger Bank contributes the most to IR within MPAs at 2.5%, followed by the Frisian Front (1.9%), Cleaver Bank (1.3%), North Sea Coastal Zone (1.5%), Central oyster Grounds (0.8%) and Brown Ridge (1.1%) (Figure 5, **Table 10**). The results indicate that fisheries are the dominant contributor to IR within MPAs, accounting for 9.3%. Benthic trawl fisheries (8.4%) is the main contributor to this total see **Table 9**. Others, including static gear fisheries (0.5%), suction/hydraulic fisheries (0.3%), and mining (0.2%), contribute marginally to the overall IR.

Implementing strict protection under the MPA Guide reduces the total IR to 22.7%, representing a 10.0% reduction (Figure 6). These findings underscore the significant impact of benthic trawl fisheries on sublittoral sediment and the need for targeted management measures to protect this important marine habitat, particularly in high-risk areas like the Dogger Bank and Frisian Front. By extending these restrictions to include "Other activities" The total IR could be reduced by an additional 0.1%, lowering the total IR of the Dutch EEZ to 22.6%.

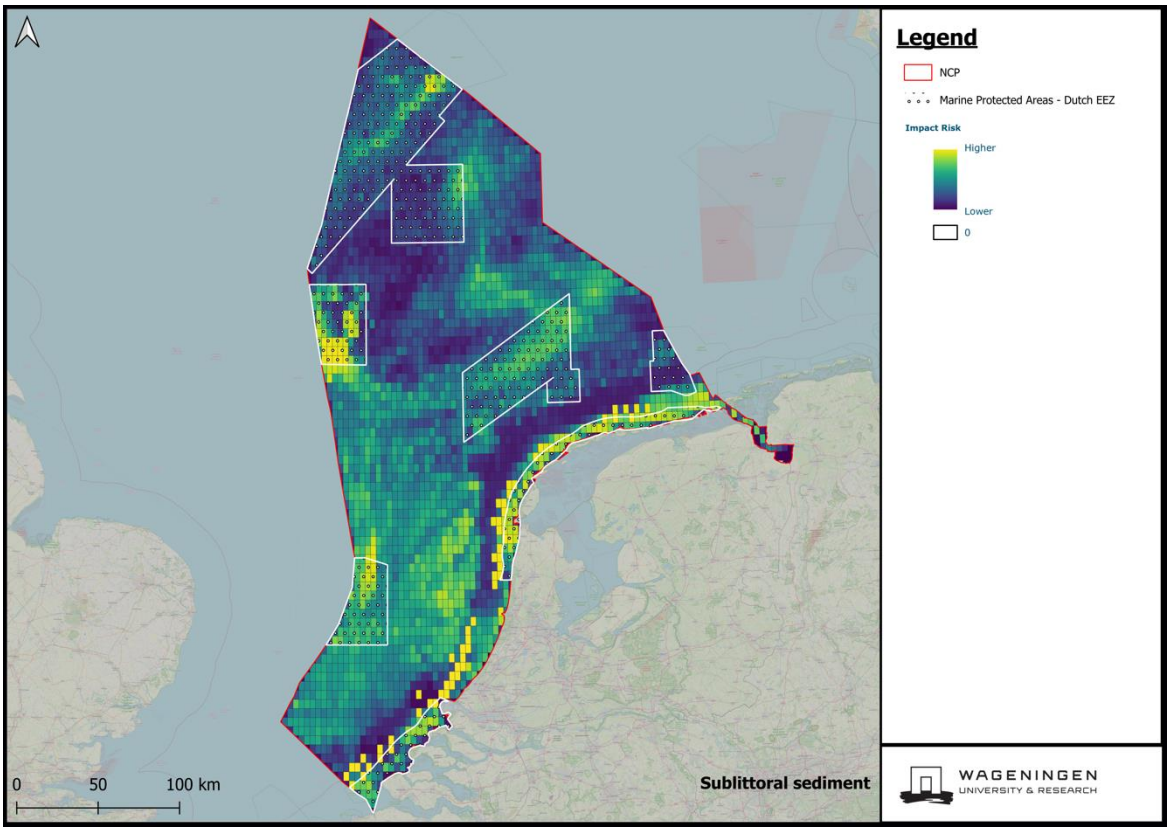

Figure 5: *Spatial distribution of impact risk for sublittoral sediment across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities and distribution of sublittoral sediment was based on EUNIS habitat maps, both derived from EMODnet (European Marine Observation and Data Network n.d.).*

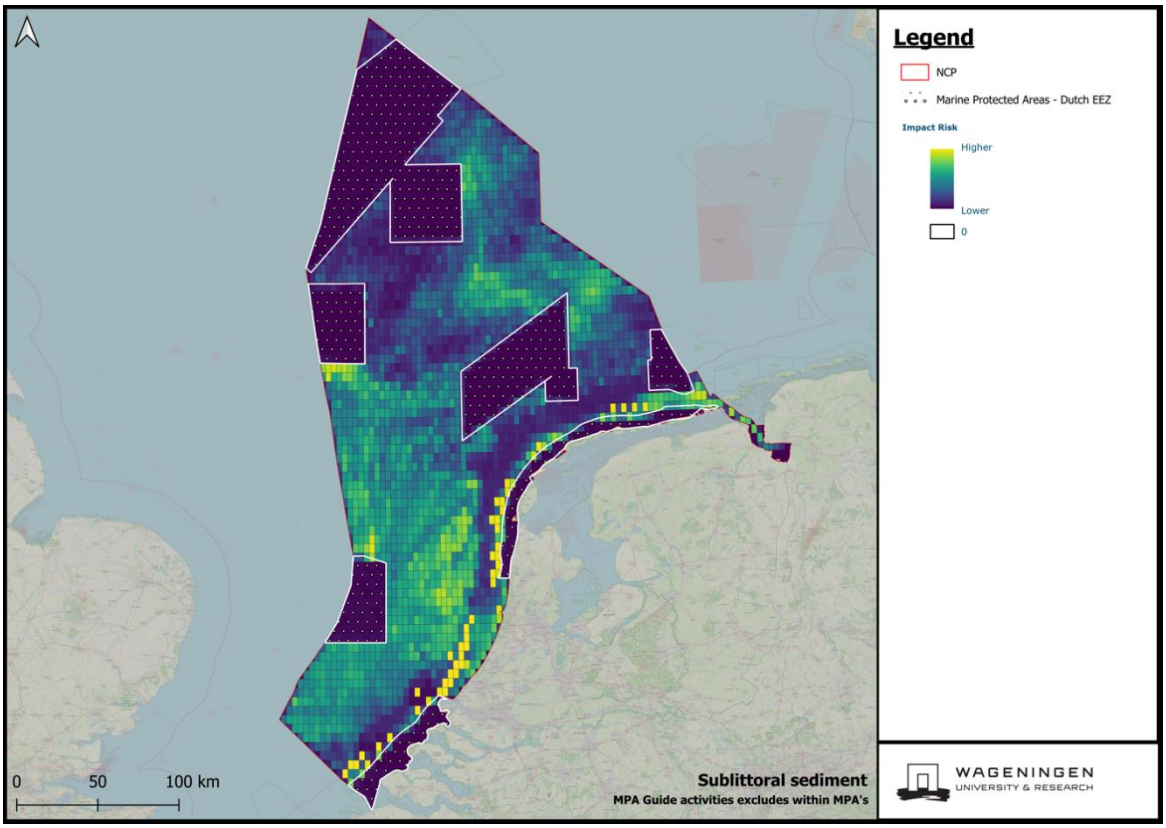

Figure 6: *Spatial distribution of impact risk for sublittoral sediment with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities and distribution of sublittoral sediment was based on EUNIS habitat maps, both derived from EMODnet (European Marine Observation and Data Network n.d.).*

Flat Oyster (*Ostrea edulis*) beds

Flat oyster habitats in the Dutch EEZ experience an IR of 30.7%, with 9.1% occurring within MPAs and 21.6% outside of these zones. Most of the IR within MPAs occurs in the Frisian Front MPA (7.4%), while the Central oyster Grounds, with the second-highest impact risk, only accounts for 0.9% (Figure 7, Table 10). Fisheries are the primary activity causing IR, contributing 7.1% in the Frisian Front alone and 8.7% across all MPAs. More specifically, benthic trawl fisheries contribute 8.5% and static gear fisheries 0.2% within MPAs (**Table 9**).

Implementing strict protection measures (***Figure 8***) could reduce the total IR from 30.7% to 21.7%, representing a substantial improvement. Extending restrictions to include "Other activities" would not result in a significant additional reduction.

It should be noted that the fisheries management measures that are recently in place in the offshore MPAs are not taken in to account as the dataset covers the period prior to March 2023. Furthermore, within the no-fisheries zone at the Frisian Front, two sites of 50 km^2 will be reserved for flat oyster reef restoration and one site of 100 km^2 will be reserved for fisheries research (OFL 2020).

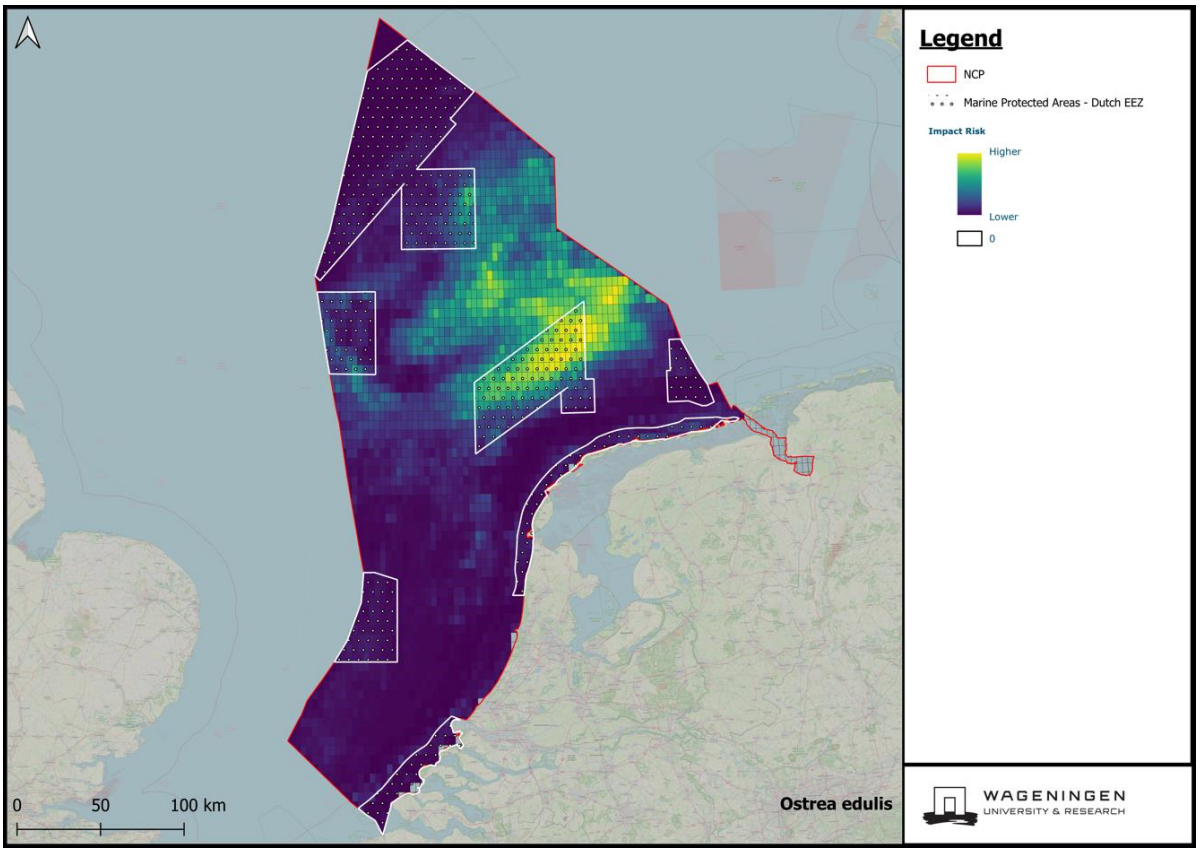

Figure 7: *Spatial distribution of impact risk for European flat oyster (Ostrea edulis) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Sas et al. 2023).*

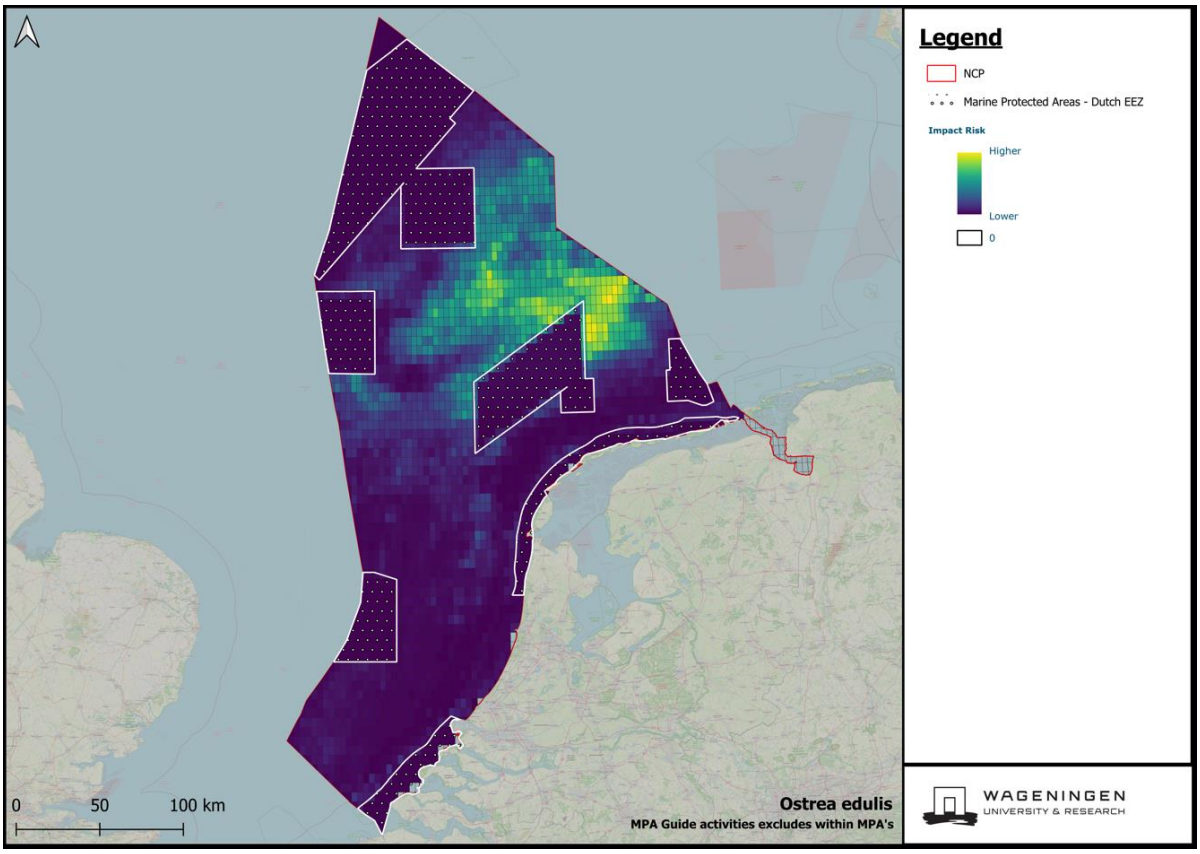

Figure 8: *Spatial distribution of impact risk for European flat oyster (Ostrea edulis) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Sas et al. 2023).*

Ross worm (Sabellaria spinulosa) beds

Sabellaria habitats in the Dutch EEZ experience an overall threat of 42.2%. Most of this occurs in the Cleaver Bank (10%) and Brown Ridge (5.6%), with 2.6% in the next important MPA, the Frisian Front (Figure 9, **Table 10**). The Dogger Bank and North Sea Coastal Zone each contribute approximately respectively 1.9% and 1.6% to the overall threat. Fisheries remain the dominant threat, accounting for 19.3% of the IR across MPAs (**Table 9**), mainly caused by benthic trawl fisheries (16.1%).

Strict protection across all MPAs (according to the MPA guide categories) could reduce the total IR with 21.8%, from 42.2% to 20.4%. Extending these measures to include "Other activities" (which offshore mainly consist out of steaming of maritime vessels and military dumped munitions) would further reduce the IR to 20.3% (Figure 10, Table 9).

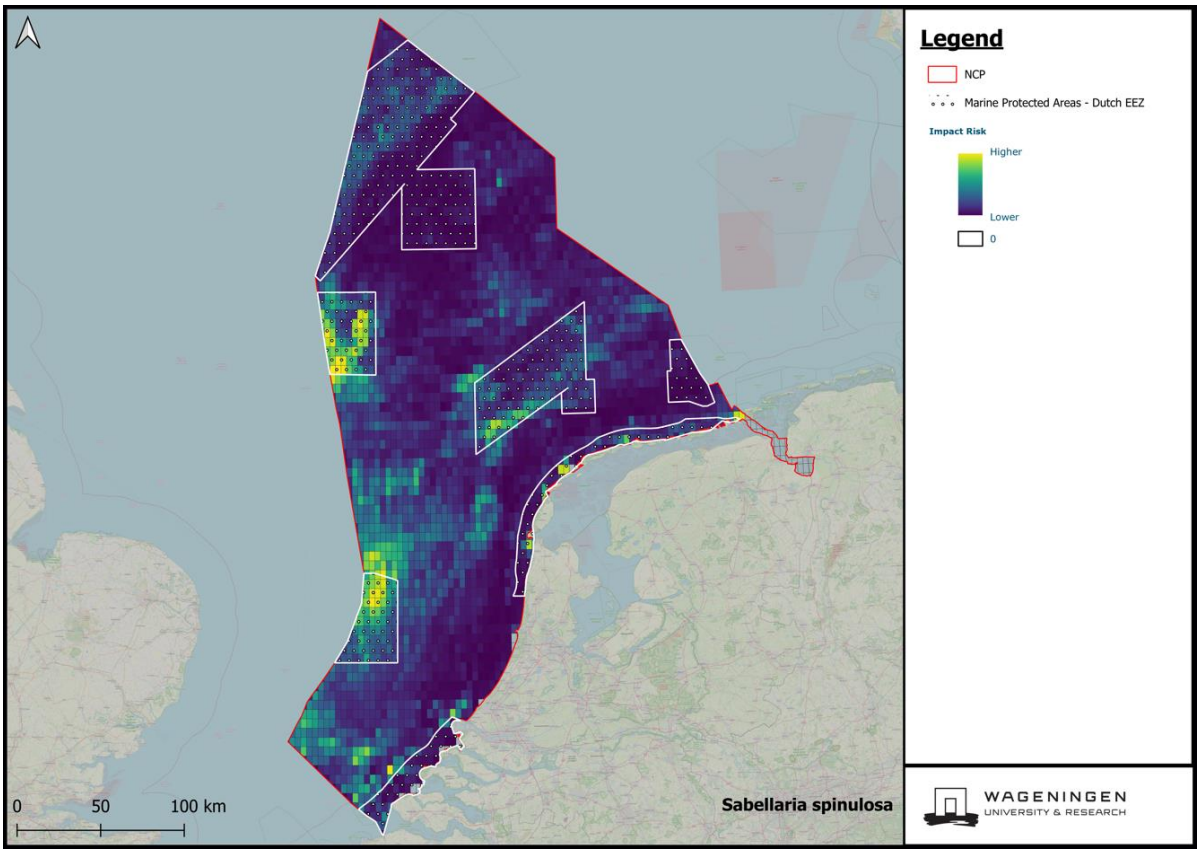

Figure 9: *Spatial distribution of impact risk for ross worm (Sabellaria spinulosa) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Sas et al. 2023).*

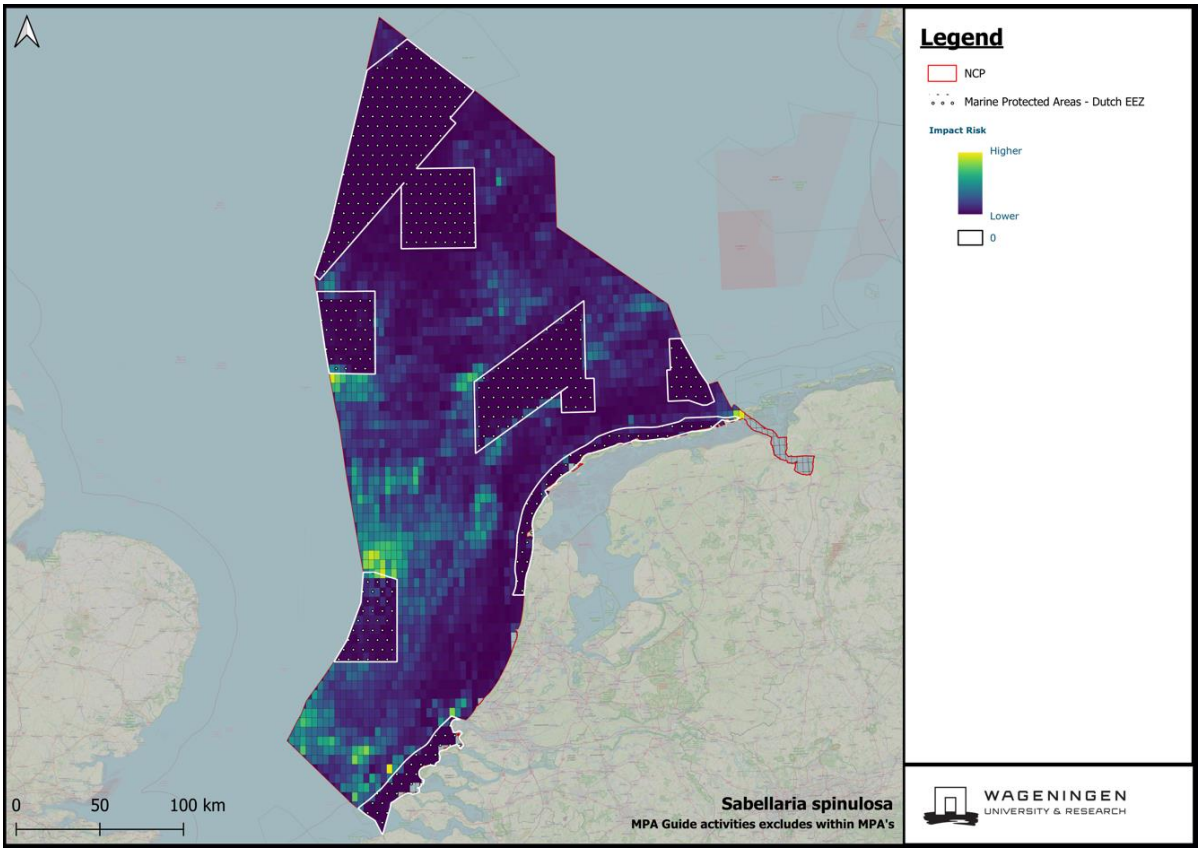

Figure 10: *Spatial distribution of impact risk for ross worm (Sabellaria spinulosa) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Sas et al. 2023).*

4.2.2 Fish

All fish species

The Dutch EEZ fish community overall was found to undergo the highest level of threat, with an overall IR of 98.1%. Due to the large surface area, most of this IR occurs in the Dogger Bank (8.6%) followed by the Frisian Front (4.8%), see Figure 11 and Table 10. The gradual variation in IR from south to north can be explained by surface area differences per cell, which becomes smaller as you move further north due to the map projection. The calculations assumed an equal number of fish per unit area. Because the grid cells in the south cover a larger surface area, the IR is correspondingly higher in the southern region of the Dutch continental shelf.

It is not surprising that fishing is the main factor contributing to impact risk for fish. The IR of 8.7% by fisheries in total breaks down in 6.6% by benthic dredges, 1.9% by pelagic trawls and 0.2% by static gears (Table 9). Implementing strict protection across all MPAs (Figure 12) for activities categorized under the MPA Guide would only reduce the overall IR with 20%, from 98.1% to 78.1%. Extending restrictions to include "Other activities" would not result in a significant additional reduction.

It should be noted that the fisheries management measures that are recently in place in the offshore MPAs are not taken in to account as the dataset covers the period prior to March 2023.

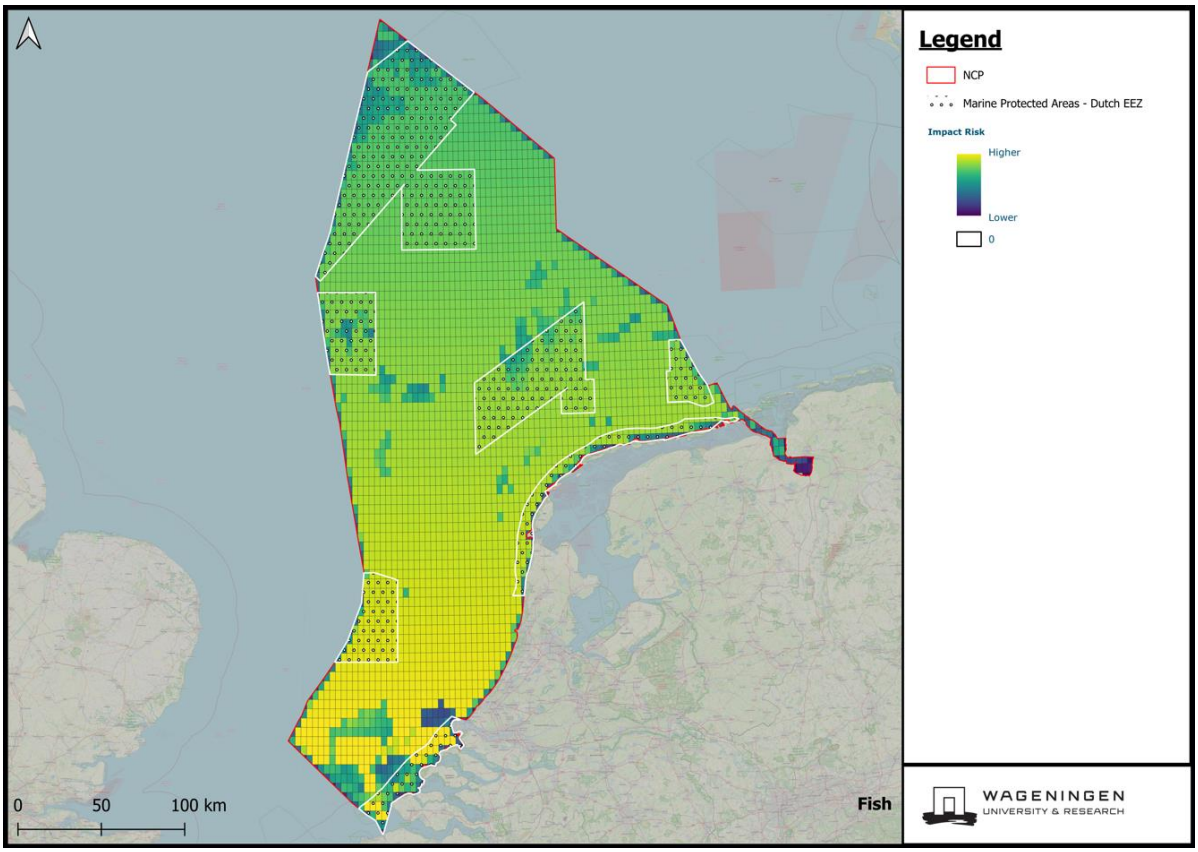

Figure 11: *Spatial distribution of impact risk for fish (Pisces) in general across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and an equal species distribution per surface area across the DCS.*

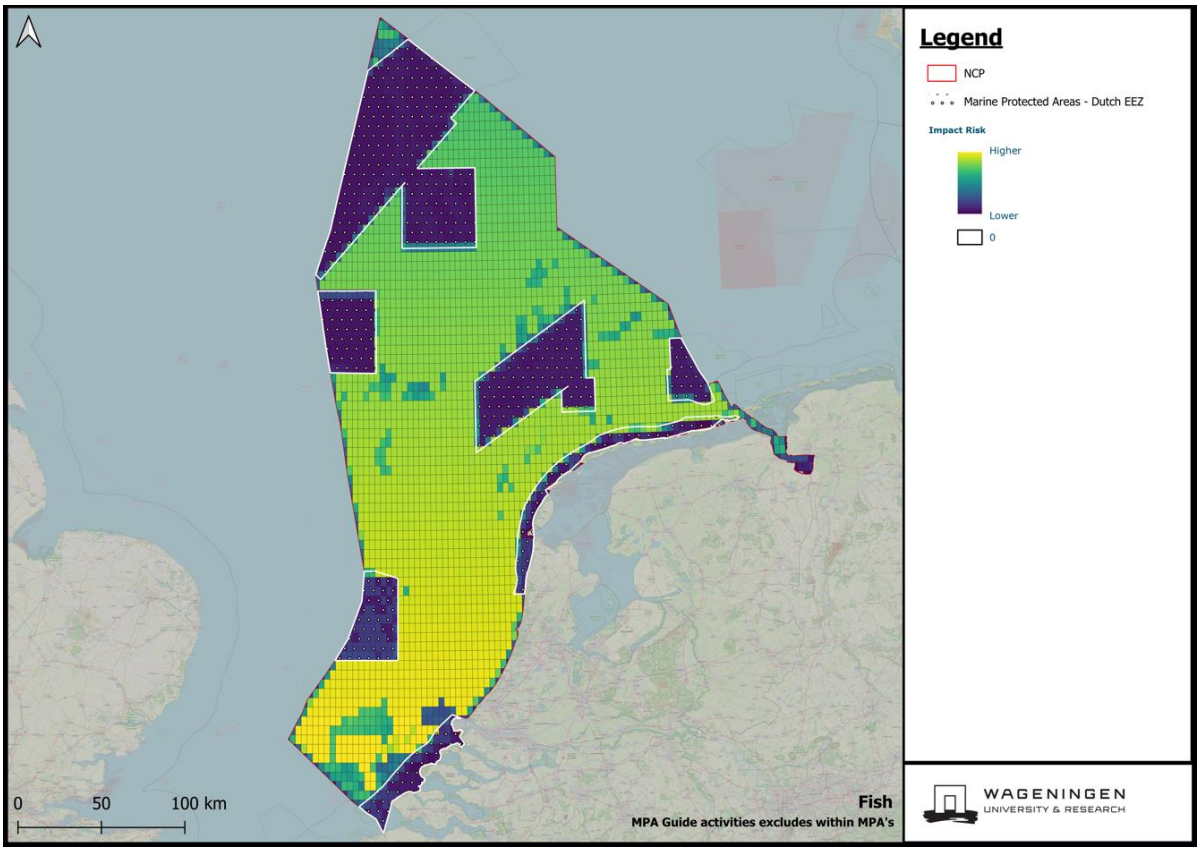

Figure 12: *Spatial distribution of impact risk for fish (Pisces) in general with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and an equal species distribution per surface area across the DCS.*

4.2.3 Marine mammals

Harbour porpoise

The baseline total Impact Risk (IR) for harbour porpoises is 37.2%, with 10.7% occurring within MPAs and 26.5% outside of these zones. Among MPAs, the Dogger Bank (2.7%), Brown Ridge (2.3%), and Frisian Front (1.8%) show the highest contributions, while areas like Raan Flats and Voordelta have minimal impact (Table 10, Figure 13). The results show that fisheries cause the highest IR within MPAs with a combined total of 5.9% (**Table 9**). This category consists out of static gear fisheries (2.4%), benthic trawl fisheries (2.3%) and pelagic trawl fisheries (1.1%). Other contributors to the overall IR within MPAs include "Other activities" (1.3%), non-extractive activities (1%), and infrastructure (0.5%).

Implementing the MPA Guide's activity exclusions within MPAs reduces total IR from 37.2% to 28.6%, a reduction of 8.6% from baseline (***Figure 14***). Extending these measures to include "Other activities" (which offshore mainly consist out of steaming of maritime vessels and military dumped munitions) would further reduce the IR to 27.3% (Table 9).

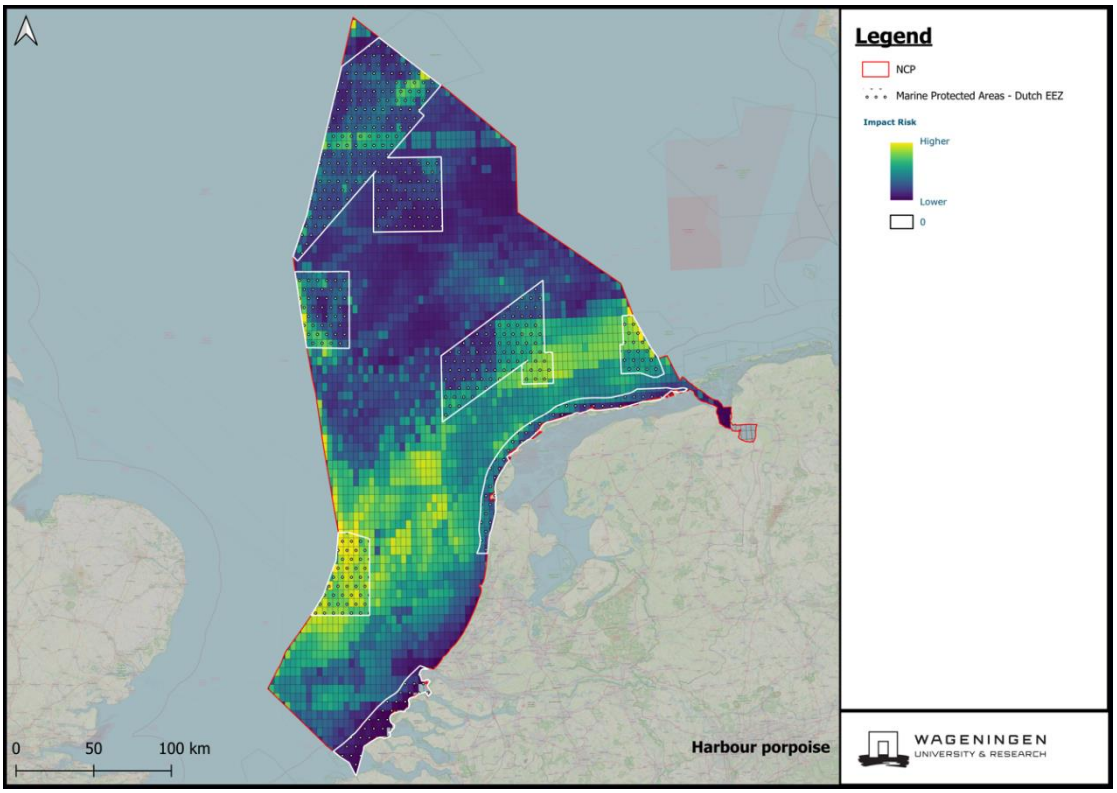

Figure 13: *Spatial distribution of impact risk for harbour porpoise (Phocoena phocoena) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Gilles et al. 2016)[7].*

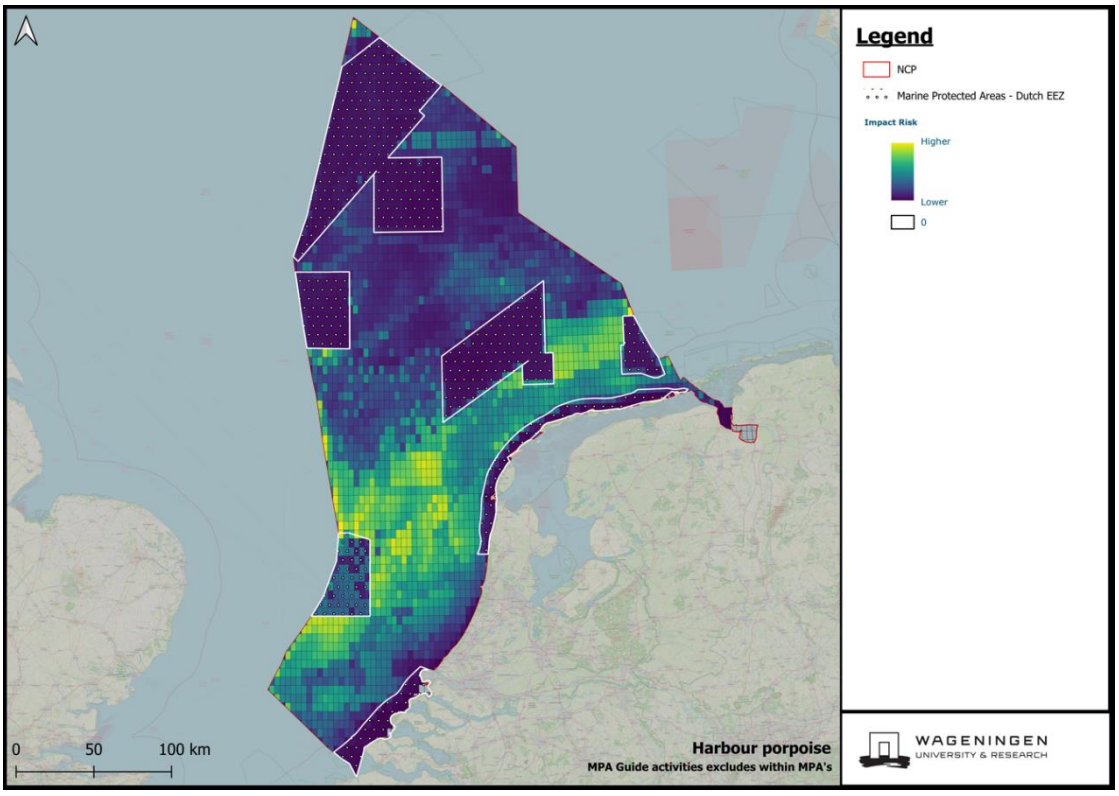

Figure 14: *Spatial distribution of impact risk for harbour porpoise (Phocoena phocoena) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Gilles et al. 2016).*

[7] The 2016 maps provide valuable historical context and can still be useful as a baseline for identifying trends or in areas where major changes are less likely. While distribution is dynamic, SCANS surveys indicate limited changes in overall numbers, meaning the 2016 maps may still represent general patterns of harbour porpoise distribution.

4.2.4 Birds

Common scoter

The baseline IR for the common scoter within the entire Dutch EEZ is 54.6%, with 39.3% occurring within MPAs and 15.4% outside of these zones. The North Sea Coastal Zone contributes the most to IR within MPAs (34.1%), followed by the Voordelta (4.9%). Other areas, such as the Frisian Front and Brown Ridge, show negligible IR, primarily due to incidental observations of small groups or individuals, either passing through in flight or resting temporarily (***Figure 15***, Table 10). The results show that fisheries cause the highest IR within MPAs with a total of 23.6% (**Table 9**). This category consists mainly out of static gear fisheries (11.7%) and benthic trawl fisheries (10.4%). Other contributors to the overall IR within MPAs include pelagic trawl fisheries (1.6%), non-extractive activities (1.4%) and "Other activities" (5%), which consists out of steaming from maritime vessels, military dumped munitions and waste at ports. Mining activities cause a smaller but still considerable IR of 0.6%.

Implementing strict protection across all MPAs for the activities categorized under the MPA Guide reduces the total IR in the entire Dutch EEZ from 54.6% to 25.5%, a 29.1% reduction from the baseline (***Figure 16***). Extending these restrictions to include "Other activities" would significantly reduce the Impact Risk by an additional 5%, lowering the total IR of the Dutch EEZ to 24.1%.

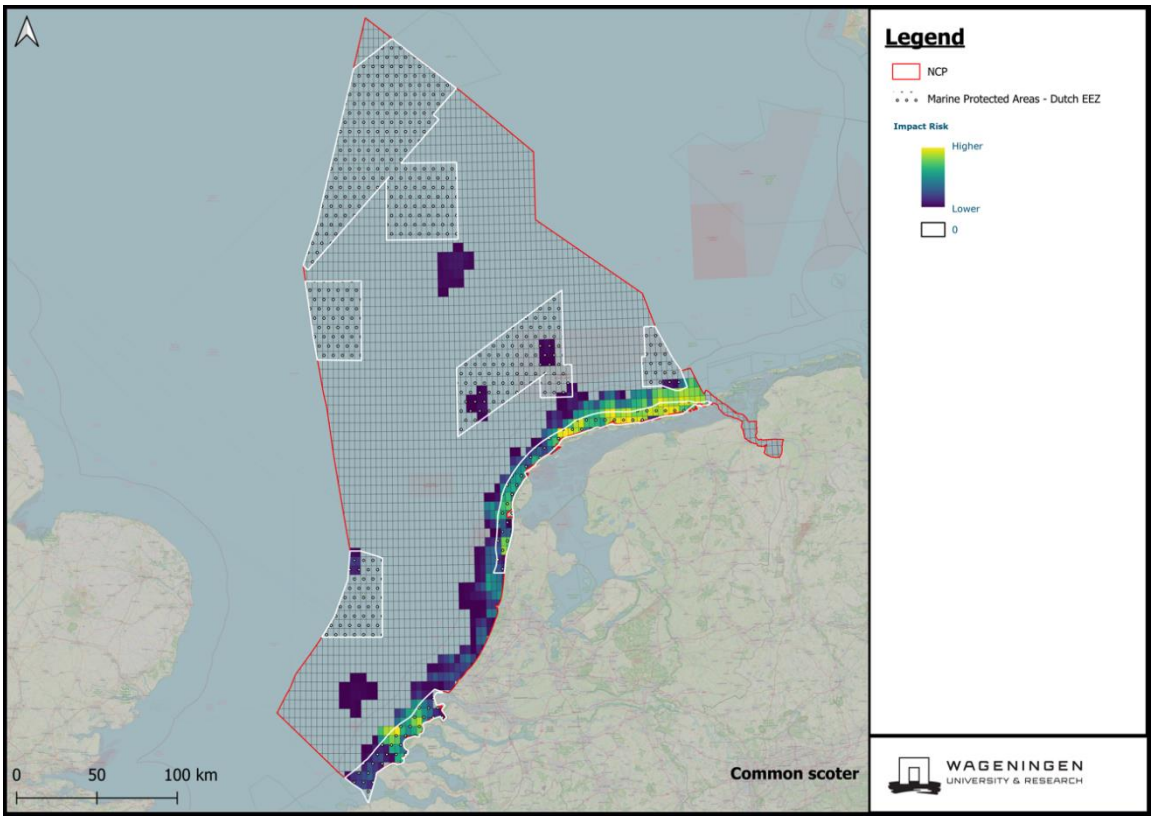

Figure 15: *Spatial distribution of impact risk for common scoter (Melanitta nigra) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Soudijn, Leopold, and van Bemmelen 2022)[8].*

[8] For all non-breeding birds the maximum predicted value per raster cell is used for the period October - march.

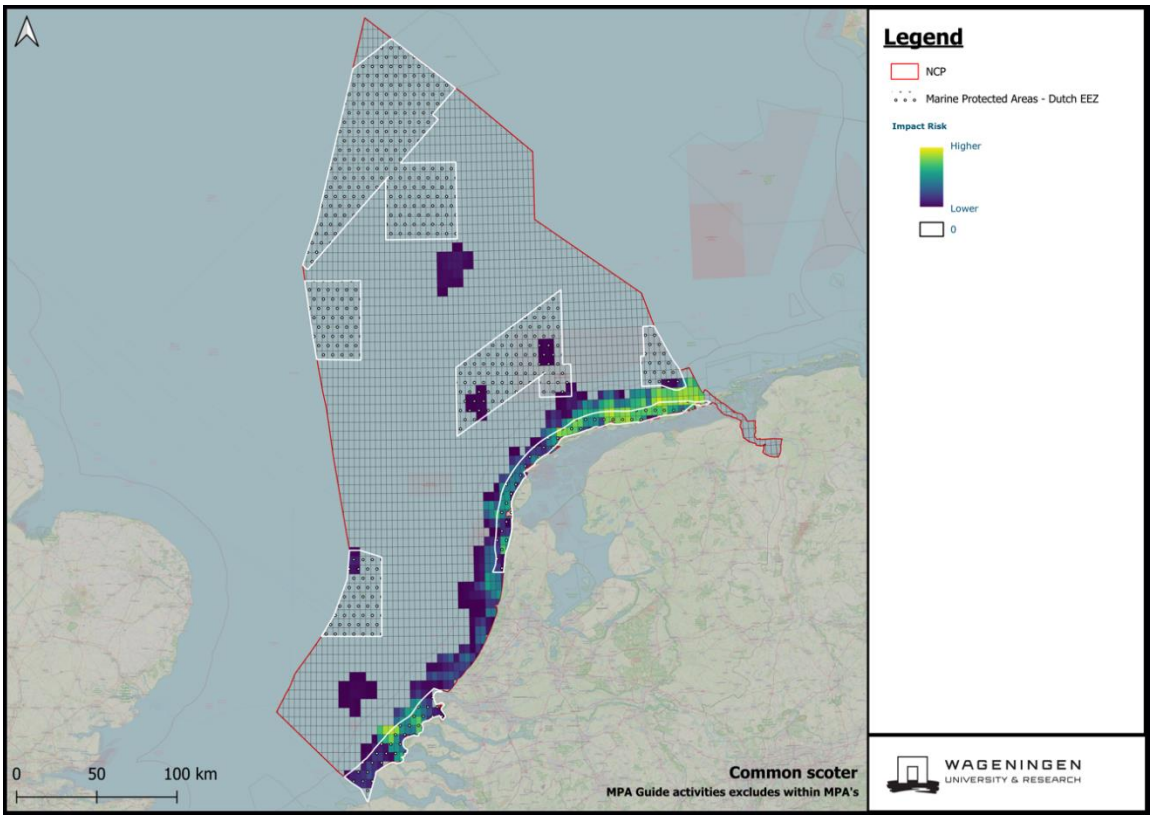

Figure 16: *Spatial distribution of impact risk for common scoter (Melanitta nigra) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Soudijn, Leopold, and van Bemmelen 2022).*

Common eider

The results for the common eider are similar to those for the common scoter. The baseline total Impact Risk (IR) for common eiders is 61.1%, with 48.3% occurring within MPAs and 12.7% outside of these zones (Table 10). The North Sea Coastal Zone contributes the most to the IR within MPAs, accounting for 44.7%, followed by the Voordelta with 3.6%. Like for the common scoter, other MPAs such as the Dogger Bank and Brown Ridge, show negligible IR which is primarily caused by incidental observations of small groups or individuals, either passing through in flight or resting temporarily (***Figure 17***). The results indicate that fisheries are the dominant cause of IR with a total of 26.7%. Static gear fisheries (13.4%) and benthic trawl fisheries (12.6%) are the main contributors to this total, followed by pelagic trawl fisheries (0,7%), see **Table 9**. Non-extractive activities (3.5%) and "Other activities" (5.2%), which include maritime traffic, military dumped munitions, and waste near ports, also add significantly to the overall IR. Mining activities cause a smaller IR of 0.1% in total.

Implementing strict protection for all activities categorized under the MPA Guide reduces the total IR in the Dutch EEZ from 61.1% to 24.8%, a 36.3% reduction from the baseline (***Figure 18***). By extending these restrictions to include "Other activities" one could significantly further reduce the total IR by an additional 5.2%, lowering the total IR of the Dutch EEZ to 19.6%.

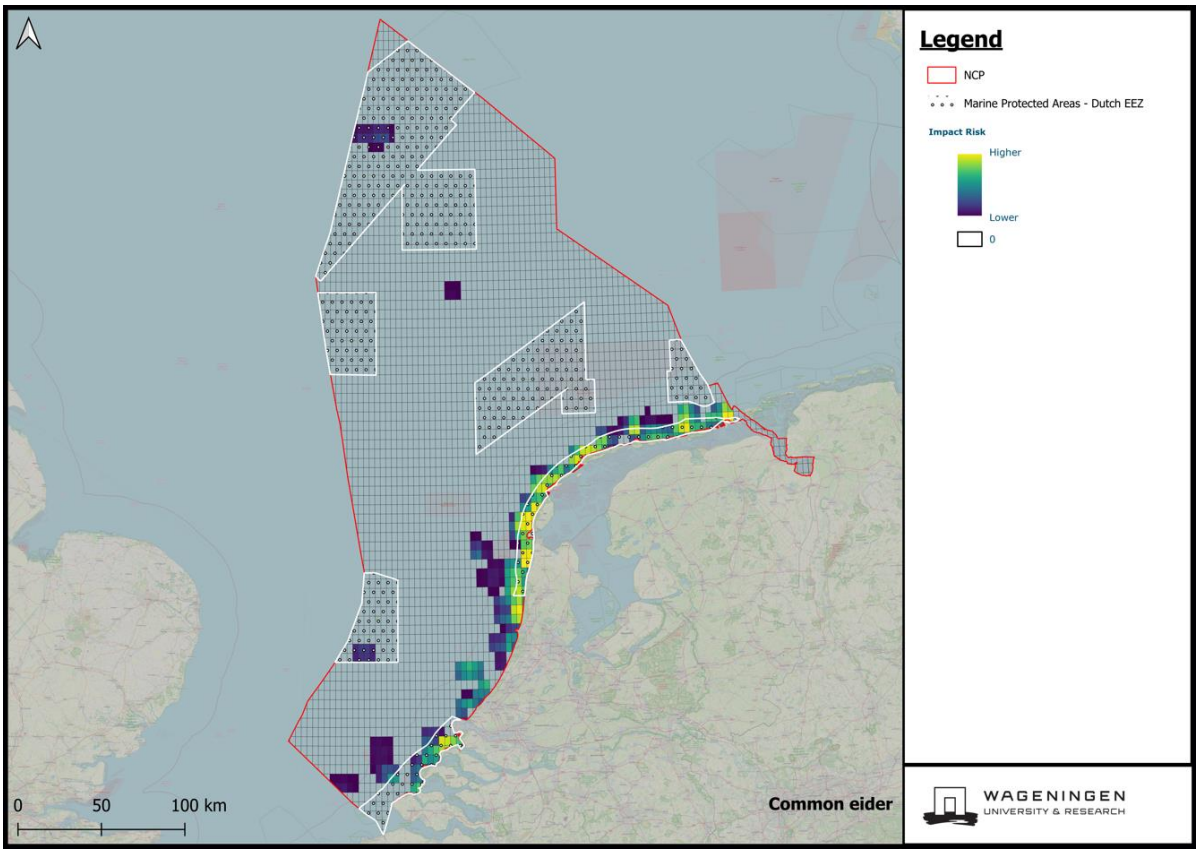

Figure 17: *Spatial distribution of impact risk for common eider (Somateria mollissima) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Soudijn, Leopold, and van Bemmelen 2022).*

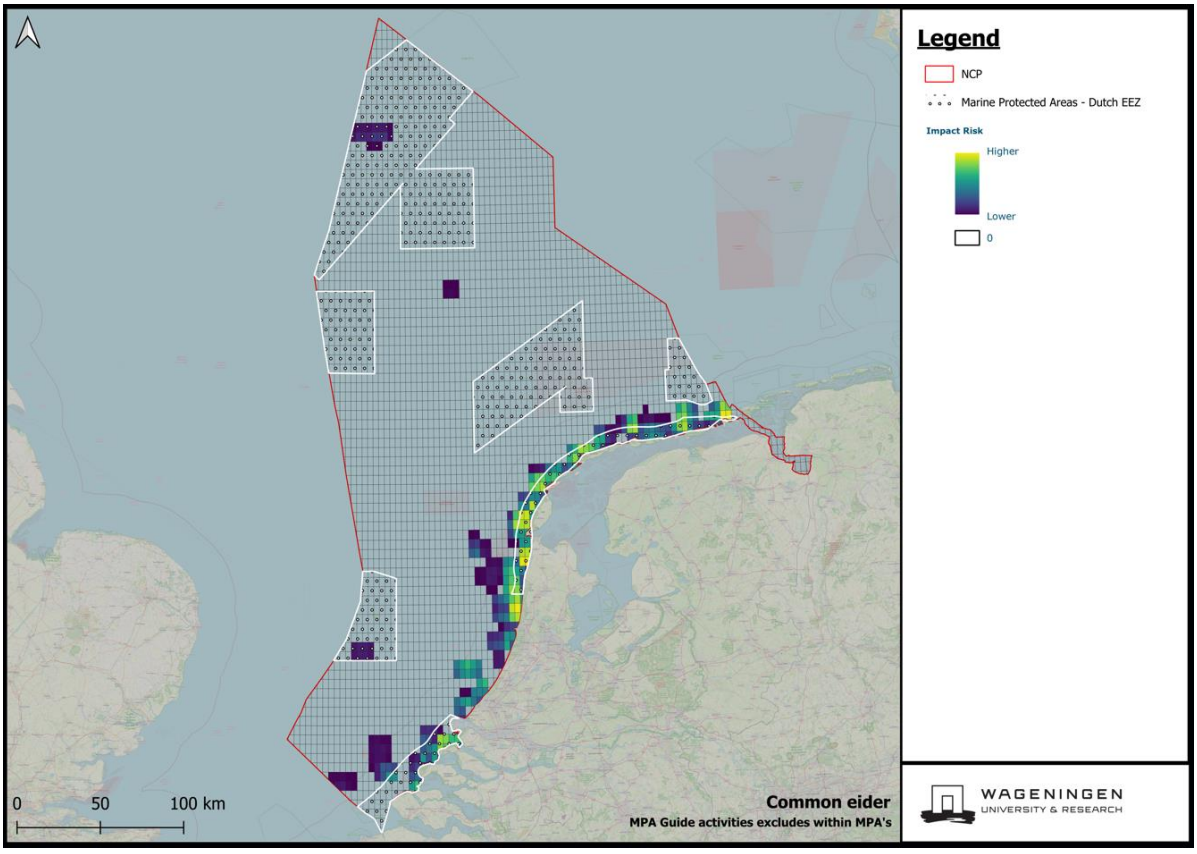

Figure 18: *Spatial distribution of impact risk for common eider (Somateria mollissima) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Soudijn, Leopold, and van Bemmelen 2022).*

Great crested grebe

The baseline IR for the entire Dutch EEZ is 47.2%, with only 3.2% occurring within MPAs and 44.0% outside of these zones. The Voordelta is the primary contributor to the threat (represented by the Impact Risk) within MPAs, accounting for 1.7%, followed by the North Sea Coastal Zone with 1.2%. More offshore areas (e.g. Brown Ridge) contribute marginally due to occasional use by great crested grebes (***Figure 19***, **Table 10**). Fisheries activities are the main contributors to IR within MPAs, with static gear fisheries accounting for 1.0% and benthic trawl fisheries contributing 0.6%. "Other activities", including maritime traffic, military dumped munitions, and waste near ports, add another 0.8%. Non-extractive activities, such as recreational boating, account for 0.2% of the IR (**Table 9**).

Implementing strict protection under the MPA Guide reduces the total IR in the Dutch EEZ with 2.0%, lowering it from 47.2% to only 45.2% (***Figure 20***). Extending these restrictions to include "Other activities" could enhance the reduction of IR by nearly half, adding an additional 0.8% and lowering the total IR of the Dutch EEZ to 44.4%.

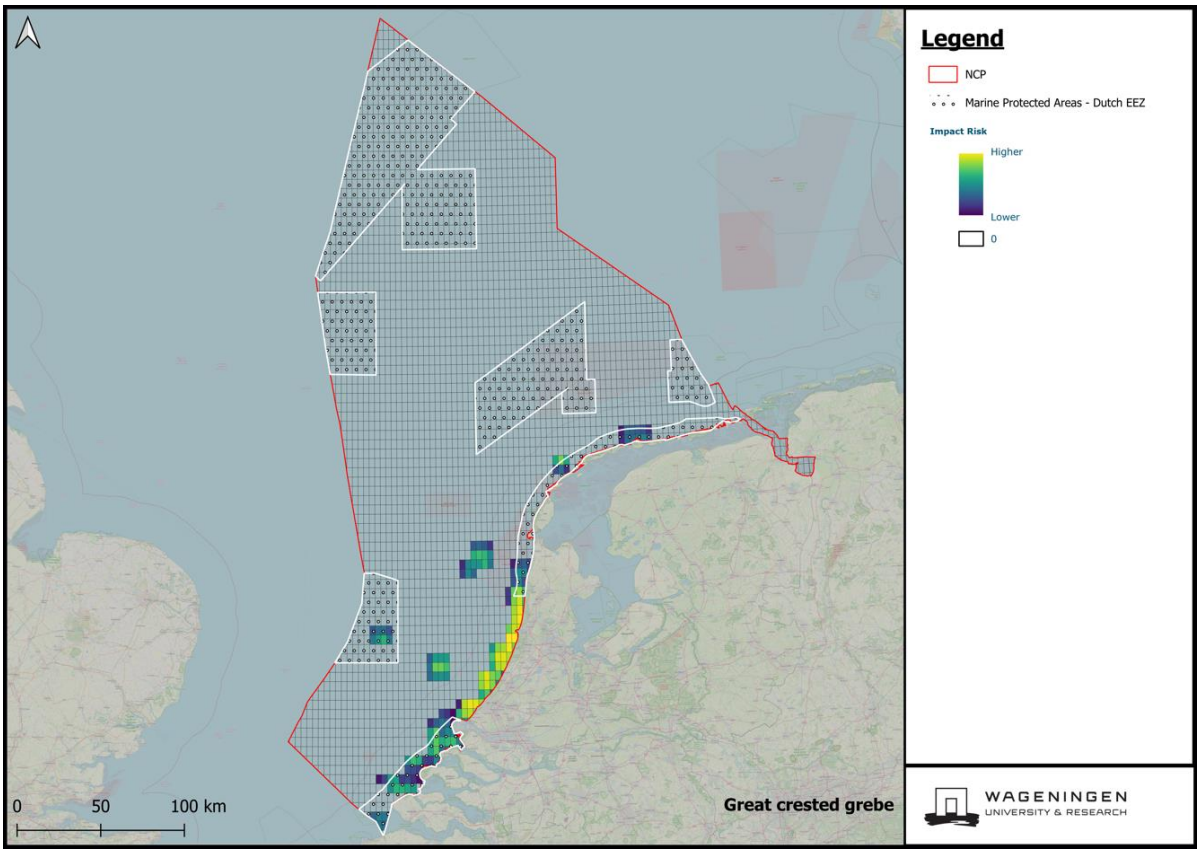

Figure 19: *Spatial distribution of impact risk for great crested grebe (Podiceps cristatus) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Soudijn, Leopold, and van Bemmelen 2022).*

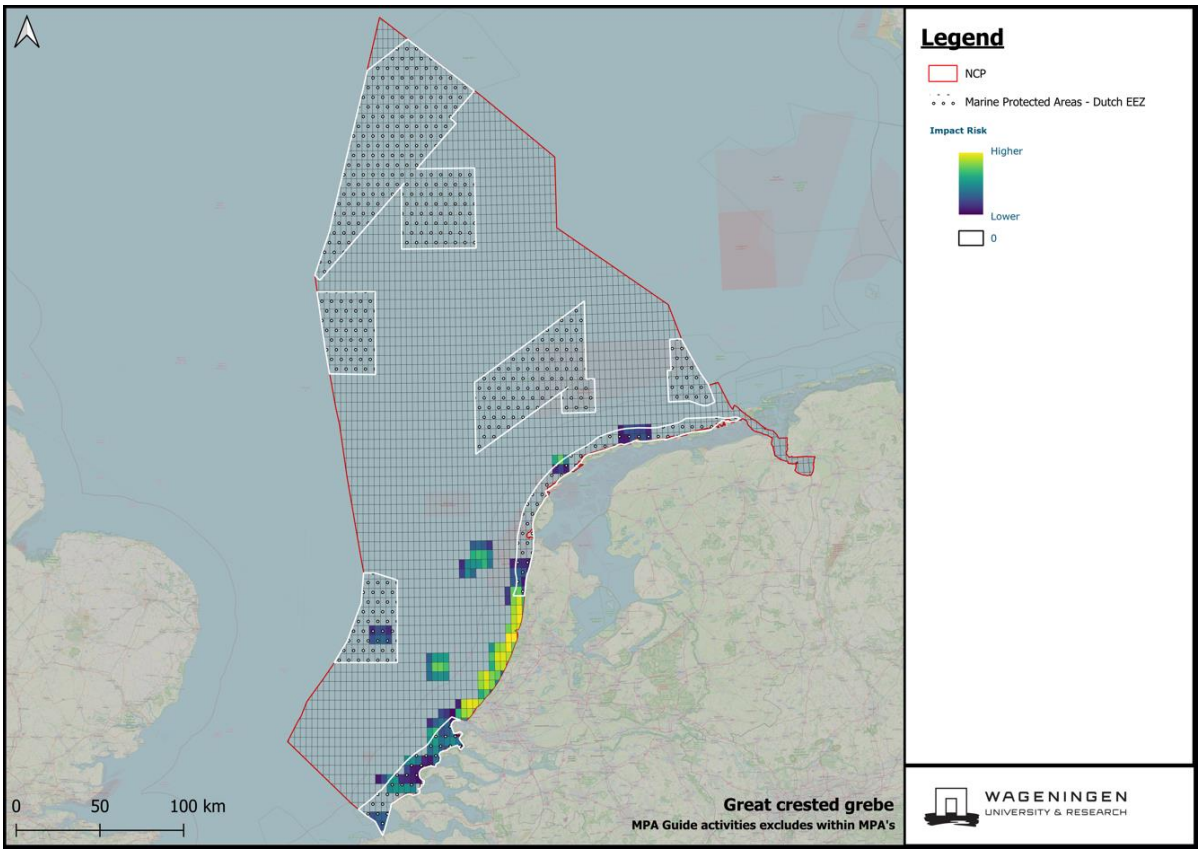

Figure 20: *Spatial distribution of impact risk for great crested grebe (Podiceps cristatus) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Soudijn, Leopold, and van Bemmelen 2022).*

Great black-backed gull

The baseline IR for the entire Dutch EEZ is 39.8%, with 8.7% occurring within MPAs and 31.1% outside of these zones (***Figure 21***). The Voordelta contributes the most to IR within MPAs at 3.7%, followed by the North Sea Coastal Zone with 2.5%. Other areas, such as the Brown Ridge (1.2%) and Cleaver Bank (0.5%), have moderate contributions (**Table 10**).

The main contributors to IR within MPAs are fisheries and "Other activities". Static gear fisheries and benthic trawl fisheries each account for 2.0%, while "Other activities," e.g. maritime traffic, military dumped munitions, and waste at ports, contribute 2.2% (**Table 9**). Non-extractive activities account for 0.6%. Pelagic trawl fisheries and mining activities make smaller contributions, at 0.2% and 0.1%, respectively.

Implementing strict protection for activities under the MPA Guide reduces the total IR in the Dutch EEZ by 5.5%, from 39.8% to 34.3% (***Figure 22***). Extending these measures to include "Other activities" would further reduce the IR to 32.1%.

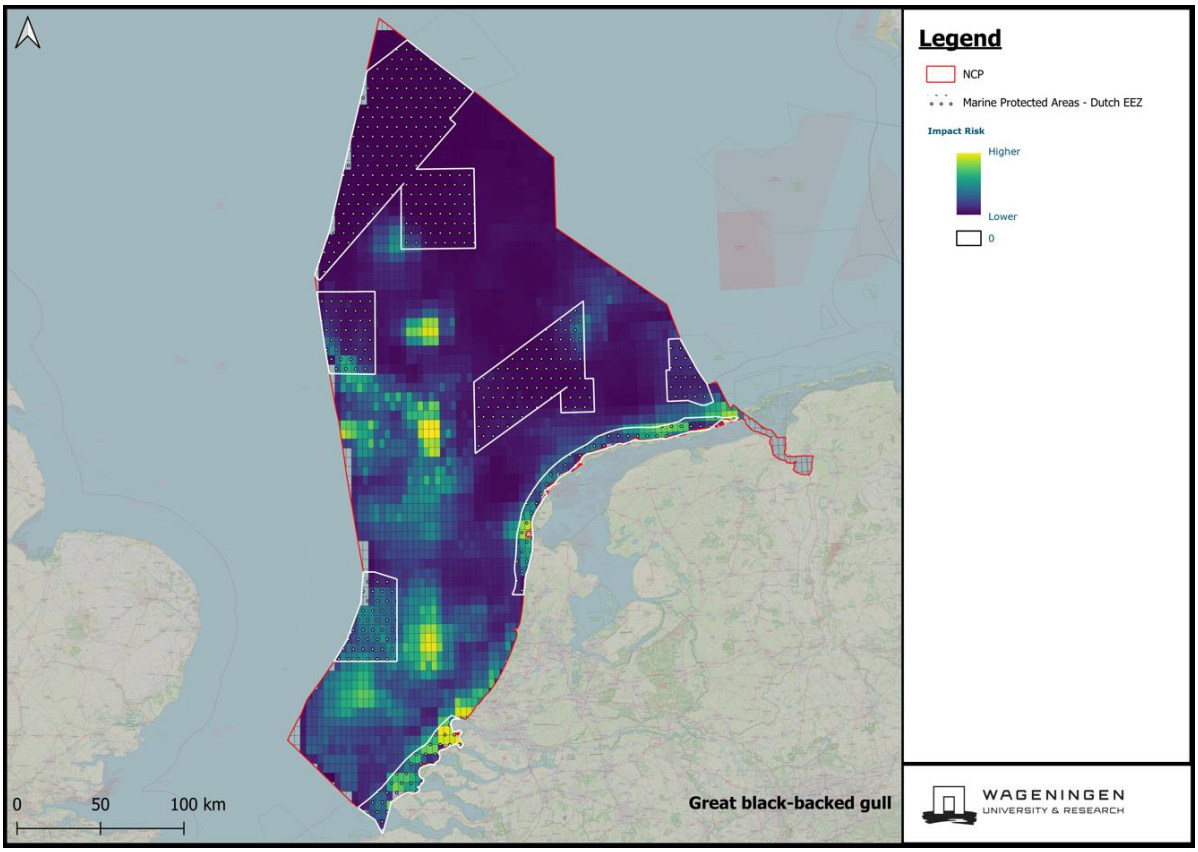

Figure 21: *Spatial distribution of impact risk for great black-backed-gull (Larus marinus) across the Dutch Continental Shelf (DCS) and within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Donk 2024).*

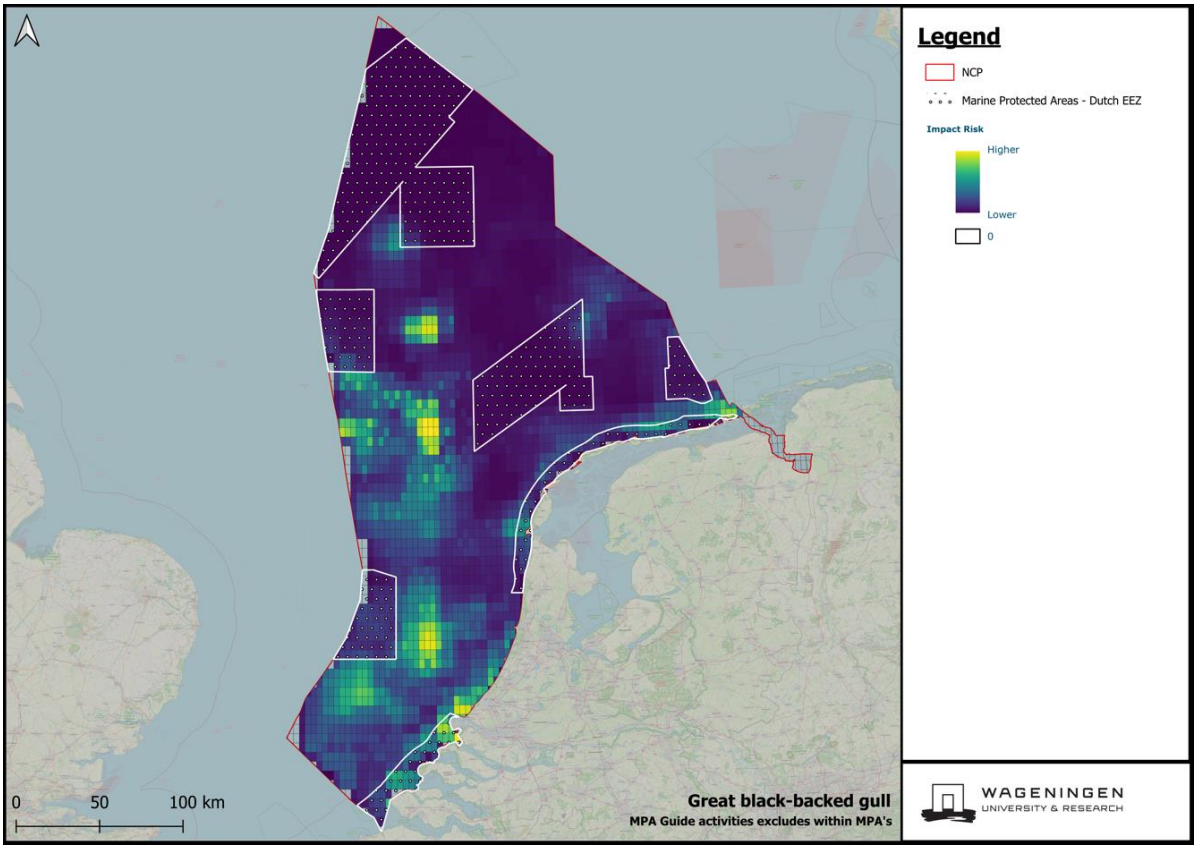

Figure 22: *Spatial distribution of impact risk for great black-backed-gull (Larus marinus) with exclusion of MPA guide activities within Marine Protected Areas (MPAs). Impact risk was calculated using spatial data on human activities from EMODnet and species distribution data from (Donk 2024).*

4.3 Area-based protection affecting socio-economic activities

The additional (strict) protection that can potentially be achieved from excluding human activities in a specific MPA is shown in **Table 10**. Larger MPAs are generally expected to offer greater additional protection, provided they operate under a similar protection regime. However, the exclusion of activities from a larger MPA is also expected to have bigger socio-economic consequences as reflected in **Table 11** showing the proportion of each activity taking place in a specific MPA. The impact risk reduction by exclusion of these activities is shown in **Table 12**. To balance the amount of protection that can be achieved through the exclusion of all activities against the expected socio-economic consequences for the activities **Table 13** provides a measure of efficiency expressed as the amount of Impact Risk (%) from all activities combined per surface area. This efficiency measure can thus be interpreted as a proxy for the protection achieved relative to the possible socio-economic consequences, effectively a crude attempt at balancing the ecological gain against socio-economic loss. Note, however, that this is at best a proxy as this does not involve the actual socio-economic consequences but surface area as a proxy.

Table 10: *The amount of Impact Risk (%) per selected species/habitat caused by all activities combined within the MPAs, all MPAs combined and outside the MPAs. Together these make up the overall threat experienced by the species/habitat in the Dutch EEZ. The Impact Risk in areas where the species is designated is presented in bold with an asterix (*). For the group of fish this involves one or more specific fish species*

MPA	Sublittoral sediment	Flat Oyster (Ostrea edulis)[1]	Ross worm (*Sabellaria spinulosa*)[2]	Fish	Harbour porpoise	Great black-backed gull	Common scoter	Common eider	Great crested grebe
Borkum Reef Grounds	0.2	0.0	0.0	1.2	0.9	0.2	0.3	0.0	
Brown Ridge	1.1	0.1	5.6	2.3	2.3	**1.2***	0.0	0.0	0.2
Cleaver Bank	1.3	0.4	10.0	2.5	**1.0***	0.5			
Dogger Bank	2.5	0.1	1.9	8.6	**2.7***	0.0		0.0	
Frisian Front subarea 1	1.9	7.4	2.6	4.8	1.8	0.3	0.0		
Frisian Front subarea 2	0.2	0.1	0.1	0.6	0.5	0.0	0.0		
North Sea Coastal Zone	1.5	0.1	1.6	2.3	**0.8***	2.5	**34.1***	**44.7***	1.2
Central Oyster Grounds	0.8	0.9	0.1	3.5	0.6	0.1			
Raan Flats	0.2	0.0	0.1	0.3	**0.0***	0.1	0.0		0.1
Voordelta	0.6	0.0	0.2	1.2	**0.1***	3.7	**4.9***	**3.6***	**1.7***
All MPAs	10.3	9.1	22.2	27.3	10.7	8.7	39.3	48.3	3.2
Outside MPAs	22.5	21.6	20.0	70.8	26.5	31.1	15.4	12.7	44.0
Overall threat	32.8	30.7	42.2	98.1	37.2	39.8	54.6	61.1	47.2
Overall threat under full protection according to MPA-Guide	22.7	21.7	20.4	74.2	28.6	34.3	25.5	24.8	45.2

1 Flat oyster reefs of the open North Sea have disappeared and recovery requires the introduction of a starting population and further enhancement measures. The general environmental conditions in the North Sea are still suited for the oysters to survive, grow, and reproduce (Sas et al. 2023).

2 For Sabellaria, the best conditions in the EEZ will probably be in the N2000 area Brown Ridge, the MSFD area Borkum Reef Ground and possibly the N2000 area Frisian Front and a neighbouring area. Also, the construction of wind farms will probably constitute opportunities for small Sabellaria reef aggregations, in particular in or near scour protection (Sas et al. 2023).

Table 11: *Proportion of each of the activities in the Dutch marine EEZ occurring in each of the MPAs (%). Other activities include shipping and steaming and military marine dumped munitions.*

Activities	Borkum Reef Grounds	Brown Ridge	Cleaver Bank	Dogger Bank	Frisian Front subarea 1	Frisian Front subarea 2	North Sea Coastal Zone	Central oyster Grounds	Raan Flats	Voordelta	Total outside of MPA	Total inside of MPA
Mining	0%	1.5%	0.7%	1.7%	7.1%	0.2%	2.7%	0%	0.2%	1.7%	84.3%	15.7%
Dredging and dumping[2]	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.3%	99.7%	0.3%
Anchoring[1]												
Infrastructure	2.4%	3.1%	0.2%	1.1%	4.1%	0.6%	1.1%	0.9%	0.2%	1.6%	84.6%	15.4%
Aquaculture[1]												
Benthic trawl fisheries	0.4%	4.3%	6.0%	7.9%	6.3%	0.3%	8.8%	2.3%	0.7%	1.9%	61.1%	38.9%
Pelagic trawl fisheries	0.8%	1.3%	2.9%	9.3%	3.7%	0.8%	1.4%	6.0%			73.7%	26.3%
Static gear fisheries	3.3%	7.0%	0.0%	1.3%	2.0%	1.2%	5.7%	0.2%		0.6%	78.6%	21.4%
Suction/hydraulic fisheries			77.5%	8.9%							13.6%	86.4%
Non-extractive activities	1.8%	4.3%	0.9%	2.7%	3.4%	1.1%	5.2%	1.5%	0.7%	3.1%	75.3%	24.7%
Other activities[3]	0.2%	5.6%	0.2%	0.6%	0.5%	0.1%	18.2%	0.2%	0.7%	1.8%	71.9%	28.1%

1 due to a lack of data not included in this assessment

2 Based on dredge dumping areas. Due to a lack of data extraction of dredged material is not included in this assessment

3 Including steaming activities of military, fisheries and cargo vessels, dropped military munitions and waste at ports

Table 12: *IR reduction by exclusion of activity groups in each of the MPAs*

Exclusion of specific activity groups	Borkum Reef Grounds	Brown Ridge	Cleaver Bank	Dogger Bank	Frisian Front subarea 1	Frisian Front subarea 2	North Sea Coastal Zone	Central oyster Grounds	Raan Flats	Voordelta
Mining	0	0.11	0.07	0.10	0.50	0.01	0.78	0	0.02	0.16
Dredging and Dumping[2]	0	0	0	0	0	0	0	0	0	0.02
Anchoring[1]										
Infrastructure	0.05	0.09	0.02	0.11	0.11	0.01	0.04	0.06	0.001	0.01
Aquaculture[1]										
Benthic trawl fisheries	0.28	6.27	8.83	7.39	12.44	0.25	24.66	2.45	0.56	4.44
Pelagic trawl fisheries	0.08	0.23	0.46	1.45	0.32	0.03	2.37	0.89	0	0
Static gear fisheries	0.64	1.94	0.06	0.65	0.77	0.20	24.66	0.06	0	3.45
Suction/hydraulic fisheries	0	0	2.31	0.08	0	0	0	0	0	0
Non-extractive activities	0.22	0.06	0.03	0.05	0.52	0.19	4.66	0.02	0.02	1.00
Other activities[3]	0.10	0.56	0.26	0.57	0.27	0.02	8.20	0.20	0.13	4.42
Exclusion of all extractive activities[4]	**1.01**	**8.55**	**11.73**	**9.68**	**14.03**	**0.48**	**52.48**	**3.40**	**0.58**	**8.07**

1 due to a lack of data not included in this assessment

2 Based on dredge dumping areas. Due to a lack of data extraction of dredged material is not included in this assessment

3 Including steaming activities of military, fisheries and cargo vessels, dropped military munitions and waste at ports

4 Equals the sum of the IR caused by Mining, Dredging and Dumping and all types of fisheries

Table 13: *For each selected species/habitat in a specific MPA this provides a measure of efficiency expressed as the amount of Impact Risk (%) experienced per C-squares grid cell caused by all activities combined. Colors show the potential reduction per species (group) and area combinations. Green cells highlight areas with the highest reduction potential, while red cells show areas with the lowest. The color scale is applied within each species or habitat separately, meaning that values are ranked per species/habitat rather than to fixed categories The areas where the species is designated are presented in bold with an asterix (*).*

MPA	Sublittoral sediment	Ostrea edulis	Sabellaria spinulosa	Fish	Harbour porpoise	Great black-backed gull	Common scoter	Common eider	Great crested grebe
Borkum Stones	0.006	0.001	0.001	0.031	0.024	0.004	0.007	0.00001	
Brown Ridge	0.015	0.001	0.076	0.031	0.03	**0.016***	0.00006	0.0002	0.003
Cleaver Bank	0.016	0.005	0.118	0.03	**0.012***	0.006			
Dogger Bank	**0.009***	0.0004	0.007	0.03	**0.010***	0.0001		0.0001	
Frisan Front subarea 1	0.008	0.004	0.005	0.031	0.026	0.001	0.00002		
Frisian Front subarea 2	0.012	0.047	0.017	0.031	0.011	0.002	0.00001		
North Sea Coastal Zone	**0.019***	0.002	0.021	0.029	**0.010***	0.032	**0.43***	**0.57***	0.015
Oyster Grounds	0.007	0.008	0.001	0.031	0.005	0.001			
Raan Expanse	**0.016***	0.0003	0.011	0.03	**0.002***	0.015	0.001		0.011
Voordelta	**0.012***	0.0003	0.004	0.026	**0.002***	0.082	**0.11***	**0.079***	**0.038***

4.4 Guidance for strict protection

Achieving effective conservation of marine biodiversity requires targeted measures to mitigate cumulative human impacts in ecologically sensitive areas. Within the Dutch continental shelf, certain activities can exert significant pressures on vulnerable species and habitats. By identifying key regions where exclusions of specific activities can yield the greatest benefits, strategic protection can be implemented that supports ecosystem recovery, preserves biodiversity, and ensures the long-term health of marine environments. This guidance can be applied to identify priority areas for strict protection, including the activities to exclude (causing socio-economic impact) and the ecological gain (reducing ecological impact) this provides.

4.4.1 Strict protection according to MPA-guide

Following the MPA guide by Grorud-Colvert et al. (2021), mining, dredging & dumping and fisheries are not allowed under a strict protection regime (**Figure 1**). If one or more of these activities are allowed, then the MPA could only be classified as minimally protected or incompatible with biodiversity conservation, regardless of regulations on other activities (Grorud-Colvert et al. 2021; Aminian-Biquet et al. 2024). Some other activities are allowed under regulated conditions (minimal impact, section 2.1.1). **Table 14** provides an overview of activities and their conditions under strict protection including an indication of the effort required in each MPA to achieve this level. Currently, none of the MPAs meet the requirements for all activities and none of the activities meet the requirements in all MPAs. For only one MPA, the Central oyster Grounds, exclusion of fisheries will enable the area to be considered as strictly protected, provided that there are no dredging & dumping and no oil- & gas extractive activities within the area and measures are in place to ensure minimal impact from other activities. Because strict protection does not allow extractive activities and

large scale infrastructure, the other MPAs are incompatible with a strict protection regime due to the presence of oil and/or gas platforms. Strict protection in these MPAs might be possible if areas surrounding the platforms are excluded, i.e. by zoning.

Table 14: *Guidance for strict protection on the Dutch North Sea, based on the MPA Guide (Grorud-Colvert et al. 2021) X = Not allowed; ≈ Under regulated conditions (minimal impact). Colour codes indicate the consequences for activities in case strict protection applies, where activities in MPAs that are marked: green are currently not present (or unlikely to be present) and will thus not/hardly be affected by strict protection; red are currently present and not allowed under strict protection; orange are currently present and allowed with minimal impact under strict protection and will thus be partly affected by strict protection. The presence of activities is based on spatial data (see Annex 5), management plans (Rijkswaterstaat 2023d; 2016c; 2016a; 2016b) and (Sandig, Tamis, and Jongbloed 2024).*

MPAs	Activity groups						
	Mining	**Dredging and dumping**	**Fisheries**	**Anchoring***	**Infrastructure**	**Aquaculture***	**Non-extractive activities**
	X	X	X	≈	≈	≈	≈
	Surface mineral and/or oil/gas extraction not allowed	Dredging & dumping not allowed	Fisheries not allowed*	Anchoring with low impact, small-scale, and short duration allowed	Small scale infrastructure** with minimal impact allowed	Aquaculture for the purpose of harvesting seafood is not allowed#.	Only allowed with minimal to low impact, low density, and/or small-scale
Borkum Reef Grounds	Present[1]	No dumping sites, dredging unlikely[3]	Area based measures proposed[4]	Anchoring unlikely[3]	Platforms present (IR 0.05%)	Aquaculture unlikely[3]	Present (IR 0.22%)
Brown Ridge	Present[1]	No dumping sites, dredging unlikely[3]	Area based measures proposed[4]	Anchoring unlikely[3]	Platforms present (IR 0.09%)	Aquaculture unlikely[3]	Present (IR 0.06%)
Dogger Bank	Present[1]	No dumping sites, dredging unlikely[3]	Area based measures proposed[4]	Anchoring unlikely[3]	Platforms present (IR 0.11%)	Aquaculture unlikely[3]	Present (IR 0.05%)
Frisian Front subarea 1	Present[1]	No dumping sites, dredging unlikely[3]	Area based measures apply and are proposed[4]	Anchoring unlikely[3]	Platforms present (IR 0.11%)	Aquaculture unlikely[3]	Present (IR 0.52%)
Frisian Front subarea 2	Present[1]	No dumping sites, dredging unlikely[3]	Area based measures apply and are proposed [4]	Anchoring unlikely[3]	Platforms present (IR 0.01%)	Aquaculture unlikely[3]	Present (IR 0.19%)
Cleaver Bank	Present[1]	No dumping sites, dredging unlikely[3]	Area based measures apply and are proposed [4]	Anchoring unlikely[3]	Platforms present (IR 0.02%)	Aquaculture unlikely[3]	Present (IR 0.03%)
North Sea Coastal Zone	Present[1]	Allowed[2,3]	Area based measures apply[2,4]	Area based measures apply[2]	Platforms present (IR 0.04%)	Aquaculture potentially present[3]	Present (IR 4.66%)
Central oyster grounds	Oil/gas extraction not present, potential mineral extraction[1]	No dumping sites, dredging unlikely[3]	Area based measures apply and are proposed [4]	Anchoring unlikely[3]	No platforms present (IR 0.06%)	Aquaculture unlikely[3]	Present (IR 0.02%)
Raan Flats	Present[1]	Allowed[2,3]	Area based measures apply[2,4]	Allowed [2,3]	Platforms present (IR 0.001%)	Allowed [2,3]	Present (IR 0.02%)
Voordelta	Present[1,2]	Present[2]	Area based measures apply[2,4]	Unknown[3]	Platforms present (IR 0.01%)	Allowed [2,3]	Present (IR 1.00%)

* except for scientific monitoring purposes

** allowed structures are only for conservation, scientific, navigational, or sustainable tourism purposes, thus excluding structures for (non) renewable energy (e.g. oil/gas platforms, wind turbines)

Restoration works using aquaculture techniques may be allowed

1. In the North Sea a permit is required for sand and gravel extraction, which is allowed (with a permit) seaward of the continuous Normal Amsterdam Level (NAP) -20 meter depth line (www.noordzeeloket.nl). The extraction of sand is of national importance as it is used for coastline protection and also for construction on land. Extraction of gravel hardly occurs, Shells may be extracted in water deeper than -5 meters NAP. There are no MPAs that prohibit extraction of surface minerals.
2. This activity is included (allowed) in the MPA management plan (Rijkswaterstaat 2023d; 2016c; 2016a; 2016b). Activities may be allowed: 1) with permit requirement; 2) without a permit requirement (no conditions apply); or 3) exemption from the permit requirement under certain conditions. Zoning may apply, see Table 2 for zones in the North Sea Coastal Zone and Voordelta with additional protection based on access restriction decisions that could be considered as strictly protected
3. The presence of the activity could not be determined based on the spatial data used in this analysis. It is considered unlikely that dredging, anchoring and aquaculture occurs in the offshore areas, as these activities are assumed to be related to the coastal zone.
4. See Table 2 and Table 3 for zones in the MPAs

4.4.2 Guidance for a gradual and targeted strict protection

Policymakers often face the challenge of balancing ecological opportunities and socio-economic developments. A binary approach (e.g. strict protection allowing basically no activities at all) can lead to complex challenges. To quantify and visualise progress in taking steps toward various levels of protection, understanding the reduction in Impact Risk (IR) achieved by restriction of specific activities provides valuable guidance for decision-making. The paragraphs below outline, for each assessed area, the species requiring protection under legislation and the most effective and efficient strategies for achieving the desired ecological improvement. Furthermore, the socio-economic impacts of restricting specific activities in these areas are evaluated based on the presence of a specific activity within an area compared to the total deployment across the entire Dutch EEZ.

In the **North Sea Coastal Zone**, which accounts for about 2.3% of the Dutch marine area, fisheries are the main source of Impact Risk (IR) for common eider (*Somateria mollissima*, IR 44.7%) and common scoter (*Melanitta nigra*, IR 34.1%) (**Table 10**). Benthic trawl and static gear fisheries are the primary drivers to the total threat, while "other activities" also contribute significantly. Other designated species experiencing IR include great black-backed gull (*Larus marinus*), great crested grebe (*Podiceps cristatus*), various fish species fish, and sublittoral sediment (H1110B). For the common eider, common scoter and sublittoral sediment, measures in the North Sea Coastal Zone are the most efficient among the MPAs (**Table 13**). About 8.8% of all benthic trawl effort in the Dutch EEZ takes place in this area (**Table 11**), indicating relatively high fishing intensity. Excluding all extractive activities (e.g. mining, dredging and dumping, and all types of fishing) would greatly reduce the IR for these species and habitats by in total 52.5% (**Table 12**), but would also entail considerable socio-economic costs for local users.

In the **Voordelta** (area extent 1.3% of Dutch marine area), fisheries and "other activities" contribute equally to the total threat of this area, followed by non-extractive activities. This region exhibits high IR for bird species, with most IR for the designated common scoter, followed by great black-backed gull, common eider and great crested grebe (**Table 10**). Approximately 1.9% of benthic trawl effort, 0.6% of the static gear fisheries, 3.1% of non-extractive activities and only 1.8% of the "other activities" in the Dutch EEZ occur here (**Table 11**), which are significantly smaller proportions compared to the North Sea Coastal Zone. For the assessed bird species, especially great black-winged gull and the designated great crested grebe, measures in the Voordelta are the most efficient (**Table 13**). Excluding all extractive activities would reduce the IR by approximately 8%, whereas exclusion of non-extractive activities would reduce the IR further by 1% (**Table 12**). The Voordelta's ecological sensitivity makes it a priority for targeted management. Based on the spatial data used for human activities (Annex 5), the Voordelta is the only MPA with a designated site for dumping of dredged material. Considering this site comprises only 0.3% of all dumping areas in the Dutch EEZ (**Table 11**), this indicates that nearly all dumping activities occur outside MPAs. Due to a lack of data, extraction of dredged material is not included in this assessment.

The main source of IR in the **Frisian Front subarea 1** (area extent 2.0% of Dutch marine area) is benthic trawling. Total IR from benthic trawling is 12.4% whereas other activities each cause less than 1% IR (**Table 12**). Measures involving the exclusion of benthic trawl fisheries is thus important to protect key habitats and species, including mostly the native European flat oyster (*Ostrea edulis*) but also ross worm (*Sabellaria spinulosa*), fish species, harbour porpoise (*Phocoena phocoena*), and sublittoral sediment in general. It should be noted that the IR from benthic trawling does not account for the fisheries management measures that apply since 2023 (European Commission. 2023). This area is relevant for habitat restoration, particularly for oyster beds and ross worm reefs, which experience high IR (7.4% and 2.6%, respectively). Fisheries are a primary driver of these risks, and their removal would facilitate habitat recovery and enhance biodiversity. Another important activity taking place in the Frisian Front is mining which here mainly involves oil and/or gas extraction (Annex 5). About 7.1% of all mining in the Dutch EEZ takes place in this MPA (**Table 11**), indicating relatively high mining intensity. Excluding all extractive activities (e.g. mining, dredging and dumping, and all types of fishing) would reduce the IR for these species and habitats by in total 14% (**Table 12**).

In the **Frisian Front subarea 2**, which makes up about 0.7% of the Dutch marine area, fish and harbour porpoise have the highest Impact Risk (**Table 10**). However, within this MSFD area, sea floor integrity is of main importance. Together with non-extractive activities, benthic trawl fisheries and static gear fisheries

mainly contribute to the overall threat (**Table 12**). With respectively 1.1%, 0.3% and 1.2% of the total Dutch EEZ effort (**Table 11**), a restriction for these activities within this area would have a relatively low socio-economic effect. It should be noted that the IR from benthic trawling does not account for the fisheries management measures that are in force since 2023 (European Commission. 2023). Excluding all extractive activities (e.g., mining, dredging and all fishing methods) could reduce the IR by 0.48 (**Table 12**).

On the **Cleaver Bank**, which accounts for about 2.5% of the Dutch marine area, fisheries are also the main source of IR for ross worm, various fish species and sublittoral sediment (**Table 10**). Benthic trawl fisheries are causing the most IR of all types of fisheries, followed by suction/hydraulic trawl fisheries. Other designated species experiencing IR include harbour porpoise. For the ross worm, measures in the Cleaver Bank are the most efficient (**Table 13**). About 6% of all benthic trawl effort in the Dutch EEZ takes place in this area (**Table 11**), indicating relatively high fishing intensity. It should be noted that the IR from benthic trawling does not account for the fisheries management measures that are in force since 2023 (European Commission. 2023). Excluding all extractive activities (e.g. mining, dredging and dumping, and all types of fishing) would reduce the impact risk by in total 11.7% (**Table 12**).

In the **Dogger Bank**, which covers about 7.6% of the Dutch marine area, fisheries are the main source of IR, especially for various fish species (8.6%), harbour porpoise (2.7%) and sublittoral sediment (H1110C, 2,5%) (**Table 9**). Benthic trawl and pelagic trawl fisheries are the main contributors to this IR, while other activities play a minor part (**Table 12**). A relatively high share of pelagic trawl effort takes place in the Dogger Bank: 9.3% of all pelagic trawling in the Dutch EEZ occurs here, which is nearly half of the total pelagic effort inside all Dutch MPAs (26.3%) (**Table 11**). Benthic trawl fisheries are also significant (7.9% of total EEZ effort in the Dogger Bank). Excluding all extractive activities (e.g., mining, dredging and dumping, and all types of fishing) would reduce the IR here by 9.7% (**Table 12**), although this would entail considerable socio-economic challenges for local fisheries and oil and gas industries

In the **Brown Ridge**, which covers about 2.2% of the Dutch marine area, Natura 2000 designation focuses on six seabird species including the great black-backed gull (Annex 2). Yet, this area is also important for ross worm, various fish species and harbour porpoise (**Table 10**). Moreover, implementing restrictions in this area proves to be the most effective way to reduce IR per unit of surface area for harbour porpoise and various fish species (**Table 13**). While legislation under Natura 2000 does not strictly require closing this area for bottom- of water column- disturbing activities, the ecological potential of the area may give substantiated reason for additional closure of activities. Benthic trawl and static gear fisheries are the main contributors to IR in the Brown Ridge (**Table 12**). A notable share of static gear fisheries (7.0% of total EEZ effort) and 4.3% of benthic trawl fisheries (**Table 11**) takes place here. Excluding all extractive activities (e.g., mining, dredging and dumping, and all types of fishing) could reduce the IR by 8.6% (**Table 12**).

In the **Central oyster Grounds**, which covers about 3.3% of the Dutch marine area, also fisheries are the main source of IR. This mainly applies for various fish species, European flat oyster and sublittoral sediment (**Table 10**). Within this MSFD area, sea floor integrity is of main importance. Benthic trawl fisheries contribute mainly to the overall threat (**Table 12**). With only 2.3% of the total Dutch EEZ effort (**Table 11**), the restriction of benthic trawl fisheries within this area could provide a desirable improvement for habitats and species that rely primarily on the seafloor. It should be noted that the IR from benthic trawling does not account for the fisheries management measures that are in force since 2023 (European Commission. 2023). Excluding all extractive activities (e.g., mining, dredging and dumping, and all types of fishing) would reduce the total IR by 3.40% (**Table 12**).

Like for areas all MPAs, in the **Borkum Reef Grounds**, which covers about 1.1% of the Dutch marine area, fisheries are the main source of IR, particularly for ross worm, various fish species and harbour porpoise (**Table 10**). Static gear fisheries and benthic trawl fisheries are the primary contributors to the overall threat within this area (**Table 12**). This area is relatively small but hosts valuable marine life, including various reefs and sublittoral habitats. Within this MSFD area, sea floor integrity is of main importance. With only 0.3% of the total Dutch EEZ effort (**Table 11**), the restriction of benthic trawl fisheries within this area could provide a desirable improvement for ross worm and boost biodiversity within this area. Excluding all extractive activities (such as mining, dredging and dumping, and all types of fishing) would reduce the overall IR by 1% (**Table 12**).

In the **Raan Flats**, which covers about 0.7% of the Dutch marine area, fisheries are the main source of IR. Despite the relatively low IR and thus a low contribution to the overall threat of this area to the total IR of the Dutch EEZ, effects should still be minimized to meet set targets per area. In this area benthic trawl fisheries are the main contributors, though "other activities" also play a role. Sublittoral sediment (H1110B) and Sabellaria spinulosa experience lower IR values but remain affected by local activities. Excluding all extractive activities (e.g. mining, dredging and dumping, and all types of fishing) would reduce the overall IR by 0.58% (**Table 12**).

5 Discussion and Conclusion

5.1 Discussion

Any spatial management aimed at the conservation of specific species and/or habitats depends on the availability and quality of spatial information, not just of the species/habitats but also of the human activities being managed. As the very nature of threatened and declining species or low abundances in general prevents adequate monitoring of the species and thus the availability of spatial information, this study is principally aimed at identifying the species/habitats that mostly required additional protection. It also provides an approach that unambiguously identifies how this additional protection can be achieved if the required data are available. The presented results should therefore be primarily considered a proof of concept of the science advice that can be provided to guide this process, as well as an indication of the knowledge requirements that come with such advice requests. This discussion will contemplate the results in that light.

The inventory of available spatial information on the selection of species/habitats requiring stricter protection based on their conservation status showed that often spatial information was lacking. The limited selection of activities and species/habitats for which spatial distributions were available, however, did allow scientific advice to be provided to guide the selection of protection regimes, thereby proving the suitability of this approach and pointing towards data gaps that need to be addressed in order to improve the quality of advice.

For some species, population trends indicate concerning developments that warrant attention which is not yet reported in official status reports. The harbour seal (*Phoca vitulina*) population for instance, which had been growing at an average annual rate of 8% since 2003, showed significant changes after 2013, with growth halting entirely. Since 2020, the population has been decreasing steadily, with an average decline of 5% per year in the Dutch Wadden Sea over the past four years. Long-term monitoring data reveal that almost no pups have survived to adulthood for over a decade (Galatius et al. 2024). According to S. Brasseur (personal communication, January 2025), the current conservation status of the harbour seal is not favourable. However, since the latest status reports indicate a favourable state, harbour seal was not included in these analyses.

Results show the estimated restoration potential values are heavily dependent on the applied spatial distributions. For some species, those spatial distributions are mere snapshots based on a specific year or short period in time, which may compromise representativity. For instance, within the Dutch part of the North Sea the great crested grebe (*Podiceps cristatus*) is primarily observed along the coasts of North and South Holland. This pattern could genuinely reflect the species' preference for these areas, but it may also be a result of limitations in monitoring coverage. As a result, IR for the great crested grebe within coastal Natura 2000 sites may be underestimated due to incomplete spatial coverage in monitoring efforts. Another issue concerning the use of species distribution is that these distributions are a reflection of the situation under (past and present) human influence. Due to the presence and dispersal of human activities and their pressures, species distribution may already be affected e.g. by behavioral responses to disturbance. Thus the applied spatial distributions already include a certain level of impact of human activities which may affect the calculation of IR.

Moreover, it can be expected that even a representative distribution based on a period in the past may differ considerably in the future as a consequence of, e.g., climate change. Certain species and their inclusion in the analysis also warrant further consideration. For example, the common eider, while designated in the North Sea Coastal Zone and thus included in the analysis, is predominantly associated with the Wadden Sea, making its inclusion less relevant to offshore North Sea management. Much of the same applies to the spatial distributions of the human activities, although for those the future distributions are more likely to be affected by socio-economic drivers like the energy transition.

Human activities impact species/habitats through pressures, some of which are known to disperse. While non-dispersing pressures can be considered a good-enough proxy by the spatial extent of these activities, dispersing pressures like contaminants, noise, visual disturbance, and litter require a more nuanced representation, as their impacts extend beyond the immediate location of the activity. These complexities were not addressed in this study and remain an area for further refinement.

Note that for each of the protection scenarios where a specific activity is excluded from an MPA, the assumption is that the corresponding amount of activity is removed from the ecosystem. Certainly in the case of fisheries, a closure without additional reductions in capacity and/or effort is likely to result in the reallocation of effort to other areas, causing additional IR elsewhere and thus compromising the effective level of protection.

The results of this study align with approaches in neighboring North Sea basin countries, focusing mainly on the restriction of fisheries in designated areas to achieve the goal of 10% strict protection as required under frameworks such as the Birds and Habitats Directive (BHD) or the Marine Strategy Framework Directive (MSFD). This similarity of approach shows that this initial study is relevant and useful within the wider regional context of other EU member states. The approach of this study aligns with the 10% strict protection target by ensuring that key areas within the Dutch continental shelf meet the criteria for full protection as defined by Grorud-Colvert et al. (2021). These international guidelines however prescribe that mining is an incompatible activity with any protection level. However, in the Dutch context, ongoing oil and gas extraction within certain areas remains a given, creating a misalignment between international best practices and national guidelines.

To summarise, effective spatial management for marine conservation hinges on the availability and quality of spatial data of both the stressors, i.e. human activities and their pressures, as well as the receptors, i.e. species and habitats. Notably for the mobile species applies that this could be their actual spatial distribution (which may already be affected by past or current human activities) or what is referred to as their fundamental spatial distribution, i.e. as it would be in an undisturbed situation and thus mostly based on habitat suitability. Recognising the challenges of monitoring threatened species and habitats, this study focuses on identifying priority areas for additional protection and providing a clear approach to achieve it. The approach applied in this study conforms with the principles of ecosystem-based management for marine spatial planning strategies in order to achieve stricter protection. However, addressing gaps in spatial information and fate of dispersing pressures into future analyses are crucial next steps to improve the accuracy of this approach. Additionally, aligning national policies with international standards, particularly concerning extractive activities, remains a key challenge.

5.2 Conclusion

Across nearly all Marine Protected Areas (MPAs) in the Dutch EEZ, fisheries emerge as the primary contributor to the IR. The North Sea Coastal Zone and the Voordelta show high IR values for various bird species, whereas the Frisian Front and Cleaver Bank are important for reef-building species like respectively ross worm (*Sabellaria spinulosa*) and European flat oyster (*Ostrea edulis*). The Dogger Bank has a relatively high IR for various fish species, harbour porpoise (*Phocoena phocoena*), and sublittoral sediment, while the Brown Ridge MPA (despite its Natura 2000 designation focusing on seabirds) is also important for ross worm and harbour porpoise. MPAs such as the Central oyster Grounds, Borkum Reef Grounds, Frisian Front subarea 2, and Raan Flats also face fisheries impacts but to a smaller degree. Although excluding all extractive activities (e.g., mining, dredging, and fishing) would sharply reduce total threat across all MPAs, it would also bring considerable socio-economic consequences for the local industry.

While the risk-based approach provides an unambiguous estimate of the degree of protection achieved by the selected species and habitats, it cannot provide one "best" solution as this depends on the level of ambition (e.g. a selection of at least 10% or all designated MPAs), the level of protection (e.g. exclusion of only bottom-trawling, all fisheries or all human activities) and, depending on the previous choices, which species/habitats are to be preferred. The default scenario would be to apply pragmatic strict protection in all

MPAs (**Table 14**) as this is achievable and would meet (and even exceed) the 10% requirement. Other scenarios, however, require input from decision-makers on the criteria and options mentioned above. With this input this risk-based approach can be applied as a decision-support tool to identify what would be the preferred scenarios depending on the decision-makers preferences.

6 Quality Assurance

Wageningen Marine Research utilises an ISO 9001:2015 certified quality management system. The organisation has been certified since 27 February 2001. The certification was issued by DNV.

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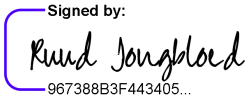
Justification

Report C027a/25
Project Number: 4318100494

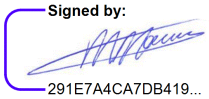
The scientific quality of this report has been peer reviewed by a colleague scientist and a member of the Management Team of Wageningen Marine Research

Approved: R.H. Jongbloed
Researcher

Signature: 

Date: 20 May 2025

Approved: Dr. A.M. Mouissie
Business Manager Projects

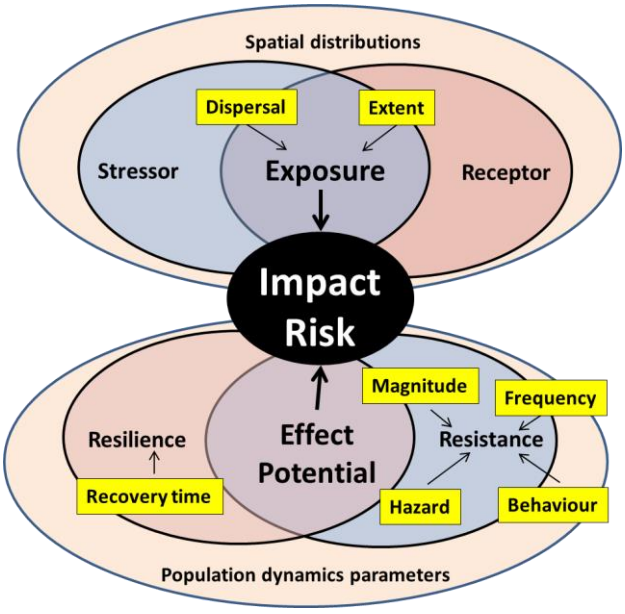
Signature: 

Date: 20 May 2025

Annex 1 SCAIRM: a Spatial Cumulative Assessment of Impact Risk for Management

At the basis of SCAIRM[9] is a linkage framework, consisting of impact chains that link causes to impacts via the main elements: activities, pressures and ecosystem components (e.g. "bottom trawl fishing" -> "abrasion/damage" -> "benthic community"). SCAIRM is based on the EU MSFD[10]. Human **activities** are sectoral at their basic level (e.g. fishing, renewable energy) which can be sub-divided into operations. **Pressures** (e.g. abrasion, noise) represent the mechanism through which human activities interact with the ecosystem. The **ecosystem components** include (at the most basic level) pelagic habitats, benthic habitats and species groups (birds, mammals, reptiles, fish, cephalopods).

Impact Risk (IR) as the change in equilibrium state of the receptor caused by a stressor is the key concept that allows cumulation across pressures. Impact Risk can be estimated per impact chain as Exposure*Effect Potential (***Figure 23***) using the spatial distributions of the stressor (i.e. activities-pressure), the spatial distributions of the receptor (i.e. ecosystem component) and population dynamics parameters. The SCAIRM output is basically an aggregation of Impact Risk across impact chains and thus cumulative pressures[1].



Extent = the footprint of the stressor (A-P) and the receptor EC, where they overlap is the exposure extent.
Dispersal= the potential of the P to spread and increase its spatial overlap beyond that of the Extent;
Hazard = the relative depletion of the EC from a single interaction with the P at maximum magnitude;
Magnitude = the average strength in the assessment area of the P where it is co-occurring with the EC;
Behaviour = behavioural response (e.g. avoidance) when an ecosystem component and a pressure co-occur in space and time determining the likelihood of interaction (i.e. actual contact that causes the effect);
Frequency = the average number of occurrences per year of the P in the area co-occurring with the EC (only applies in case of an intermittent interaction mechanism);
Recovery time = the number of years after impact until full recovery (to the EC's original undisturbed state).

Figure 23: *Calculation of Impact Risk from Exposure and Effect Potential which, in turn, can be estimated from respectively the spatial distributions of the stressor (i.e. activities-pressure) and receptor (i.e. ecosystem component) and population dynamics parameters resilience and resistance if quantitative information is available. If lacking, these can be estimated from the boxed terms using categorical scores based on expert judgement (Piet et al., 2023)[1].*

[10] EU Marine Strategy Framework Directive: Commission Directive (EU) 2017/845 and Commission Decision (EU) 2017/848 f

Annex 2 Offshore Natura 2000 objectives

Table B4.15: *Overview of conservation objectives for designated areas in the Dutch North Sea (offshore and coastal). The table includes area names, objectives, codes, descriptions, scientific names, target statuses, and contributions to habitat functions and is reported in Dutch. Objectives for population numbers and habitat quality are specified where relevant (=: maintain, >: expand). Relative contributions of each area to conservation goals are categorized (e.g., A1, B1). Data for this table is derived from https://www.natura2000.nl/.*

Area name	ID	Objective type	Code	Description	Scientific name	Status of objective	Target number of breeding pairs/ population size	Habitat function	Target area size	Target quality	Relative contribution
Doggersbank	164	Habitatsoort	H1351	Bruinvis	Phocoena phocoena	definitief	=		=	=	B1
Doggersbank	164	Habitatsoort	H1364	Grijze zeehond	Halichoerus grypus	definitief	=		=	=	C
Doggersbank	164	Habitatsoort	H1365	Gewone zeehond	Phoca vitulina	definitief	=		=	=	C
Doggersbank	164	Habitattype	H1110C	Permanent met zeewater van geringe diepte overstroomde zandbanken	Doggersbank	definitief	n.a.	n.a.	=	>	A4
Friese Front	166	Niet-Broedvogels	A199	Zeekoet	Uria aalge	definitief	behoud	SR	=	=	
Klaverbank	165	Habitatsoort	H1351	Bruinvis	Phocoena phocoena	definitief	=		=	=	B1
Klaverbank	165	Habitatsoort	H1364	Grijze zeehond	Halichoerus grypus	definitief	=		=	=	C
Klaverbank	165	Habitatsoort	H1365	Gewone zeehond	Phoca vitulina	definitief	=		=	=	C
Klaverbank	165	Habitattype	H1170	Riffen		definitief	n.a.	n.a.	=	>	A4
Noordzeekustzone	7	Habitatsoort	H1095	Zeeprik	Petromyzon marinus	definitief	>		=	=	B1
Noordzeekustzone	7	Habitatsoort	H1099	Rivierprik	Lampetra fluviatilis	definitief	>		=	=	B1
Noordzeekustzone	7	Habitatsoort	H1103	Fint	Alosa fallax	definitief	>		=	=	B1
Noordzeekustzone	7	Habitatsoort	H1351	Bruinvis	Phocoena phocoena	definitief	=		=	>	C
Noordzeekustzone	7	Habitatsoort	H1364	Grijze zeehond	Halichoerus grypus	definitief	=		=	=	B1-B2
Noordzeekustzone	7	Habitatsoort	H1365	Gewone zeehond	Phoca vitulina	definitief	=		=	=	B1-B2
Noordzeekustzone	7	Habitatsoort	H1903	Groenknolorchis	Liparis loeselii	definitief	=		=	=	C
Noordzeekustzone	7	Broedvogels	A137	Bontbekplevier	Charadrius hiaticula	definitief	20		=	=	B1
Noordzeekustzone	7	Broedvogels	A138	Strandplevier	Charadrius alexandrinus	definitief	30		>	>	B1
Noordzeekustzone	7	Broedvogels	A195	Dwergstern	Sterna albifrons	definitief	20		>	>	C
Noordzeekustzone	7	Niet-Broedvogels	A001	Roodkeelduiker	Gavia stellata	definitief	behoud	F	=	=	
Noordzeekustzone	7	Niet-Broedvogels	A002	Parelduiker	Gavia arctica	definitief	behoud	F	=	=	A2
Noordzeekustzone	7	Niet-Broedvogels	A017	Aalscholver	Phalacrocorax carbo	definitief	1900	SRF	=	=	B2
Noordzeekustzone	7	Niet-Broedvogels	A048	Bergeend	Tadorna tadorna	definitief	520	SRF	=	=	C
Noordzeekustzone	7	Niet-Broedvogels	A062	Toppereend	Aythya marila	definitief	behoud	F	=	=	B1-B2
Noordzeekustzone	7	Niet-Broedvogels	A063	Eider	Somateria mollissima	definitief	26200	F	=	=	A1
Noordzeekustzone	7	Niet-Broedvogels	A065	Zwarte zee-eend	Melanitta nigra	definitief	51900	F	=	=	
Noordzeekustzone	7	Niet-Broedvogels	A130	Scholekster	Haematopus ostralegus	definitief	3300	SR	=	=	C
Noordzeekustzone	7	Niet-Broedvogels	A132	Kluut	Recurvirostra avosetta	definitief	120	SR	=	=	C

Area name	ID	Objective type	Code	Description	Scientific name	Status of objective	Target number of breeding pairs/ population size	Habitat function	Target area size	Target quality	Relative contribution
Noordzeekustzone	7	Niet-Broedvogels	A137	Bontbekplevier	Charadrius hiaticula	definitief	510	SR	=	=	C
Noordzeekustzone	7	Niet-Broedvogels	A141	Zilverplevier	Pluvialis squatarola	definitief	3200	SR	=	=	B2
Noordzeekustzone	7	Niet-Broedvogels	A143	Kanoetstrandloper	Calidris canutus	definitief	560	SR	=	=	C
Noordzeekustzone	7	Niet-Broedvogels	A144	Drieteenstrandloper	Calidris alba	definitief	2000	SRF	=	=	A2
Noordzeekustzone	7	Niet-Broedvogels	A149	Bonte strandloper	Calidris alpina	definitief	7400	SR	=	=	B1-B2
Noordzeekustzone	7	Niet-Broedvogels	A157	Rosse grutto	Limosa lapponica	definitief	1800	SR	=	=	B1-B2
Noordzeekustzone	7	Niet-Broedvogels	A160	Wulp	Numenius arquata	definitief	640	SR	=	=	C
Noordzeekustzone	7	Niet-Broedvogels	A169	Steenloper	Arenaria interpres	definitief	160	SRF	=	=	B1
Noordzeekustzone	7	Niet-Broedvogels	A177	Dwergmeeuw	Larus minutus	definitief	behoud	F	=	=	
Noordzeekustzone	7	Habitattype	H1110B	Permanent met zeewater van geringe diepte overstroomde zandbanken	Noordzee-kustzone	definitief	n.a.	n.a.	=	>	A1
Noordzeekustzone	7	Habitattype	H1140B	Bij eb droogvallende slikwadden en zandplaten	Noordzee-kustzone	definitief	n.a.	n.a.	=	=	A3
Noordzeekustzone	7	Habitattype	H1310A	Eenjarige pioniersvegetaties van slik- en zandgebieden met Salicornia spp. en andere zoutminnende soorten	zeekraal	definitief	n.a.	n.a.	=	=	B1
Noordzeekustzone	7	Habitattype	H1310B	Eenjarige pioniersvegetaties van slik- en zandgebieden met Salicornia spp. en andere zoutminnende soorten	zeevetmuur	definitief	n.a.	n.a.	=	=	A1
Noordzeekustzone	7	Habitattype	H1330A	Atlantische schorren (Glauco-Puccinellietalia maritimae)	buitendijks	definitief	n.a.	n.a.	=	=	C
Noordzeekustzone	7	Habitattype	H2110	Embryonale wandelende duinen		definitief	n.a.	n.a.	=	=	A2
Noordzeekustzone	7	Habitattype	H2190B	Vochtige duinvalleien	kalkrijk	definitief	n.a.	n.a.	=	=	B1
Vlakte van de Raan	163	Habitatsoort	H1095	Zeeprik	Petromyzon marinus	definitief	>		=	=	C
Vlakte van de Raan	163	Habitatsoort	H1099	Rivierprik	Lampetra fluviatilis	definitief	>		=	=	C
Vlakte van de Raan	163	Habitatsoort	H1103	Fint	Alosa fallax	definitief	>		=	=	C
Vlakte van de Raan	163	Habitatsoort	H1351	Bruinvis	Phocoena phocoena	definitief	=		=	=	C
Vlakte van de Raan	163	Habitatsoort	H1364	Grijze zeehond	Halichoerus grypus	definitief	=		=	=	C
Vlakte van de Raan	163	Habitatsoort	H1365	Gewone zeehond	Phoca vitulina	definitief	=		=	=	C
Vlakte van de Raan	163	Habitattype	H1110B	Permanent met zeewater van geringe diepte overstroomde zandbanken	Noordzee-kustzone	definitief	n.a.	n.a.	=	=	B1
Voordelta	113	Habitatsoort	H1095	Zeeprik	Petromyzon marinus	definitief	>		=	=	A
Voordelta	113	Habitatsoort	H1099	Rivierprik	Lampetra fluviatilis	definitief	>		=	=	B
Voordelta	113	Habitatsoort	H1102	Elft	Alosa alosa	definitief	>		=	=	A
Voordelta	113	Habitatsoort	H1103	Fint	Alosa fallax	definitief	>		=	=	A
Voordelta	113	Habitatsoort	H1351	Bruinvis	Phocoena phocoena	definitief	=		=	>	C
Voordelta	113	Habitatsoort	H1364	Grijze zeehond	Halichoerus grypus	definitief	=		=	=	B1
Voordelta	113	Habitatsoort	H1365	Gewone zeehond	Phoca vitulina	definitief	>		=	>	C
Voordelta	113	Niet-Broedvogels	A001	Roodkeelduiker	Gavia stellata	definitief	behoud	F	=	=	A1
Voordelta	113	Niet-Broedvogels	A005	Fuut	Podiceps cristatus	definitief	280	F	=	=	C
Voordelta	113	Niet-Broedvogels	A007	Kuifduiker	Podiceps auritus	definitief	6	F	=	=	B2
Voordelta	113	Niet-Broedvogels	A017	Aalscholver	Phalacrocorax carbo	definitief	480	SRF	=	=	B1

Area name	ID	Objective type	Code	Description	Scientific name	Status of objective	Target number of breeding pairs/ population size	Habitat function	Target area size	Target quality	Relative contribution
Voordelta	113	Niet-Broedvogels	A034	Lepelaar	Platalea leucorodia	definitief	10	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A043	Grauwe gans	Anser anser	definitief	70	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A048	Bergeend	Tadorna tadorna	definitief	360	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A050	Smient	Anas penelope	definitief	380	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A051	Krakeend	Anas strepera	definitief	90	F	=	=	B1
Voordelta	113	Niet-Broedvogels	A052	Wintertaling	Anas crecca	definitief	210	F	=	=	B1
Voordelta	113	Niet-Broedvogels	A054	Pijlstaart	Anas acuta	definitief	250	F	=	=	B1
Voordelta	113	Niet-Broedvogels	A056	Slobeend	Anas clypeata	definitief	90	F	=	=	B1
Voordelta	113	Niet-Broedvogels	A062	Toppereend	Aythya marila	definitief	80	F	=	=	
Voordelta	113	Niet-Broedvogels	A063	Eider	Somateria mollissima	definitief	2500	F	=	=	
Voordelta	113	Niet-Broedvogels	A065	Zwarte zee-eend	Melanitta nigra	definitief	9700	F	=	=	C
Voordelta	113	Niet-Broedvogels	A067	Brilduiker	Bucephala clangula	definitief	330	F	=	=	B2
Voordelta	113	Niet-Broedvogels	A069	Middelste zaagbek	Mergus serrator	definitief	120	F	=	=	B1
Voordelta	113	Niet-Broedvogels	A130	Scholekster	Haematopus ostralegus	definitief	2500	SRF	=	=	
Voordelta	113	Niet-Broedvogels	A132	Kluut	Recurvirostra avosetta	definitief	150	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A137	Bontbekplevier	Charadrius hiaticula	definitief	70	SRF	=	=	B1
Voordelta	113	Niet-Broedvogels	A141	Zilverplevier	Pluvialis squatarola	definitief	210	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A144	Drieteenstrandloper	Calidris alba	definitief	350	SRF	=	=	B1
Voordelta	113	Niet-Broedvogels	A149	Bonte strandloper	Calidris alpina	definitief	620	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A157	Rosse grutto	Limosa lapponica	definitief	190	SRF	=	=	B1
Voordelta	113	Niet-Broedvogels	A160	Wulp	Numenius arquata	definitief	980	SRF	=	=	C
Voordelta	113	Niet-Broedvogels	A162	Tureluur	Tringa totanus	definitief	460	SRF	=	=	B1
Voordelta	113	Niet-Broedvogels	A169	Steenloper	Arenaria interpres	definitief	70	SRF	=	=	
Voordelta	113	Niet-Broedvogels	A177	Dwergmeeuw	Larus minutus	definitief	behoud	F	=	=	B2
Voordelta	113	Niet-Broedvogels	A191	Grote stern	Sterna sandvicensis	definitief	behoud	F	=	=	A2
Voordelta	113	Niet-Broedvogels	A193	Visdief	Sterna hirundo	definitief	behoud	F	=	=	A2
Voordelta	113	Habitattype	H1110A	Permanent met zeewater van geringe diepte overstroomde zandbanken	getijdengebied	definitief	n.a.	n.a.	=	=	C
Voordelta	113	Habitattype	H1110B	Permanent met zeewater van geringe diepte overstroomde zandbanken	Noordzee-kustzone	definitief	n.a.	n.a.	=	=	B2
Voordelta	113	Habitattype	H1140A	Bij eb droogvallende slikwadden en zandplaten	getijdengebied	definitief	n.a.	n.a.	=	=	C
Voordelta	113	Habitattype	H1140B	Bij eb droogvallende slikwadden en zandplaten	Noordzee-kustzone	definitief	n.a.	n.a.	=	=	A1
Voordelta	113	Habitattype	H1310A	Eenjarige pioniersvegetaties van slik- en zandgebieden met Salicornia spp. en andere zoutminnende soorten	zeekraal	definitief	n.a.	n.a.	=	=	C
Voordelta	113	Habitattype	H1310B	Eenjarige pioniersvegetaties van slik- en zandgebieden met Salicornia spp. en andere zoutminnende soorten	zeevetmuur	definitief	n.a.	n.a.	=	=	C
Voordelta	113	Habitattype	H1320	Schorren met slijkgrasvegetatie (Spartinion maritimae)		definitief	n.a.	n.a.	=	=	C

Area name	ID	Objective type	Code	Description	Scientific name	Status of objective	Target number of breeding pairs/ population size	Habitat function	Target area size	Target quality	Relative contribution
Voordelta	113	Habitattype	H1330A	Atlantische schorren (Glauco-Puccinellietalia maritimae)	buitendijks	definitief	n.a.	n.a.	=	=	C
Voordelta	113	Habitattype	H2110	Embryonale wandelende duinen		definitief	n.a.	n.a.	=	=	B1
Voordelta	113	Habitattype	H2120	Wandelende duinen op de strandwal met Ammophila arenaria („witte duinen“)		definitief	n.a.	n.a.	=	=	C
Bruine Bank	168	Niet-Broedvogels	A177	Dwergmeeuw	Larus minutus	definitief	behoud	F	=	=	C
Bruine Bank	168	Niet-Broedvogels	A199	Zeekoet	Uria aalge	definitief	behoud	F	=	=	C
Bruine Bank	168	Niet-Broedvogels	A016	Jan-van-gent	Morus bassanus	definitief	behoud	F	=	=	C
Bruine Bank	168	Niet-Broedvogels	A175	Grote jager	Catharacta skua	definitief	behoud	F	=	=	C
Bruine Bank	168	Niet-Broedvogels	A187	Grote mantelmeeuw	Larus marinus	definitief	behoud	F	=	=	C
Bruine Bank	168	Niet-Broedvogels	A200	Alk	Alca torda	definitief	behoud	F	=	=	C

Annex 3 Draft Dutch MSFD assessment part 1 - 2024-2030

Source: (Ministerie I en W en LVVN in prep.). Contents of the tables reported in Dutch

Birds

(two pages). Assessment of the status of seabirds and coastal birds in the International North Sea (based on OSPAR indicators B1 and B3). Specific information on the Dutch part of the North Sea (NL) is also included under D1C2 and D1C3. D1C1 indicates whether species are at risk of bycatch based on their lifestyle (?, species with ?* have been reported as victims in the International North Sea, Dierschke et al. 2022b), or not (-). See main text for an explanation of the assessment. Green: status 'good', red: 'not good'. The last column shows the integrated assessment per functional group, indicating the % of elements assessed as 'good' (breeding bird + non-breeding bird) for the species assessed by OSPAR (rows with light blue background). Arrows indicate changes in status compared to the previous policy period (↑ improvement, ↓ deterioration). In the Dutch supplement, '*' indicates that the assessment was partly based on recently defined 'Favourable Reference Populations'; for the other species the assessment system was analogous to that of OSPAR.

soortgroep (kenmerk)	vogelsoort (element)	D1C1	D1C2 broedv.		D1C2 niet-brv.		D1C3		D1C5	beoordeling		
		bij-vangst	B1 broed	NL broed	B1 nietbr	NL nietbr	B3 repro	NL repro	habi-tat	broed-vogel	niet-broed	groep
Oppervlakte-foerageerders	noordse stormvogel	?*							?			42%
	drieteenmeeuw	-							?			
	kokmeeuw	-							?			
	zwartkopmeeuw	-		*					?			
	stormmeeuw	-							?			
	grote mantelmeeuw	-				*			?			
	zilvermeeuw	?*							?			
	kleine mantelmeeuw	?*		*					?			
	grote stern	-		*			↑		?			
	dwergstern	-		*			↑	?	?			
	Dougalls Stern	-							?			
	visdief	-		*				?	?			
	noordse stern	-		*					?			
	grote jager	-				*			?			
	kleine jager	-							?			
	stormvogeltje	-							?			
	dwergmeeuw	-				*						
	vorkstaartmeeuw	-										
	vaal stormvogeltje	-										
	noordse pijlstormvogel	-										
	vale Pijlstormvogel	-										
	rosse franjepoot	-										
Waterkolom-foerageerders	middelste zaagbek	?				*			?			82%
	roodhalsfuut	?							?			
	jan-van-gent	?*				*			?			
	aalscholver	?*		*		*			?			
	kuifaalscholver	?*							?			
	papegaaiduiker	?							?			
	Zwarte Zeekoet	?							?			
	Zeekoet	?*				*	↑		?			
	alk	?*				*			?			
	roodkeelduiker	?*				*						
	parelduiker	?				*						
	fuut	?				*						
	kuifduiker	?				*						
	kleine alk	?										
	ijsduiker	?*										
	grauwe pijlstormvogel	?										

(Tabel 1 vervolg)

soortgroep (kenmerk)	vogelsoort (element)	D1C1	D1C2 broedv.		D1C2 niet-brv.		D1C3		D1C5	beoordeling		
		bij-vangst	B1 broed	NL broed	B1 nietbr	NL nietbr	B3			broed-vogel	niet-broed	groep
Bodem-foerageerders	topper	?				*			?			25%
	eider	?*	↓	*		*		?	?	↓		
	brilduiker	?				*			?			
	grote zee-eend	?										
	zwarte Zee-eend	?*				*						
	ijseend	?										
Waadvogels (intergetijden-gebied)	bergeend	-				*			?			50%
	pijlstaart	-				*			?			
	wintertaling	-				*			?			
	lepelaar	-		*		*		?	?			
	kleine zilverreiger	-		*		*			?			
	scholekster	-				*			?			
	kluut	-		*		*			?			
	zilverplevier	-			↓	*			?		↓	
	goudplevier	-							?			
	bontbekplevier	-		*		*			?			
	strandplevier	-		*		*			?			
	regenwulp	-							?			
	wulp	-				*			?			
	rosse grutto	-				*			?			
	grutto	-							?			
	steenloper	-				*			?			
	kanoet	-				*			?			
	krombekstrandloper	-				*			?			
	drieteenstrandloper	-				*			?			
	bonte Strandloper	-				*			?			
	paarse Strandloper	-			↓				?		↓	
	kemphaan	-							?			
	tureluur	-				*			?			
	zwarte ruiter	-				*			?			
	groenpootruiter	-				*			?			

Fish

(two pages)

Coastal fish species

kenmerk	Soort	D3-stock	D1C2				D1C4		D1C5		Oordeel	Percentage soorten/bestanden met goede status
	Nederlandse naam	ICES-code	FC1	EL	HR-FRP	CFP-D3	HR-FRR	EL	HR-H	EL	Totaal	
Kustgebonden soorten	Fint											8% (drempelwaarde is 75%)
	Paling											
	Snotolf											
	Zeebaars	bss.27.4bc7ad-h										
	Zeebaars	bss.27.6a7bj										
	Rivierprik											
	Zeeprik											
	Pollak											
	Pollak	pol.27.3a4										
	Pollak	pol.27.67										
	Golfrog											
	Zeeforel											
	Puitaal											
	Zalm											

Pelagic fish species

kenmerk	Soort	D3-stock	D1C2				D1C4		D1C5		Oordeel	Percentage soorten/bestanden met goede status
	Nederlandse naam	ICES-code	FC1	EL	HR-FRP	CFP-D3	HR-FRR	EL	HR-H	EL	Totaal	
Pelagische soorten	Zandspiering?	san.sa.1r										40% (drempelwaarde is 75%)
	Zandspiering?	san.sa.2r										
	Zandspiering?	san.sa.3r										
	Zandspiering?	san.sa.4										
	Zandspiering?	san.sa.5r										
	Zandspiering?	san.sa.6										
	Zandspiering?	san.sa.7r										
	Reuzenhaai	bsk.27.nea										
	Reuzenhaai											
	Haring	her.27.1-24a514a										
	Haring	her.27.20-24										
	Haring	her.27.3a47d										
	Blauwe wijting	whb.27.1-91214										
	Sardien	pil.27.7										
	Makreel	mac.27.nea										
	Goudbrasem											
	Sprot	spr.27.3a4										
	Sprot	spr.27.7de										
	Horsmakreel	hom.27.2a4a5b6a7a-ce-k8										
	Horsmakreel	hom.27.3a4bc7d										
	Elft											
	Houting											

Demersal fish species

kenmerk	Soort	D3-stock	D1C2				D1C4		D1C5		Oordeel	Percentage soorten/bestanden met goede status
	Nederlandse naam	ICES-code	FC1	EL	HR-FRP	CFP-D3	HR-FRR	EL	HR-H	EL	Totaal	
Demersale soorten	Sterrog											29% (drempelwaarde is 75%)
	Sterrog	rjr.27.23a4										
	Zeewolf											
	Engelse poon	gur.27.3-8										
	Rode poon											
	Kongeraal											
	Pijlstaartrog											
	Scherpsnuitrog											
	Vleet	rjb.27.3a4										
	Grauwe poon	gug.27.3a47d										
	Kabeljauw	cod.27.21										
	Kabeljauw	cod.27.47d20										
	Kabeljauw	cod.27.7e-k										
	Ruwe haai											
	Ruwe haai	gag.27.nea										
	Witje	wit.27.3a47d										
	Blauwkeeltje											
	Heilbot											
	Gevlekte scharretong	idb.27.7b-k8abd										
	?	lez.27.4a6a										
	Scharretong											
	Scharretong	meg.27.7b-k8abd										
	Zandrog											
	Kaardrog											
	Kaardrog	rjf.27.67										
	Grootoogrog											
	Grootoogrog	rjn.27.3a4										
	Schar	dab.27.3a4										
	Grijze zeedulvel											
	Grijze zeedulvel	ank.27.78abd										
		anf.27.3a46										
	Zeedulvel											
	Zeedulvel	mon.27.78abd										
	Schelvis	had.27.46a20										
	Schelvis	had.27.7b-k										
	Wijting	whg.27.3a										
	Wijting	whg.27.47d										
	Wijting	whg.27.7b-ce-k										
	Heek	hke.27.3a46-8abd										
	Tongschar	lam.27.3a47d										
	Mul	mur.27.3a47d										
	Mul	mur.27.67a-ce-k89a										
	Gevlekte gladde haai	sdv.27.nea										
	Gladde haaien											
	Gaffelkabeljauw											
	Gaffelkabeljauw	gfb.27.nea										
	Bot	fle.27.3a4										
	Schol	ple.27.21-23										
	Schol	ple.27.420										
	Schol	ple.27.7bc										
	Schol	ple.27.7d										
	Schol	ple.27.7e										
	Koolvis	pok.27.3a46										
	Blonde rog											
	Blonde rog	rjh.27.4a6										
	Blonde rog	rjh.27.7afg										
	Stekelrog											
	Stekelrog	rjc.27.3a47d										
	Stekelrog	rjc.27.7e										
	Kleinoogrog											
	Kleinoogrog	rje.27.7fg										
	Gevlekte rog											
	Gevlekte rog	rjm.27.3a47d										
	Gevlekte rog	rjm.27.67bj										
	Gevlekte rog	rjm.27.7ae-h										
	Golfrog	rju.27.7de										
	Roggen?	raj.27.3a47d										
	Roggen?	raj.27.67a-ce-k										
	Tarbot	tur.27.3a										
	Tarbot	tur.27.4										
	Griet											
	Griet	bll.27.3a47de										
	Hondshaai											
	Hondshaai	syc.27.3a47d										
	Hondshaai	syc.27.67a-ce-j										
	Kathaai											
	Kathaai	syt.27.67										
	Roodbaars?											
	Kleine roodbaars											
	Tong	sol.27.20-24										
	Tong	sol.27.4										
	Tong	sol.27.7bc										
	Tong	sol.27.7d										
	Tong	sol.27.7e										
	Doornhaai	dgs.27.nea										
	Kever	nop.27.3a4										

Marine mammals

Assessment of the current status of marine mammals per species and species group. The individual results per indicator are also shown. For an explanation of the indicators, see the relevant criterion fact sheets. Green: good environmental status maintained/achieved, red: good environmental status not maintained/achieved, grey: not analysed, yellow: environmental status unknown. The assessment of D1C5 has not been included in the integrated assessment of the species (group). The integrated assessment was based on 'one out all out' (in accordance with the European Commission, 2022).

Soortgroep ('kenmerk')	Soort ('element')	D1C1	D1C2			D1C3		D1C4	D1C5	Oordeel element	Oordeel soortgroep
		M6	M3	M4	HR-FRP	M5	nat.	HR-FRR	HR-Hab		
Zeehonden	Grijze zeehond			n.v.t.			n.v.t.				
	Gewone zeehond			n.v.t.		n.v.t.					
Kleine tandwalvissen	Bruinvis		n.v.t.			n.v.t.	n.v.t.				

Annex 4 Identification of relevant species and habitats for restoration

The table below provides insight into the selection of relevant species and habitats for strict protection, outlining their current conservation status and their potential presence in the Dutch Continental Shelf. The urgency for restoration measures, and the potential for population or habitat recovery is derived from respectively the conservation status/the trend and the potential for IR reduction.

Table B4.16: *Identification of relevant species and habitats for restoration. Numbers in the "Directive" column indicate the legislative frameworks to which the habitat or species is linked: 1 = Birds and Habitats Directive (BHD); 2 = Marine Strategy Framework Directive (MSFD); 3 = Nature Restoration Regulation (NRR); 4 = OSPAR Threatened and Declining Species and Habitats List. The North Sea species list is derived from Bos et al. (2016)[11].*

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Habitat	Coast	Embryonic dunes	Embryonale duinen	n.a.	Favourable	1	No	n.a.	No
Habitat	Coast	Moist dune slacks	Vochtige duinvalleien	n.a.	Unfavourable - inadequate	1	No	n.a.	No
Habitat	Coast	Mudflat vegetation	Slijkgrasvelden	n.a.	Unfavourable - inadequate	1	No	n.a.	No
Habitat	Coast	Mudflats and sandbanks	Slik- en zandplaten	n.a.	Unfavourable - inadequate	1	No	n.a.	No
Habitat	Coast	Saline pioneer vegetation	Zilte pionierbegroeiingen	n.a.	Unfavourable - inadequate	1	No	n.a.	No
Habitat	Coast	Salt marshes and saline grasslands	Schorren en zilte graslanden	n.a.	Unfavourable - inadequate	1	No	n.a.	No
Habitat	Coast	White dunes	Witte duinen	n.a.	Favourable	1	No	n.a.	No
Habitat	Coast	Intertidal mudflats	Getijdenplaten	n.a.	Threatened and/or Declining	4	Yes	n.a.	Yes
Habitat	Coast	Intertidal Mytilus edulis beds on mixed and sandy sediments	Mosselbanken op droogvallende platen	n.a.	Threatened and/or Declining	4	Yes	n.a.	Yes
Habitat	Group 1: Seagrass meadows	Seagrass meadows on littoral sand (Atlantic Ocean)	Zeegrasvelden op litoraal zand (Atlantische Oceaan)	n.a.	Unknown	3	No	n.a.	No
Habitat	Group 1: Seagrass meadows	Seagrass meadows on littoral mud (Atlantic Ocean)	Zeegrasvelden op litorale modder (Atlantische Oceaan)	n.a.	Unknown	3	No	n.a.	No
Habitat	Group 1: Seagrass meadows	Seagrass meadows on infralittoral sand (Atlantic Ocean)	Zeegrasvelden op infralitoraal zand (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 3: Mussel- and oyster beds	Reefs with bivalves in the circalittoral zone (Atlantic Ocean)	Riffen met tweekleppigen in de circalitorale zone (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes

[11] Bos, O.G., Gittenberger, A., Boois, I.J. de, Asch, M. van, Wal, J.T. van der, Cremer, J., Hoorn, B. van der, Pieterse, S.M., Bakker, P.A.J., 2016. Soortenlijst Nederlandse Noordzee. Wageningen Marine Research Den Helder, Research Rapport C125/16A. http://edepot.wur.nl/401117

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Habitat	Group 4: Calcareous algae meadows	Calcareous algae meadows on infralittoral coarse sediment (Atlantic Ocean)	Kalkwiervelden op infralitoraal grof sediment (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 5: Sponge, coral and coralline fields	Fauna communities on circalittoral rocks (Atlantic Ocean)	Faunagemeenschappen op circalitoraal gesteente (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 6: Hydrothermal and cold submarine vents	Hydrothermal and cold submarine vents on circalittoral rocks (Atlantic Ocean)	Hydrothermale en koude submariene bronnen op circalitoraal gesteente (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 6: Hydrothermal and cold submarine vents	Hydrothermal and cold submarine vents on circalittoral rocks from the coast (Atlantic Ocean)	Hydrothermale en koude submariene bronnen op circalitoraal gesteente uit de kust (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 6: Hydrothermal and cold submarine vents	Hydrothermal and cold submarine vents on circalittoral mud (Atlantic Ocean)	Hydrothermale en koude submariene bronnen op circalitorale modder (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 6: Hydrothermal and cold submarine vents	Hydrothermal and cold submarine vents on circalittoral coastal mud (Atlantic Ocean)	Hydrothermale en koude submariene bronnen op circalitorale modder uit de kust (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 6: Hydrothermal and cold submarine vents	Hydrothermal and cold submarine vents on infralittoral rocks (Atlantic Ocean)	Hydrothermale en koude submariene bronnen op infralitoraal gesteente (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 6: Hydrothermal and cold submarine vents	Hydrothermal and cold submarine vents on infralittoral mud (Atlantic Ocean)	Hydrothermale en koude submariene bronnen op infralitorale modder (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Littoral mixed sediment (Atlantic Ocean)	Litoraal gemengd sediment (Atlantische Oceaan)	n.a.	Unknown	3	No	n.a.	No
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Littoral coarse sediment (Atlantic Ocean)	Litoraal grof sediment (Atlantische Oceaan)	n.a.	Unknown	3	No	n.a.	No
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral mixed sediment (Atlantic Ocean)	Circalitoraal gemengd sediment (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral coastal mixed sediment (Atlantic Ocean)	Circalitoraal gemengd sediment uit de kust (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not	Circalitoral coarse sediment (Atlantic Ocean)	Circalitoraal grof sediment (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
	deeper than 1,000 meters)								
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral coastal coarse sediment (Atlantic Ocean)	Circalitoraal grof sediment uit de kust (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral sand (Atlantic Ocean)	Circalitoraal zand (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral coastal sand (Atlantic Ocean)	Circalitoraal zand uit de kust (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral mud (Atlantic Ocean)	Circalitorale modder (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Circalitoral mud from the coast (Atlantic Ocean)	Circalitorale modder uit de kust (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Infralittoral mixed sediment (Atlantic Ocean)	Infralitoraal gemengd sediment (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Infralittoral coarse sediment (Atlantic Ocean)	Infralitoraal grof sediment (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Infralittoral sand (Atlantic Ocean)	Infralitoraal zand (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Infralittoral mud (Atlantic Ocean)	Infralitorale modder (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Littoral sand (Atlantic Ocean)	Litoraal zand (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Group 7: Soft sediments (not deeper than 1,000 meters)	Littoral mud (Atlantic Ocean)	Litorale modder (Atlantische Oceaan)	n.a.	Unknown	3	Yes	n.a.	Yes
Habitat	Marine	Permanently submerged sandbanks	Permanent overstroomde zandbanken	n.a.	Unfavourable - bad	1	Yes	n.a.	Yes

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Habitat	Marine	Reefs	Riffen	n.a.	Unfavourable - bad	1	Yes	n.a.	Yes
Habitat	Marine	Benthic habitats (using indicator species and diversity)	Benthische habitats (ahv indicatorsoorten en diversiteit)	n.a.	Not GES	2	Yes	n.a.	Yes
Habitat	Marine	Pelagic habitats (using zooplankton and phytoplankton)	Pelagische habitats (ahv zoo- & fytoplantkton)	n.a.	Unknown	2	Yes	n.a.	Yes
Habitat	Marine	Ostrea edulis beds	Platte oesterriffen	n.a.	Threatened and/or Declining	4	Yes	n.a.	Yes
Habitat	Marine	Sabellaria spinulosa reefs	Zandkokerwormriffen	n.a.	Threatened and/or Declining	4	Yes	n.a.	Yes
Habitat	Marine	Sea-pen and burrowing megafauna communities	Zeeveer en gravende megafauna gemeenschappen	n.a.	Threatened and/or Declining	4	Yes	n.a.	Yes
Habitat	Marine	Zostera beds	Zeegrasvelden	n.a.	Threatened and/or Declining	4	Yes	n.a.	Yes
Species	Birds	Black scoter	Zwarte zee-eend	Melanitta nigra	Unfavourable - bad	1, 2	Yes	Yes	Yes
Species	Birds	Eider duck	Eider	Somateria mollissima	Unfavourable - bad	1, 2	Yes	Yes	Yes
Species	Birds	Great black-backed gull	Grote mantelmeeuw	Larus marinus	Unfavourable - bad	1, 2	Yes	Yes	Yes
Species	Birds	Great crested grebe	Fuut	Podiceps cristatus	Unfavourable - inadequate	1, 2	Yes	Yes	Yes
Species	Birds	Avocet	Kluut	Recurvirostra avosetta	Unfavourable - inadequate	1, 2	No	Yes	No
Species	Birds	Bar-tailed godwit	Rosse grutto	Limosa lapponica	Favourable	1, 2	No	Yes	No
Species	Birds	Common guillemot	Zeekoet	Uria aalge	Favourable	1, 2	Yes	Yes	No
Species	Birds	Common redshank	Tureluur	Tringa totanus	Unfavourable - inadequate	1, 2	No	Yes	No
Species	Birds	Cormorant	Aalscholver	Phalacrocorax carbo	Favourable	1, 2	Yes	Yes	No
Species	Birds	Dunlin	Bonte strandloper	Calidris alpina	Favourable	1, 2	No	Yes	No
Species	Birds	Eurasian curlew	Wulp	Numenius arquata	Favourable	1, 2	No	Yes	No
Species	Birds	Gadwall	Krakeend	Anas strepera	Favourable	1, 2	No	No	No
Species	Birds	Goldeneye	Brilduiker	Bucephala clangula	Unfavourable - bad	1, 2	No	Yes	No
Species	Birds	Great skua	Grote jager	Catharacta skua	Favourable	1, 2	Yes	Yes	No
Species	Birds	Grey plover	Zilverplevier	Pluvialis squatarola	Favourable	1, 2	No	Yes	No
Species	Birds	Greylag goose	Grauwe gans	Anser anser	Favourable	1, 2	No	No	No
Species	Birds	Horned grebe	Kuifduiker	Podiceps auritus	Favourable	1, 2	No	Yes	No
Species	Birds	Kentish plover	Strandplevier	Charadrius alexandrinus	Unfavourable - bad	1, 2	No	Yes	No
Species	Birds	Little gull	Dwergmeeuw	Larus minutus	Favourable	1, 2	Yes	Yes	No
Species	Birds	Little tern	Dwergstern	Sternula albifrons	Favourable	1, 2	Yes	Yes	No
Species	Birds	Northern gannet	Jan-van-gent	Morus bassanus	Favourable	1, 2	Yes	Yes	No
Species	Birds	Northern pintail	Pijlstaart	Anas acuta	Favourable	1, 2	No	Yes	No
Species	Birds	Northern shoveler	Slobeend	Anas clypeata	Favourable	1, 2	No	No	No
Species	Birds	Oystercatcher	Scholekster	Haematopus ostralegus	Unfavourable - bad	1, 2	No	Yes	No
Species	Birds	Razorbill	Alk	Alca torda	Favourable	1, 2	Yes	Yes	No
Species	Birds	Red knot	Kanoet	Calidris canutus	Favourable	1, 2	No	Yes	No
Species	Birds	Red-breasted merganser	Middelste zaagbek	Mergus serrator	Favourable	1, 2	No	Yes	No

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Species	Birds	Red-throated diver	Parelduiker	Gavia arctica	Favourable	1, 2	No	Yes	No
Species	Birds	Red-throated diver	Roodkeelduiker	Gavia stellata	Favourable	1, 2	No	Yes	No
Species	Birds	Ringed plover	Bontbekplevier	Charadrius hiaticula	Unfavourable - bad	1, 2	No	Yes	No
Species	Birds	Ringed plover	Bontbekplevier	Charadrius hiaticula	Favourable	1, 2	No	Yes	No
Species	Birds	Ruddy turnstone	Steenloper	Arenaria interpres	Unfavourable - inadequate	1, 2	No	Yes	No
Species	Birds	Sanderling	Drieteenstrandloper	Calidris alba	Favourable	1, 2	No	Yes	No
Species	Birds	Sandwich tern	Grote stern	Sterna sandvicensis	Favourable	1, 2	Yes	Yes	No
Species	Birds	Scaup	Topper	Aythya marila	Unfavourable - inadequate	1, 2	No	Yes	No
Species	Birds	Shelduck	Bergeend	Tadorna tadorna	Favourable	1, 2	No	Yes	No
Species	Birds	Spoonbill	Lepelaar	Platalea leucorodia	Favourable	1, 2	No	Yes	No
Species	Birds	Teal	Wintertaling	Anas crecca	Favourable	1, 2	No	No	No
Species	Birds	Wigeon	Smient	Anas penelope	Unfavourable - inadequate	1, 2	No	Yes	No
Species	Birds	Kittiwake	Drieteenmeeuw	Rissa tridactyla	Threatened and/or Declining	2, 4	Yes	Yes	Yes
Species	Fish	Twaite shad	Fint	Alosa fallax	Unfavourable - bad	1	Yes	Yes	Yes
Species	Fish	Atlantic halibut	Heilbot	Hippoglossus hippoglossus	Not GES	2	Yes	Yes	Yes
Species	Fish	Atlantic herring	Haring	Clupea harengus	Not GES	2	Yes	Yes	Yes
Species	Fish	Atlantic horse mackerel	Horsmakreel	Trachurus trachurus	Unknown	2	Yes	Yes	Yes
Species	Fish	Atlantic wolffish	Zeewolf	Anarhichas lupus	Not GES	2	Yes	Yes	Yes
Species	Fish	Blonde ray	Blonde rog	Raja brachyura	Unknown	2	Yes	Yes	Yes
Species	Fish	Blue whiting	Blauwe wijting	Micromesistius poutassou	Not GES	2	Yes	Yes	Yes
Species	Fish	Brill	Griet	Scophthalmus rhombus	Unknown	2	Yes	Yes	Yes
Species	Fish	Coalfish	Koolvis	Pollachius virens	Not GES	2	Yes	Yes	Yes
Species	Fish	Common sole	Tong	Solea solea	Not GES	2	Yes	Yes	Yes
Species	Fish	Common stingray	Gewone pijlstaartrog	Dasyatis pastinaca	Not GES	2	Yes	Yes	Yes
Species	Fish	Cuckoo ray	Grootoogrog	Leucoraja naevus	Unknown	2	Yes	Yes	Yes
Species	Fish	European flounder	Bot	Platichthys flesus	Unknown	2	Yes	Yes	Yes
Species	Fish	European pilchard	Europese sardine	Sardina pilchardus	Unknown	2	Yes	Yes	Yes
Species	Fish	European seabass	Europese zeebaars	Dicentrarchus labrax	Not GES	2	Yes	Yes	Yes
Species	Fish	Greater forkbeard	Gaffelkabeljauw	Phycis blennoides	Unknown	2	Yes	Yes	Yes
Species	Fish	Grey gurnard	Grauwe poon	Eutrigla gurnardus	Unknown	2	Yes	Yes	Yes
Species	Fish	Haddock	Schelvis	Melanogrammus aeglefinus	Not GES	2	Yes	Yes	Yes
Species	Fish	Lumpfish	Snotolf	Cyclopterus lumpus	Not GES	2	Yes	Yes	Yes
Species	Fish	Megrim	Scharrentong	Lepidorhombus whiffiagonis	Not GES	2	Yes	Yes	Yes
Species	Fish	Norway redfish	Kleine roodbaars	Sebastes viviparus	Not GES	2	Yes	Yes	Yes
Species	Fish	Nursehound	Kathaai	Scyliorhinus stellaris	Unknown	2	Yes	Yes	Yes
Species	Fish	Pollack	Pollak	Pollachius pollachius	Unknown	2	Yes	Yes	Yes

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Species	Fish	Red gurnard	Engelse poon	Chelidonichthys cuculus	Unknown	2	Yes	Yes	Yes
Species	Fish	Sandy ray	Zandrog	Leucoraja circularis	Not GES	2	Yes	Yes	Yes
Species	Fish	Smalleyed ray	Kleinoogrog	Raja microocellata	Unknown	2	Yes	Yes	Yes
Species	Fish	Small-spotted catshark	Hondshaai	Scyliorhinus canicula	Unknown	2	Yes	Yes	Yes
Species	Fish	Starry smooth-hound	Gevlekte gladde haai	Mustelus asterias	Unknown	2	Yes	Yes	Yes
Species	Fish	Spurdog	Doornhaai	Squalus acanthias	Not GES	2	Yes	Yes	Yes
Species	Fish	Anglerfishes n.e.i.	Zeeduivels n.e.i.	Lophius budegassa, Lophius piscatorius	Unknown	2	Yes	No	No
Species	Fish	Starry ray	Sterrog	Amblyraja radiata	Unknown	2	Yes	Yes	Yes
Species	Fish	Striped red mullet	Mul	Mullus surmuletus	Unknown	2	Yes	Yes	Yes
Species	Fish	Tope shark	Ruwe haai	Galeorhinus galeus	Unknown	2	Yes	Yes	Yes
Species	Fish	Viviparous eelpout	Puitaal	Zoarces viviparus	Not GES	2	Yes	Yes	Yes
Species	Fish	Atlantic mackerel	Makreel	Scomber scombrus	GES	2	Yes	Yes	No
Species	Fish	Witch flounder	Hondstong	Glyptocephalus cynoglossus	Not GES	2	Yes	Yes	Yes
Species	Fish	Blackbellied angler		Lophius budegassa	GES	2	Yes	No	No
Species	Fish	Bluemouth	Blauwkeeltje	Helicolenus dactylopterus	GES	2	Yes	Yes	No
Species	Fish	Common dab	Schar	Limanda limanda	GES	2	Yes	Yes	No
Species	Fish	Skate spp	Rog spp.	Dipturus spp	Unknown	2	Yes	No	No
Species	Fish	Conger eel	Kongeraal	Conger conger	GES	2	Yes	Yes	No
Species	Fish	European hake	Heek	Merluccius merluccius	GES	2	Yes	Yes	No
Species	Fish	European plaice	Schol	Pleuronectes platessa	GES	2	Yes	Yes	No
Species	Fish	European sprat	Sprot	Sprattus sprattus	GES	2	Yes	Yes	No
Species	Fish	Four-spot megrim	Viervlekkige schartong	Lepidorhombus boscii	Unknown	2	Yes	No	No
Species	Fish	Gilt-head bream	Goudbrasem	Sparus aurata	GES	2	Yes	No	No
Species	Fish	Lemon sole	Tongschar	Microstomus kitt	GES	2	Yes	Yes	No
Species	Fish	Longnosed skate		Dipturus oxyrinchus	Unknown	2	Yes	No	No
Species	Fish	Norway pout	Kever	Trisopterus esmarkii	GES	2	Yes	Yes	No
Species	Fish	Rays and skates nei	Roggen en vleten n.e.i.	Rajidae n.e.i.	Unknown	2	Yes	No	No
Species	Fish	Sand lance	zandspiering	Ammodytes spp	GES	2	Yes	No	No
Species	Fish	Shagreen ray	Kaardrog	Leucoraja fullonica	Not GES	2	Yes	No	No
Species	Fish	Smoothhounds spp.	Gladde haaien n.e.i.	Mustelus spp	GES	2	Yes	No	No
Species	Fish	Tub gurnard	Rode poon	Chelidonichthys lucerna	GES	2	Yes	Yes	No
Species	Fish	Turbot	Tarbot	Scophthalmus maximus	GES	2	Yes	Yes	No
Species	Fish	Undulate ray	Golfrog	Raja undulata	GES	2	Yes	Yes	No
Species	Fish	Whitebellied anglerfish	Zeeduivel	Lophius piscatorius	GES	2	Yes	Yes	No
Species	Fish	Whiting	Wijting	Merlangius merlangus	GES	2	Yes	Yes	No
Species	Fish	Angelshark	Zee-engel	Squatina squatina	Critically endangered (Europe)	3	Yes	Yes	Yes

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Species	Fish	African devil ray	Afrikaanse duivelsrog	Mobula rochebrunei	Unknown	3	Yes	No	No
Species	Fish	Atlantic devil ray	Atlantische duivelsrog	Mobula hypostoma	Endangered (Global)	3	Yes	No	No
Species	Fish	Common sawfish	Gewone zaagrog	Pristis pristis	Critically endangered (Europe)	3	Yes	No	No
Species	Fish	Devil ray	Duivelsrog	Mobula mobular	Endangered (Global)	3	Yes	No	No
Species	Fish	Dwarf devil ray	Dwergduivelsrog	Mobula munkiana	Vulnerable (Global)	3	Yes	No	No
Species	Fish	Dwarf sawfish	Dwergzaagrog	Pristis clavata	Critically endangered (Global)	3	Yes	No	No
Species	Fish	Giant manta ray	Reuzenmanta	Mobula birostris	Endangered (Global)	3	Yes	No	No
Species	Fish	Great white shark	Witte haai	Carcharodon carcharias	Critically endangered (Europe)	3	Yes	No	No
Species	Fish	Green sawfish	Groene zaagrog	Pristis zijsron	Critically endangered (Global)	3	Yes	No	No
Species	Fish	Guitarfishes	Gitaarroggen	Rhinobatidae	Unknown	3	Yes	No	No
Species	Fish	Longfin devil ray	Langvinduivelsrog	Mobula eregoodootenkee	Endangered (Global)	3	Yes	No	No
Species	Fish	Narrowtooth sawfish	Mestandzaagrog	Anoxypristis cuspidata	Critically endangered (Global)	3	Yes	No	No
Species	Fish	Norway skate	Noorse rog	Raja (Dipturus) nidarosiensis	Near threatened (Europe)	3	Yes	No	No
Species	Fish	Reef manta ray	Rifmanta	Manta alfredi	Vulnerable (Global)	3	Yes	No	No
Species	Fish	Shortfin devil ray	Kortvinduivelsrog	Mobula kuhlii	Endangered (Global)	3	Yes	No	No
Species	Fish	Sicklefin devil ray	Sikkelvinduivelsrog	Mobula tarapacana	Endangered (Global)	3	Yes	No	No
Species	Fish	Smalltooth sawfish	Kleintandzaagrog	Pristis pectinata	Critically endangered (Global)	3	Yes	No	No
Species	Fish	Smooth-tail devil ray	Gladstaartduivelsrog	Mobula thurstoni	Endangered (Global)	3	Yes	No	No
Species	Fish	Spinetail devil ray	Gestekelde duivelsrog	Mobula japanica	Endangered (Global)	3	Yes	No	No
Species	Fish	Velvet belly lantern shark	Gladde lantaarnhaai	Etmopterus pusillus	Least concern (Global)	3	Yes	No	No
Species	Fish	White skate	Witte rog	Raja alba	Critically endangered (Europe)	3	Yes	No	No
Species	Fish	[Northeast Atlantic] spurdog	Doornhaai	Squalus acanthias	Threatened and/or Declining	4	Yes	Yes	Yes
Species	Fish	Atlantic Cod	Kabeljauw	Gadus morhua	Threatened and/or Declining	2, 4	Yes	Yes	Yes
Species	Fish	Long-snouted seahorse	Langsnuitzeepaardje	Hippocampus guttulatus (synonym: Hippocampus ramulosus)	Threatened and/or Declining	4	Yes	No	No
Species	Fish	Short-snouted seahorse	Kortsnuitzeepaardje	Hippocampus hippocampus	Threatened and/or Declining	4	Yes	No	No
Species	Fish	River lamprey	Rivierprik	Lampetra fluviatilis	Unfavourable - inadequate	1, 2	Yes	Yes	Yes
Species	Fish	Allis shad	Elft	Alosa alosa	Unknown	1, 2, 4	Yes	Yes	Yes
Species	Fish	Sea lamprey	Zeeprik	Petromyzon marinus	Unfavourable - bad	1, 2, 4	Yes	Yes	Yes
Species	Fish	Salmon	Zalm	Salmo salar	Unfavourable - bad	1, 3, 4	Yes	Yes	Yes
Species	Fish	Houting	Houting	Coregonus oxyrinchus	Unfavourable - inadequate	1, 3, 4	Yes	No	No
Species	Fish	Basking shark	Reuzenhaai	Cetorhinus maximus	Endangered (Europe)	2, 3	Yes	Yes	Yes
Species	Fish	Sea trout	Zeeforel	Salmo trutta	Least concern (Europe)	2, 3	Yes	Yes	No
Species	Fish	Eel	Paling	Anguilla anguilla	Threatened and/or Declining	2, 4	Yes	Yes	Yes

Habitat/ Species	Group	Name (English)	Name (Dutch)	Name (scientific)	Status	Directive	Depends on the open water of the North sea?	Included in species list of North sea?	Relevant for Dutch EEZ?
Species	Fish	Spotted ray	Gevlekte rog	Raja montagui	Threatened and/or Declining	2, 4	Yes	Yes	Yes
Species	Fish	Thornback ray	Stekelrog	Raja clavata	Threatened and/or Declining	2, 4	Yes	No	No
Species	Invertebrates	Ocean quahog	Noordkromp	Arctica islandica	Threatened and/or Declining	4	Yes	Yes	Yes
Species	Invertebrates	Dog whelk	Purperslak	Nucella lapillus	Threatened and/or Declining	4	Yes	No	No
Species	Invertebrates	Flat oyster	Platte oester	Ostrea edulis	Threatened and/or Declining	4	Yes	No	No
Species	Marine mammals	Bottlenose dolphin	Tuimelaar	Tursiops truncatus	Favourable	1	Yes	Yes	No
Species	Marine mammals	Common dolphin	Gewone dolfijn	Delphinus delphis	Favourable	1	Yes	Yes	No
Species	Marine mammals	White-beaked dolphin	Witsnuitdolfijn	Lagenorhynchus albirostris	Favourable	1	Yes	Yes	No
Species	Marine mammals	White-sided dolphin	Witflankdolfijn	Lagenorhynchus acutus	Favourable	1	Yes	Yes	No
Species	Marine mammals	Grey seal	Grijze zeehond	Halichoerus grypus	Favourable	1, 2	Yes	Yes	No
Species	Marine mammals	Harbour seal	Gewone zeehond	Phoca vitulina	Favourable	1, 2	Yes	Yes	No
Species	Marine mammals	Harbour porpoise	Bruinvis	Phocoena phocoena	Favourable / MSFD: Not GES	1, 2, 4	Yes	Yes	Yes
Species	Plants	Green-winged orchid	Groenknolorchis	Liparis loeselii	Favourable	1	No	No	No

Annex 5 Included activities per MPA Guide category

The table below provides insight into the spatial sources used for the Impact Risk assessment. The table specifies which specific human activities are classified under the MPA Guide activity types in the current assessment and which specific source was used to map their spatial distribution within the Dutch Continental Shelf.

Table B4.17: *Overview of human activities in the Dutch EEZ categorized by MPA Guide activity types. The table includes specific activities, corresponding EMODnet data sources, feature types (point, line, polygon), and their coverage within the Dutch EEZ. "No MPA guide category" indicates activities not explicitly classified in the MPA Guide. Data sources for the activities are derived from EMODnet - Human Activities.*

MPA guide - Activity group	Specific activity	Source EMODnet - Human activities	Feature type	Coverage of Dutch EEZ
Mining	Sand/gravel aggregates - extraction of substrate (habitat change, interaction with seafloor, contaminant release)	Aggregate Extraction - Aggregate Extraction (points)	Point	Yes
Mining	Oil and Gas - construction (drilling, anchoring, construction of wellheads, laying pipelines, oil spills)	Oil and Gas - Active Licences (Exploration > 2024)	Point	Yes
Mining	Oil and Gas - operational (waste fluids and particulates to seafloor, surface litter and wastewater, oil spills)	Oil and Gas - Offshore Installations (Operational)	Point	Yes
Dredging and dumping	Capital dredging - extraction of substrate (habitat change, interaction with seafloor, contaminant release, increased turbidity, noise)	Dredging - Dredging	Point	No, only points for the Southern Dutch coast, Westerschelde, and Eems-Dollard
Dredging and dumping	Capital dredging - spoil/waste disposal (habitat change, smothering)	Waste disposal - Dredge Spoil Dumping (Points)	Point	Yes
Infrastructure	Marinas and dock/port facilities - operational (litter, light, noise, waste disposal)	Main ports	Point	Yes
Infrastructure	Telecoms and Electricity: Communication and electric cables - active operational (localised electro-magnetic changes)	Cables - Power Cables	Line	Yes
Infrastructure	Wind farms - construction (installation of turbines on seafloor includes interaction with seafloor, habitat change and sealing, laying cables)	Wind Farms (polygons) (Construction > 2024)	Polygon	Yes
Infrastructure	Wind farms - operational (active cables on seafloor - electromagnetic changes, moving turbines - collisions, boats servicing and maintaining farms)	Wind Farms (polygons) (Production)	Polygon	Yes
Fisheries	Benthic trawls and dredges - operations (interaction with seafloor, catch, bycatch, waste products)	Fisheries - Fishing intensity - Average Surface Swept Area Ratio	Polygon	Yes
Fisheries	Pelagic trawls - operations (catch, bycatch, waste products)	Fisheries - Fishing intensity - Pelagic trawls and seines	Polygon	Yes
Fisheries	Nets (fixed/set/gillnets/other nets/lines) - operational (catch, bycatch, waste products)	Fisheries - Fishing intensity - Static gears	Polygon	Yes

Fisheries	Suction/hydraulic dredges - operations (interaction with seafloor, catch, bycatch, waste products)	Fisheries - Fishing intensity - Average Subsurface Swept Area Ratio	Polygon	Yes
Non-extractive activities	Boating/Yachting - steaming (collisions)	Vessel Density - Annual averages - Pleasure craft	Polygon	Yes
Non-extractive activities	Military: Operations (specific to activity but can include: seismic activities, sonar)	Military Areas – Military Areas (Polygons)	Polygon	Yes
Non-extractive activities	Water sports - steaming (collisions, atmospheric emissions)	Vessel Density - Annual averages - Sailing	Polygon	Yes
Other activities	Fisheries - steaming	Vessel Density - Annual averages - Fisheries	Polygon	Yes
Other activities	Marine dumped munitions	Waste disposal - Dumped Munitions (Points)	Point	Yes
Other activities	Military: Steaming (atmospheric emissions, collisions)	Vessel Density - Annual averages - Military and Law Enforcement	Polygon	Yes
Other activities	Shipping: Steaming (atmospheric emissions, collisions)	Vessel Density - Annual averages - Cargo & Tanker	Polygon	Yes
Other activities	Operational (effluent discharge, thermal discharge) due to disposal of waste or other material and/or due to sewage treatment and storm overflows	Waste disposal - Waste at ports	Point	Only insight into waste disposal in the ports

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