Rijksoverheid

Marine Strategy (part 1)

Description of current environmental status,
good environmental status and environmental targets

2024-2030

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Summary

The EU Marine Strategy Framework Directive (MSFD) entered into force in 2008. The MSFD obliges the Member States to achieve and/or maintain good environmental status of their marine waters and to take measures to meet the established targets. The MSFD requires member states to set out how they implement the directive in three related documents. Marine Strategy part 1 describes the current environmental status, the (desired) good environmental status and the operational environmental targets set to achieve or maintain good environmental status. Accordingly, the Marine Strategy establishes the framework for sustainable use of the waters, within the constraints of the ecosystem and taking into account international and European regulations. Indicators are used to determine the extent to which the current status differs from good status. This document is the second update of part 1, which covers the period 2024 to 2030. Parts 2 and 3 of the Marine Strategy contain the monitoring programme and the programme of measures, respectively. These documents will be updated in 2026 and 2027 respectively.

Regional alignment is crucial

Because the state of the marine environment is independent of national borders, the regional marine conventions have an important role to play within the Directive. For the Netherlands this is OSPAR. To update the environmental status of the Dutch part of the North Sea, indicators and threshold values established jointly in an OSPAR context have thus been used as much as possible, as well as the OSPAR *Quality Status Report* of 2023.

Environmental status of the North Sea

As a result of initiated policy, progress is visible in various areas. For example, the amount of litter is steadily decreasing, and the same development is visible (albeit to a lesser extent) for certain contaminants. Policies on ballast water and shellfish transport also seem to be bearing fruit. For some of the measures, it is still too early to determine whether they are having the desired effect.

Some species are doing well, such as the grey seal, bird species that forage in the water column, and a number of fish populations. Pollutants in fish products also meet the threshold values. However, the assessments show that the majority of the assessed species and all habitats are not in good environmental status (see table 1). Due to intensive use of the North Sea, the pressure on the ecosystem remains high.

Table 1: Summary of the current state of the marine environment, by descriptor. Pelagic habitat types are listed separately (there is no separate group for this at descriptor level).

Descriptor	Current environmental status (Art. 8) 1/3
D1 Biodiversity marine birds	The current status in the International North Sea meets good environmental status for the group of birds that forage in the water column. This is not the case for birds of the intertidal zone and the group of birds that obtain their food from the water surface and sea floor. The status is unchanged from the previous policy period.
D1 Biodiversity marine mammals	Good environmental status has been achieved for the grey seal and harbour seal. This is not the case for harbour porpoise, as the by-catch threshold has been exceeded.
D1 Biodiversity fish	Long term trends as well as short term trends indicate recovery of vulnerable species such as common smooth-hound, small-spotted catshark, blonde ray, thornback ray, spotted ray and undulate ray. Of demersal and pelagic populations, 29 and 40 per cent meet the threshold values, respectively. Of coastal populations, this is 8 per cent. Good environmental status for fish in the International North Sea has not yet been achieved. There are still important knowledge gaps in this assessment.
D1 Biodiversity cephalopods	Assessment is not yet possible.

Descriptor	Current environmental status (Art. 8) 2/3
D1C6 Pelagic habitat types	The pelagic habitats (phyto- and zooplankton) in the International North Sea do not meet good environmental status as the habitat types 'continental shelf' and 'coastal zone' were assessed as 'not good'. The status of the 'variable salinity' habitat type is unknown.
D2 Non-indigenous species	The number of newly introduced non-indigenous species in the Dutch part of the North Sea has not decreased in the last planning period, meaning that good environmental status has not yet been achieved. This assessment is based on a Dutch analysis, using the OSPAR methodology and supplementing the dataset from the QSR (OSPAR, 2023) with more recent data.
D3 Commercially-exploited fish and shellfish	A gradual improvement is visible for demersal and benthic species (ICES, 2022a). Of 71 commercially-exploited fish and shellfish stocks, 20 of these (28 per cent) have good status, 19 (27 per cent) do not meet the criteria for good status and for 32 (45 per cent) there is insufficient information available for assessment. This means that good environmental status has not been achieved.
D4 Food webs	'Food webs' in the International North Sea do not meet good environmental status. The density, distribution and productivity of key groups representing different trophic guilds are subject to change. These changes are linked to environmental changes, probably due to human activities.
D5 Eutrophication	In the Dutch part of the North Sea, 49.7 per cent of the area meets the criteria for good environmental status. This low percentage is a distorted picture due to the area classification applied in the OSPAR assessment, in which a 'moderate' score for criterion D5C5 Oxygen concentration in the bottom of the water column in the Eastern North Sea is mainly caused by the oxygen-poor areas in the German and Danish part of that area. About 45.6 per cent of the Dutch North Sea lies in the Eastern North Sea. The remaining 4.6 per cent of the Dutch North Sea that does not comply concerns the river plumes and Northern Delta coast. There, chlorophyll a concentrations are too high. Nutrient concentrations are assessed as well, but do not count in the integral assessment of environmental status (see D5C1).
D6 Sea-floor integrity and benthic habitat types	Habitat loss remains below the threshold value (D6C4). Despite the lack of threshold values for the other criteria, it can be said that good environmental status has not been achieved in the Dutch part of the North Sea. This assessment is mainly based on the moderate to poor condition of different habitat types (D6C5). Despite a slight decrease in fishing pressure (D6C2), the status is virtually unchanged compared to the previous planning period.
D7 Permanent alteration of hydrographical conditions	Permanent hydrographical alteration occurs in an estimated 324 km2 of the Dutch North Sea; this is 0.55 per cent of the total area (58,807 km2). In the area affected, this is mainly due to impacts from the construction of new wind farms in the last planning period. This has increased the percentage of affected habitats. Disturbance is largely caused by a decrease in the stratification period in (common) sandy habitats. Of these, an estimated 0.65 per cent are affected. Side note: indicators are still under development. The figure referred to above is largely based on a tentative model and provisional threshold values. The results are therefore indicative.

Descriptor	Current environmental status (Art. 8) 3/3
D8 Contaminants	During the past planning period, the levels of most substances remained the same or decreased slightly. This picture is similar to that in the previous period. Good environmental status has not yet been achieved. The ubiquitous, persistent, bioaccumulative and toxic substances (UPBT substances) exceed the environmental quality standards (8 out of 19 substances). Of the 119 non-UPBT substances, 8 do not meet the standard and 3 cannot be assessed because their concentrations are below the reporting limit. Although tributyltin in the environment still exceeds the threshold value, reproductive harm (imposex) in marine snails has decreased to such an extent that good environmental status has been achieved for this criterion. Significant oil pollution did not occur during the last planning period.
D9C1 Contaminants in fish and other seafood	Levels of contaminants in fish, crustaceans and bivalve molluscs for human consumption are below the threshold values. Good environmental status has thus been maintained.
D10 Marine litter	The amount of litter in the marine environment is still decreasing. However, good environmental status has not yet been achieved.
D11 Introduction of energy, including underwater noise	In accordance with the OSPAR assessment, the Netherlands does not apply threshold values for D11. Nevertheless, the assessment results justify the conclusion that the status in the Dutch part of the North Sea does meet good environmental status with regard to impulsive sound, but not with regard to continuous sound.

Marine Strategy progress

Since the 2018 update of the Marine Strategy Part 1, much has been done both regionally and nationally to best meet European requirements (from Commission Decision 2017/848/EU). Significant progress has been made in improving the indicators and thresholds. For example, new regional or European thresholds have been set for habitat loss, contaminants, beach litter, and plastic particles in the stomachs of fulmars. With the establishment of threshold values, good environmental status has been made quantitative, which has also brought the assessment of current status and remaining policy challenges into sharper focus.

Within OSPAR, new indicators have been adopted and existing indicators further developed. In particular, the adoption of indicators for complex topics such as food webs and pelagic habitats are important milestones. As is the substantial improvement of the assessment of eutrophication and underwater noise. The Netherlands has been actively involved in this process.
This Marine Strategy also includes national indicators for topics to which the Netherlands attaches specific importance and for which there is not, as yet, a regionally aligned product within OSPAR, such as for benthic habitats, seabirds and harbour seals. In view of the energy transition, the Netherlands has made a first estimate of hydrographical alterations, e.g. due to wind farms. Effects of sand extraction have also been assessed.

SMART operational environmental targets

In the most recent planning period, the Netherlands was committed to achieving all environmental targets from the 2018 MS1. In most cases, sustained effort is needed to achieve or maintain good environmental status. The updated environmental targets better meet both the 'technical' requirements of the MSFD and the Directive's requirement that environmental targets be SMART: specific, measurable, acceptable, realistic and timely. That is why each environmental target has been formulated as specifically as possible, and is linked to a year by which it must be achieved, and to indicator(s) used to determine progress. Finally, the way in which the environmental objective is to be implemented is indicated. Based on lessons learnt and new knowledge, the environmental targets have also been fundamentally adjusted. Compared with the 2018 MS1, the number of environmental targets has been expanded: from 29 to 54.

Moving towards good environmental status is an ongoing process. In fact, a lot is already being done to realise the environmental targets. For instance, in elaboration of the North Sea Agreement, research and important measures for the protection of areas and species have been laid down in the Programme of Measures (Marine Strategy part 3, 2022). The Netherlands also attaches importance to jointly setting international environmental targets and taking measures. The Regional Litter Reduction Action Plan is an example of a joint package of measures. A regional action plan for Underwater Noise has also been developed within OSPAR. The Marine Strategy ratifies these national and international agreements and brings them into the third implementation cycle of the MSFD.

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Black-headed gull above the surf © Sijmen Henriks

1 Introduction

1.1 The Marine Strategy in a social context

The North Sea is a complex and open marine ecosystem and is home to a rich array of marine life. It is an ecologically valuable and fragile system, whose resilience depends heavily on the recovery and conservation of species and habitats. In addition, multiple activities take place in the North Sea, the cumulative effects of which are expected to increase in the coming years.

The OSPAR Quality Status Report, published in 2023, on the Northeast Atlantic Ocean, which includes the Dutch part of the North Sea, shows that there are challenges regarding the state of the ecosystem. The condition of the ecosystem is worrying. Increasing intensification of activities carried out by the Netherlands and surrounding countries in the North Sea, combined with their cumulative effects and the impacts of climate change, make the challenge significant.

Yet there are certainly bright spots. Some species are doing well, such as the grey seal, bird species that forage in the water column, and certain fish populations. Additionally, pollutants in fish products meet the threshold values. As a result of implemented policies, the amount of litter is steadily decreasing, and to a lesser extent, the same applies to certain pollutants. Policies related to ballast water and shellfish transport also seem to be yielding results. However, assessments show that for the majority of the evaluated species and all habitats, good environmental status has not been achieved. More generally, for some of the measures, it is still too early to determine whether they are having the desired effect.

The Cabinet is committed to a careful balance of activities in the North Sea, including food production such as fisheries, offshore wind energy, mining, shipping, and defense, with consideration for nature, coastal protection, sand extraction, and maritime heritage. This means that activities must take place within the legal obligations set by Europe and the conditions established by the MSFD to ensure a healthy and resilient ecosystem. Therefore, in this Marine Strategy Part 1, the government formulates environmental targets:

1. to achieve or maintain good environmental status;
2. to simultaneously accommodate more intensive use of the North Sea, such as developments of national importance in the areas of sustainable fisheries, the energy transition, shipping, and coastal defence, within the capacity of the marine ecosystem;
3. to fulfil the commitments under the North Sea Agreement, which relate to the Marine Strategy Part 1, and to the premise of the North Sea Programme 2022-2027 that it is about efficient and safe spatial development of the North Sea, which fits within the preconditions for a healthy ecosystem.

The North Sea Programme 2022-2027 [2] and subsequent programmes are important instruments to shape the necessary integral nature of the national North Sea policy. Because the ecosystem and use of the North Sea do not respect national boundaries, the Netherlands attaches great importance to cooperation within OSPAR, EU working groups and the *International Council for the Exploration of the Sea* (ICES). In a regional context, putting the spatial puzzle together is an important issue: how can this be done as efficiently as possible within the ecological preconditions? In addition, on the basis of the *Greater North Sea Basin Initiative* (GNSBI), efforts are being made for integral and international cooperation to keep the increasing spatial and ecological pressure on the International North Sea within acceptable limits.

To enable sustainable use of the North Sea in the long term as well, the implementation of the MSFD is now entering a phase of shifting the international focus from a tendency towards objective measurements, to implementing measures together and reducing pressures. The Netherlands will press on with efforts aimed at harmonisation and knowledge development, setting concrete targets and threshold values, and taking measures. The aim of this is to achieve an ecosystem that functions optimally and is resilient, and thus continues to offer opportunities for sustainable human use. In short: the ambition and focus for the coming implementation cycle is on addressing pressures and implementing measures.

1.2 The cycle of the MSFD

The European Marine Strategy Framework Directive from 2008 (MSFD) [3] obliges member states to draw up a strategy for establishing and/or maintaining good environmental status in their marine waters so that they can be used sustainably. There are three parts to the Netherlands' Marine Strategy. Based on Articles 8, 9 and 10 of the Directive (see Annex III), the present Marine Strategy Part 1 describes the current environmental status, good environmental status, and the environmental targets with associated indicators for the Dutch part of the North Sea. Accordingly, the Marine Strategy establishes the framework for sustainable use of the North Sea, within the constraints of the ecosystem and taking into account international and European regulations. In 2012, the first

Marine Strategy Part 1 was published. The subsequent Marine Strategy Part 2 (2014) and Part 3 (2015) contain the related MSFD monitoring programme and MSFD programme of measures, respectively.
Article 17 of the Directive requires that Member States update these three parts of the Marine Strategy every six years: for the Netherlands, this happened in 2018 (Part 1) [4], 2020 (Part 2)[5], and 2022 (Part 3)[6]. The present update of the Marine Strategy Part 1 marks the start of the third implementation cycle of the MSFD. After adoption, the Marine Strategy Part 1 will be reported to the European Commission within three months.

1.3 National and international frameworks

When updating the Marine Strategy part 1, international and national frameworks were taken into account: commitments, developments and ambitions relevant to the environmental status of the Dutch part of the North Sea. Below, ordered from global to national, are the most important frameworks.

Global frameworks

The Marine Strategy contributes to the international targets and commitments set out in the Convention on Biological Diversity (CBD) [7], the United Nations Convention on the Law of the Sea (UNCLOS, with its associated Agreement for the Protection of Biodiversity in the High Seas) [8] and the United Nations Sustainable Development Goals (SDGs) for 2030 [9]. UNCLOS provides the global legal framework for contemporary principles of protection of the marine environment, including the ecosystem-based approach, the precautionary principle and sustainable development. The CBD aims to halt biodiversity loss, ensure the conservation and sustainable use of marine biodiversity and to create a global network of Marine Protected Areas (MPAs). The 17 United Nations (UN) SDGs are a call to action for all countries - rich and poor - to promote prosperity while protecting the planet from climate change. The Marine Strategy specifically contributes to achieving SDG14 Life below water: 'Conserve and sustainably use the oceans, seas and marine resources', and the related sub-goals. In addition, the UN is working towards a global legally binding instrument to combat plastic pollution. Finally, within the International Maritime Organisation (IMO), the International Convention for the Prevention of Pollution from Ships [10] applies.

European Commission Decision 2017/848/EU

In 2017, Commission Decision 2017/848/EU [11] establishing criteria and methodological standards on good environmental status of marine waters, and specifications and standardised methods for monitoring and assessment was adopted. In it, the 11 'qualitative descriptors for the definition of good environmental status' (descriptors) listed in the MSFD were further developed into criteria (see Annex IV). The Decision also contains specific requirements, e.g. how to use the criteria, the scale for assessment and units of measurement. The European Commission recommended the Netherlands to comply with the technical requirements of this Commission Decision in its Art. 12 assessment of the Marine Strategy Part 1 2018-2024. An important provision is that thresholds must be set for many criteria, mostly through cooperation at EU level through the MSFD's Common Implementation Strategy (CIS) or at (sub)regional level (OSPAR). This is a growth process: great strides were made in the last planning period, but further work to comply with the Commission Decision in both OSPAR and EU level is needed.

Once thresholds have been set at supranational level, Member States may no longer use different national thresholds [12]. If Member States cannot use these thresholds, due justification must be given: for example, if thresholds become available too late in the national assessment process.

Other European directives and frameworks

The MSFD integrates various policy areas, relevant agreements and legislative measures concerning the marine environment (Art. 1(4)). European directives and regulations to which the MSFD explicitly links are the Common Fisheries Policy (CFP)[13], the Water Framework Directive (WFD)[14], the Birds Directive (BD) [15] , Habitats Directive (HD) [16] and EU Regulation 2023/915 on contaminants in seafood [17]. The aforementioned Commission Decision specifically identifies which standards or requirements from these legal frameworks should be adopted for the MSFD for each criterion.
In addition, the MSFD aligns with the Maritime Spatial Planning Directive (2014/89/EU) [18], REACH (the European regulation on the production of and trade in chemicals) [19], the Urban Waste Water Treatment Directive (91/271/EEC) [20] the Waste Framework Directive (2008/98/EC) [21], and the Renewable Energy Directive (2023/2413/EU) [22].
Other important frameworks include the European Sustainable Blue Economy Strategy (COM/2021/240) [23], and the European Green Deal [24] and the accompanying EU Biodiversity Strategy 2030 [25]. As part of this, the European Commission initiated a pledge and review process, which asked member states to indicate what needs to be achieved by 2030 in order to more robustly deploy the path to nature restoration. Parallel to the finalisation of the Marine Strategy Part 1, the European Nature Restoration Regulation has come into effect (also part of

the European Green Deal). This Regulation sets targets for nature restoration, including for marine species and habitats, and thus has connections with the MSFD. By mid-2027, a Nature Plan is due based on this Regulation. Where relevant, this Nature Plan under the Nature Restoration Regulation may be incorporated into the upcoming update of the MSFD monitoring program (2026) and the Program of Measures (2028).

OSPAR Regional Sea Convention

The MSFD requires Member States to adopt a regional approach (Articles 5(2) and 6 of the MSFD). Because the state of the marine environment is independent of national borders, the regional marine conventions have an important role to play within the Directive. For the Netherlands this is OSPAR. For the description of the current environmental status of the Dutch part of the North Sea, jointly established indicators and threshold values for the assessment of the marine environment have been used as much as possible, as well as the OSPAR Quality Status Report of 2023. However, the OSPAR assessment was not adopted where the Dutch dataset was more complete (e.g. for D2 Non-indigenous species). In addition, the Netherlands did not include pilot indicators or preliminary results (e.g. sea-floor litter). Additional information has been included in some cases (e.g. marine birds).
The Netherlands is a strong proponent of regionally coherent environmental targets and measures, and will focus on this in the coming implementation cycle. OSPAR's Regional Action Plan on marine litter [27] is an example of a joint package of measures. A regional action plan for Underwater Noise is also under development within OSPAR.

In 2021, the OSPAR North-east Atlantic Environment Strategy 2030 [28] was adopted. This set of strategic targets aims to confront the challenges facing the North-East Atlantic: biodiversity loss, pollution and climate change. Operational objectives with concrete actions have been drawn up for each strategic objective. They will be implemented in the period up to 2030. Implementing this strategy will lead to a clean, healthy and biologically diverse ocean that is used sustainably: thus, the OSPAR Strategy 2030 fits well with the MSFD.

OSPAR Quality Status Report

In OSPAR, the Netherlands works with 15 countries and the European Union to protect and restore the marine environment of the North-east Atlantic, of which the North Sea is a part. In September 2023, the Quality Status Report (QSR) was published. This comprehensive report, produced once every 10 years, describes the state of the marine environment in the North-east Atlantic.

The message of the QSR:

- The marine environment in the North-east Atlantic is not in good status.
- There are concerns about hazardous substances, eutrophication, underwater noise and the amount of litter that remains high despite signs of improvement.
- Marine birds are still struggling, many marine mammals remain at risk, several fish populations are in poor condition, benthic habitats are harmed and the state of the food web is worrying.
- Human activities are to blame. Effects of human-induced climate change and ocean acidification will continue.

Greater North Sea Basin Initiative

In 2021, the Netherlands launched an initiative to strengthen integral cooperation between North Sea countries around the sustainable (spatial) use of the North Sea: the Greater North Sea Basin Initiative (GNSBI). The spatial footprint and (cumulative) ecological pressure of all anticipated activities is not only increasing in the Dutch part of the North Sea, but also on the scale of the entire North Sea. The countries within this initiative thus want to work more integrally together to achieve both national and international ambitions for the North Sea, within the preconditions of a healthy ecosystem.

National policy context

The North Sea Programme 2022-2027 (part of the National Water Programme 2022-2027) and the Partial Review (under development) cover the integral Dutch North Sea policy. It includes all targets and ambitions of national importance for the Dutch part of the North Sea, and integrates Maritime Spatial Planning with the MSFD. The intensification of the use of the North Sea presents the task for the coming years to find the right social balance to achieve efficient and safe spatial development of the North Sea that fits within the preconditions of a healthy ecosystem as elaborated in the Marine Strategy.

The ecosystem approach and the precautionary principle are starting points for the integrated policy. With the adoption of the National Water Programme 2022-2027, all three parts of the Marine Strategy from the second cycle were also established. The current update of the Marine Strategy Part 1 establishes the ecological preconditions for spatial planning of activities in the North Sea and thus forms the ecological framework for the North Sea Programme 2028-2033.

North Sea agreement

With the North Sea Agreement [29], which lays down agreements until 2030, government and stakeholders are jointly shaping the three major transitions in the North Sea: energy, nature and food and the connection between them. This collaboration has enabled joint agreements on matters important to the implementation of the MSFD, such as the shift to sustainable fisheries, area protection and the development of species protection plans. In addition, the Monitoring, Research Nature Enhancement and Species Protection programme (MONS) was established as part of the North Sea Agreement. This programme aims to determine whether and how the changing use of the North Sea fits within the ecological capacity of the North Sea. The results can contribute to specifying environmental targets and taking measures (see box 5.1 in chapter 5).

North Sea Nature Enhancement Programme

The ambition of the North Sea Nature Enhancement Programme (NN), is a healthy, resilient biodiverse North Sea with room for natural processes and sustainable use. The programme is designed to improve the nature of the North Sea and complements current legally required measures to protect biodiversity and the ecosystem. The programme focusses on practical experiments (learning by doing), cooperation with key actors and early adoption of additional nature restoration and reinforcement measures.

Vision on Food from the Sea and main water bodies

The Vision on Food from the Sea and main water bodies focuses on ensuring long-term food harvesting. Food from the sea has a relatively low CO2 footprint, is rich in protein, healthy, and locally sourced. The vision states that this food harvesting must take place within the carrying capacity of the ecosystem. It outlines a perspective up to 2050, with a robust fisheries and aquaculture sector that provides a regional, healthy, and sustainable product while ensuring a good livelihood. The measures mentioned in the vision will be further developed, and agreements will be made with the fisheries sector and other stakeholders regarding their implementation.

1.4 Starting points

Elaboration of current and good environmental status

The MSFD lists 11 qualitative elements (also known as descriptors) in Annex I on the basis of which Member States must determine good environmental status. In Commission Decision (EU) 2017/848, the descriptors are elaborated into primary and secondary criteria (see Annex IV). Member states must use these criteria to describe good environmental status and assess the extent to which it has been achieved. In describing good environmental status (article 9 of the MSFD), the environmental status referred to is the status that is to be achieved, recovered or maintained. Good environmental status does not refer to the pristine marine ecosystem from the past, but an ecosystem that functions optimally and is resilient, thereby offering opportunities for sustainable human use.
The assessment of current environmental status (Article 8 of the MSFD) is based on the prescribed criteria and carried out with the information from the MSFD monitoring programme. Current environmental status was determined using indicators. Associated threshold values were then used to assess compliance with good environmental status. To ensure an internationally consistent approach, indicators and threshold values established at regional (OSPAR) or European level have been used as much as possible. Where these are not yet available (or have not yet been sufficiently elaborated), or where they specifically concern topics important to the Netherlands (see section 1.3), a national approach or interpretation has been chosen.

Elaboration of environmental targets

Environmental targets under Article 10 of the MSFD are operational targets, intended to guide progress towards good environmental status. Targets are related to the main pressures and activities that cause disruption and risk. In addition, environmental targets focus on restoration and enhancement of the marine ecosystem, and sustainable use. The environmental targets are stated quantitatively and specifically as much as possible, indicating the year by which individual targets should be achieved according to a given target point (if possible). An indicator is also set for each environmental target, to monitor progress in achieving the environmental target. These are often different indicators from those used to assess environmental status.
In setting the environmental targets, estimates were made of the effectiveness of existing and proposed policy, based on the assessment of the current environmental status and taking into account the developments until 2030 and beyond. These include, for example, expected developments in economic sectors or effects of climate change. The ecosystem response time to measures has also been taken into account. If new insights arise during the course of an implementation cycle, for example on the basis of EU pro-

jects, collaboration within OSPAR or research results, these are included in follow-up decisions around the various descriptors.

Measures are linked to the environmental targets. In early 2022, the second MSFD programme of measures was adopted (MS3, part of the North Sea Programme 2022-2027). For some of the measures, it is still too early to determine whether they are having the intended effect. Any additional measures will be determined in 2027 during the update of the Marine Strategy Part 3 (the programme of measures, at the same time as the North Sea Programme 2028-2033). The measures are thus part of the implementation cycle, but will be determined at a later stage.

DAPSIR framework

The Marine Strategy uses the so-called DAPSIR framework (see figure 5). This framework describes socio-economic *drivers* that cause human *activities*, which exert *pressures* on the marine environment and thus lead to changes in environmental *state*, with consequences for the ecosystem and ecosystem services (*impact*). A response as a reaction to a change in environmental status can be taken in any part of the framework. Environmental targets fall under the *response* of the DAPSIR framework and are intended to close any gap between current status and good environmental status, or to maintain good environmental status.

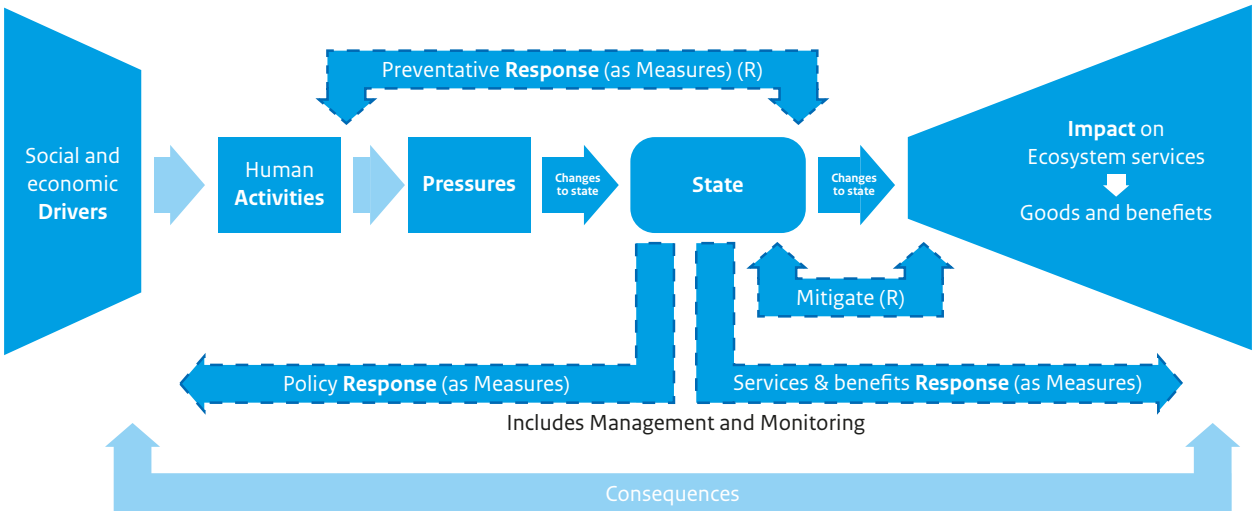
Article 12 assessment Marine Strategy Part 1 (2018)

In 2022 the European Commission assessed the Netherlands' Marine Strategy Part 1 (pursuant to Article 12 of the MSFD) [30] and made recommendations for further action. The Commission did not perform a substantive assessment, but looked at the points where the Marine Strategy part 1 deviates from the requirements in the Commission Decision. This assessment resulted in 15 recommendations for the Netherlands. The main reason for these discrepancies lies in the fact that the Commission Decision became available in 2017 at a time when preparations for the Marine Strategy part 1 (2018) were already well advanced. The present Marine Strategy is, however, based on the requirements of the Commission Decision (see section 1.3).

1.5 Progress of the Marine Strategy

Since the 2018 update of the Marine Strategy Part 1, much effort has been made both regionally and nationally to best meet the requirements of Commission Decision 2017/848/EU. Significant progress has been made on indicators and thresholds. For example, new regional or European thresholds have been set for habitat loss, contaminants, beach litter and plastic particles in the stomachs of northern fulmars. With the establishment of threshold values, good environmental status has been made quantitative, which has also brought the assessment of current status and remaining policy challenges into sharper focus.

Within OSPAR, new indicators have been adopted and existing indicators further developed. The developments of indicators for complex topics such as food webs and pelagic habitats are particularly important milestones. As is the substantial improvement of the assessment of eutrophication and underwater noise. The Netherlands has been actively involved in these processes.
This Marine Strategy also includes national indicators for topics to which the Netherlands attaches specific importance and for which there is not, as yet, a regionally aligned product within OSPAR, such as for benthic habitats, marine birds and harbour seals. In view of the energy transition, the Netherlands has made a first estimate of hydrographical alterations, e.g. due to wind farms. Effects of sand extraction have also been assessed.



Compared to the previous Marine Strategy, more criteria from Commission Decision 2017/848/EU have been elaborated, where possible using the (inter)nationally established indicators. Where a quantitative assessment was not yet possible, a qualitative assessment was carried out if possible. An example is the assessment of marine bird and marine mammal habitat condition. Progress has also been made in the elaboration of environmental targets. Ideally, environmental targets should be SMART and, if possible, regionally aligned (see chapter 5). As yet, this does not always appear to be possible. Nevertheless, progress is being made in this with each update of the MS1 (since 2012). The updated environmental targets are more specifically formulated, which is to say they explicitly describe the starting points for achieving good environmental status. The Netherlands is also complying better with the 'technical' requirements; for instance, the year by which the relevant environmental target (if possible with target point) should be achieved is indicated. Based on lessons learnt and new knowledge, compared to MS1 from 2018, the number of environmental targets has been expanded from 29 to 54 and their substance has also been amended (see chapter 5).

The MSFD states that good environmental status should have been achieved or maintained by 2020. It is now clear that this deadline has not been met in any of Europe's seas. There are several reasons for this.

- For a number of descriptors, the disturbance is significant and long-lasting.
- Due to knowledge gaps, it is not yet known in all cases what GES is and what measures are appropriate. Partly because of this, in the past two cycles, a relatively large proportion of attention in the international context has been paid to building up the implementation of the MSFD - with a focus on shaping assessments, meeting reporting obligations and defining thresholds - and less on taking measures to achieve good environmental status.
- In some cases, the process by which policy intensifications are prepared takes significant time (e.g. fisheries measures established at EU level).
- Even after policy intensifications have been made (inter) nationally, it usually takes a long time (several plan periods) before the effects of measures become visible in ecosystem restoration or pollution reductions.

The implementation of the MSFD is a growth process. Especially for the more complex topics, such as 'food webs', or those for which there are still little data (cephalopods, for example), it will take longer to fully meet the technical requirements. Nevertheless, even with the knowledge gaps that remain, it is possible - and crucial because of the precautionary principle - to set environmental targets, as the main controls that can be adjusted are known in many cases.

International collaboration
The Commission Decision determines what (e.g. methodologies, species lists, thresholds) should be established at what level (EU, (sub)regional, national). The answers to most of this complex puzzle are worked out by OSPAR working groups. There are also European technical working groups on marine litter, underwater noise and sea-floor integrity in which experts from EU member states work together on various issues. The results of these working groups are adopted by the OSPAR Commission and Marine Strategy Coordination Group respectively. In addition, ICES prepares advice for the CFP, and also ensures that the CFP is linked to the MSFD. The working groups also coordinate with each other. The Netherlands actively participates in these working groups. The progress made in this Marine Strategy is largely due to the pieces of the puzzle that these working groups manage to put together.

1.6 The MSFD scope and delimitation

Geographical boundaries

The Marine Strategy covers the Dutch part of the North Sea. The area extends to about 58,000 km^2, about one tenth of the entire North Sea (see map 1.1). It covers the water, sea floor and the subsurface on the seaward side of the baseline from where the extent of the territorial sea is measured (Article 3 of the MSFD). The international boundaries of the Dutch Continental Shelf (DCS) form the outer limit of the scope. This is also the boundary of the Exclusive Economic Zone, the EEZ.
The geographical scope of the MSFD partially overlaps with that of the Water Framework Directive (WFD). This is the zone up to 12 nautical miles from the baseline (the so-called 'coastal waters'). In this area, according to the Commission Decision of 2017, the threshold values established under the WFD in terms of contaminants and eutrophication apply.
There are also protected areas on the coast and further out to sea. These are both Natura 2000 areas, designated under the Birds and/or Habitats Directives, and MSFD areas, designated on the basis of MSFD Article 13.4. The Central Oyster Grounds, Frisian Front and the Borkum Stones are MSFD areas designated for seafloor protection. Southern Dogger Bank is expected to be added. Map 5.1 (Chapter 5) shows the various boundaries.
The Wadden Sea and Eastern Scheldt lie on the landward side of the baseline and are not within the scope of the MSFD. In these areas, protection of the marine environment is guaranteed by other Community legislation and international agreements. Both estuaries have their own

specific characteristics and thus differ from the open North Sea. However, policies aimed at the North Sea and especially the North Sea coastal zone do have a direct or indirect effect on the functioning of these areas, and vice versa.

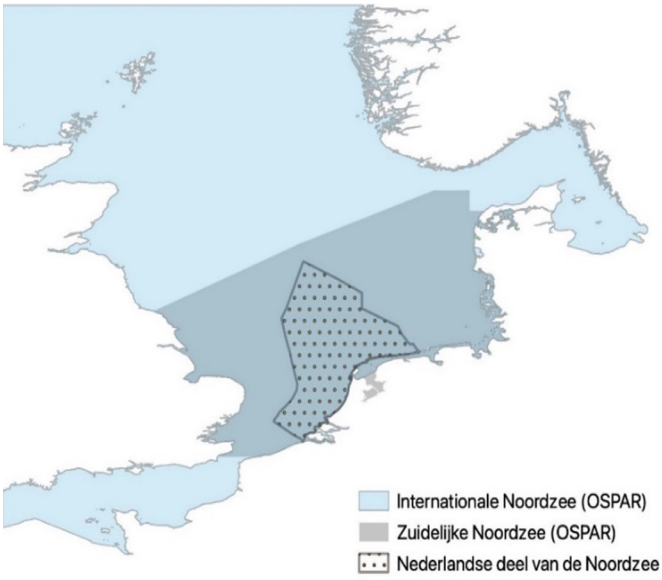
When drafting the Marine Strategy, it was taken into account that the Dutch part of the North Sea is part of the International North Sea (OSPAR Region II; see map 1.1) in a broad sense and including the Kattegat and The English Channel - within the North-East Atlantic.

Brief characterisation of the ecosystem

The North Sea is a very complex and open marine ecosystem. The Dutch part of the North Sea runs from the coast to the external boundary of the Dutch Continental Shelf and is relatively shallow (an average depth of 35 metres, rising in a northerly direction to over 60 metres). Its limited depth means that there is a strong interaction between physical and chemical processes, and life in and on the sea floor and in the water column. The water in the northern half of the Dutch part of the North Sea is influenced by currents from the Atlantic Ocean. The current in the southern half comes from the English Channel and continues past the Wadden Islands in a north-easterly direction.
A characteristic feature of the Dutch coastal waters is the heavy influence of the Scheldt, Meuse, Rhine and Eems rivers. The river water flows from south to north along the entire coast (the so-called coastal river) and contains a lot of clayey suspended material. This stimulates soil dynamics and natural turbidity. The rivers also carry a lot of nutrients to the sea. These are essential for the growth of plankton, which forms the basis of the marine food chain. Dutch coastal waters are, by their nature, very productive.
The North Sea floor consists mainly of sand and silt. But in a few places, the floor offers a natural hard substrate, such as on Cleaver Bank and the Borkum Stones (see map 5.1, chapter 5).
The North Sea is a habitat and nursery for marine mammals, fish, crustaceans and molluscs; for many species of birds it forms wintering grounds, or an important link in the North-east Atlantic migration route. Migrating bats also have their routes across the North Sea.

Administrative delineation

The Dutch part of the North Sea from one kilometre from the baseline is not municipally or provincially zoned. There, only central government is responsible. The Minister of Infrastructure and Water Management is the coordinating minister for the integral North Sea policy and management, and is responsible for water quality in a broad sense. The Minister of Infrastructure and Water Management shares responsibility for the marine environment with the State Secretary for Agriculture, Fisheries, Food security and Nature, because of his/her responsibilities for the policy areas of fisheries, food security, nature and biodiversity.
The national government has more authority within the territorial sea (up to 12 nautical miles from the baseline) than in the Exclusive Economic Zone (EEZ). Measures relating to fisheries outside the territorial sea fall under the exclusive competence of the European Commission under the Common Fisheries Policy (CFP). Measures relating to shipping fall within the jurisdiction of the International Maritime Organisation (IMO).
Neither the North Sea ecosystem nor anthropogenic activities keep within the national boundaries that cross the North Sea. None of the countries can individually face all the challenges on its part of the North Sea, nor can any of these countries have unique and complete competence to do so. For this reason, and because not all North Sea countries are EU members, the MSFD (Art. 5 and 6) obliges EU member states to take a regional approach. For the Netherlands, this involves cooperation within the OSPAR Regional Sea Convention.



Map 1.1. Boundaries of the International North Sea (OSPAR Region II), Southern North Sea (OSPAR Region IId), and Dutch part of the North Sea.

Exceptions

Article 2 of the MSFD outlines the scope of the Directive. The second section provides an exemption for 'activities that serve exclusively national defence or national security', such as coastal defence and operations of warships of the Royal Netherlands Navy. However, this dispensation is not a complete discharge: member states should strive to ensure that 'such activities are conducted in a manner compatible with the objectives of the directive, so far as is reasonable and practicable'.

1.7 Drafting the Marine Strategy

This update of the Marine Strategy Part 1 is being coordinated at national and international level in accordance with Art. 19 of the MSFD. At national level, official coordination has taken place in the Interdepartmental Directors' North Sea Consultative Body (IDON). The coordination with social parties (stakeholders) took place in two workshops, in which stakeholders could respond to the draft assessment of the environmental status and good environmental status (first meeting) and the environmental targets (second meeting).

Further coordination leading up to the Draft took place on the basis of a consultation by the Physical Environment Consultative Council (known in Dutch as the OFL). This included an opportunity for participants to respond in writing to drafts of the assessment of environmental status, good environmental status, and environmental targets. A meeting overseen by two OFL chairs was also organised on 25 March 2024. Based on the consultation, the OFL arrived at an official advice, which resulted in a number of points being refined or clarified. The minister of Infrastructure and Water Management and the State Secretary for Agriculture, Fisheries, Food security and Nature explained the government's response to the advisory report in a joint letter.

The North Sea Consultation was also involved in the drafting of the Marine Strategy Part 1, because the government considers the Marine Strategy to be a core decision with regard to the North Sea in accordance with Article 8.6 of the North Sea Agreement. In the North Sea Consultation, consensus-oriented consultations are held on how to build on agreements made in the North Sea Agreement. In addition to the central government, representatives from the energy sector, fisheries, nature organisations, the shipping industry and seaports participate in these consultations.

Views

The Draft Marine Strategy Part 1 was available for public inspection from 3 June to 14 July 2025. The Government responded to the views received by means of a Reaction Paper. The Reaction Paper clarifies whether the views received have led to changes in the final Marine Strategy, and how these have been incorporated. This Paper also contains *ex officio* changes, which are minor corrections, editorial adjustments, clarifications or updates.

1.8 Reading guide

The Marine Strategy Part 1 consists of a main document and annexes. The structure of the main document follows the DAPSIR framework (see section 1.4). Chapter 2 describes the uses (economic sectors) of the North Sea ('Drivers') and human activities ('Activities'). Chapter 3 deals with the main pressures ('Pressures') resulting from these. Chapter 4 describes the environmental state of the marine ecosystem ('State'). Finally, based on this, Chapter 5 discusses the environmental targets and policy challenges ('Response'). The impact on ecosystem services such as providing food, climate regulation, etc., are not described separately in the Marine Strategy part 1. In this respect, please see the QSR (OSPAR, 2023).

The annexes I-VII contain overviews and further information.
The Dutch Marine Strategy Part 1 also has an Annex VIII, which contain fact sheets. The fact sheets form the heart of and the basis for chapters 3 to 5. They contain detailed (technical) information on the assessment of current environmental status, good environmental status and environmental targets. The fact sheets also form the basis for reporting to the European Commission. The fact sheets are only available in Dutch.

Drilling platform © Oscar Bos

2 The development of economic activities in the North Sea

This chapter describes the socio-economic development of sectors with strong ties to the North Sea and how developments within these sectors influence the nature and extent of environmental pressures. Changes in the marine environment caused by pressures such as emissions to water, fishing and others are closely related to developments in socio-economic activities in and around the North Sea. These activities are not autonomous; they are directly influenced by 'drivers', or socio-economic motives such as demand for products, food and energy [31]. However, various economic activities are also highly dependent on a healthy and well-functioning marine ecosystem; a dependency relationship also characterised as 'ecosystem services to society'.
To complete the overview of these interactions, this chapter also presents the costs incurred to prevent or reduce degradation of the marine environment by economic activities. This chapter thus fulfils the terms of Art. 8(1)(c) of the Marine Strategy Framework Directive (MSFD).

2.1 Socio-economic development of sectors in the North Sea

The social and economic analysis of the use of the North Sea is based on the Marine Water Accounts approach [32]. The Dutch part of the North Sea is intensively used for various economic activities. The main activities are: several types of fisheries, oil and gas extraction, shipping, mineral extraction, offshore wind energy and recreation. The economic value of the North Sea (expressed in terms of value added, production value and employment) for sea-based sectors and land-based activities has increased in recent years (see table 2.1) [33]. The total value is expected to increase further in the coming years, but the development for each sector or activity will vary greatly [34].
The economic activities on the Dutch part of the North Sea generated an added value (added value is production value less costs incurred) of 4.6 billion euros in 2021. Most of this came from the shipping, and oil and gas extraction sectors. The transition from fossil fuels to renewable energy sources has a significant effect on economic activities in the Dutch part of the North Sea: the added value of the oil and gas sector fell by 53 per cent between 2015 and 2021, while the production of electricity (in kWh) in Dutch offshore wind farms increased by more than 600 per cent over the same period.
The added value of directly North Sea-related economic activities on land was 23.2 billion euros in 2021. Seaports contribute strongly as a major economic interest, but the economic importance of other activities in the coastal zone, such as tourism and recreation, also counts.
North Sea-related economic activities contribute about 3.6 per cent to the total added value of the Dutch economy, which amounted to €762.6 billion in 2021 [33]. The current geopolitical situation and high inflation cause uncertainties around the further development of all economic activities. The economies of the Netherlands and other European countries are expected to stagnate in the short term, but the added value of activities in the North Sea is expected to increase to €6.4-7.5 billion in 2035 [34]. Further development of production volumes and added value is anticipated for the period 2035-2050. The speed of development of offshore wind energy production is an important factor here. For instance, delays in the construction of offshore wind farms could prolong the need for oil and gas extraction and also lead to further growth in ship movements for importing hydrogen as an energy carrier [34].

Fisheries

The fisheries sector is characteristic of a sea-oriented country like the Netherlands. Especially in the coastal area, fisheries have great cultural and socio-economic significance because of the employment and regional identity associated with fishers, fish auctions, fish processing and such like. Fishers have a direct economic interest in their activities on the Dutch part of the North Sea; in addition, several port activities also depend directly or indirectly on fishing.
The North Sea fleet consists mainly of cutters, which fish for commercial species like flatfish and shrimp (D3). In addition, there are forms of passive fishing, such as gillnet fishing and there are some fishermen who fish for ensis (razor clams).
The total value of fishing in the Dutch part of the North Sea has declined in recent years; the cutter fishery for flatfish has decreased by about a third after the 2023 restructuring, which is expected to reduce the pressure on the ecosystem. Nevertheless, for the remaining cutters, there is a considerable task to further reduce the impact on the ecosystem when it comes to seabed disturbance (D6) and by-catch (D1).
The economic value of the fisheries sector in the Dutch part of the North Sea is expected to be between 66 million euros and 105 million euros in 2035 (Table 2.1). The fleet of the future will have less impact on the ecosystem than today's cutters; a consequence of the availability of economically viable new technologies.

Fisheries sector transition
Fishing opportunities in the North Sea are under pressure, partly due to the construction of wind farms, the closure of nature reserves, the ban on pulse fishing and Brexit. The vision for food from the sea and large bodies of water focuses on securing food production in the long term. After all, food from the sea has relatively low CO2 emissions, is high protein, healthy and is locally-sourced food. The starting point is that the food supply must be procured from within the capacity of the ecosystem. The vision outlines the prospects for 2050 with a robust fisheries and aquaculture sector, providing a regional, healthy and sustainable product, with which fishers can earn a good living. This requires physical space at sea, innovative entrepreneurship and European cooperation. Innovative entrepreneurship includes a commitment to innovations and investments to reduce impact and achieve lower CO2 emissions, less seabed disturbance and less by-catch. Funds are available to support these developments (Vision on food from sea and large bodies of water, March 2024).

Shipping

The Dutch part of the North Sea is important for shipping; its shipping lanes are among the busiest in the world. Many vessels passing through the Dutch exclusive economic zone (EEZ) are operated by foreign shipping companies and thus do not contribute to the Dutch economy. The economic value of foreign shipping is therefore not included in Table 2.1.
The economic value of shipping is expected to increase by 30-40 per cent by 2030. This development will mainly be visible in the growing transport capacity of each ship. The number of ships in itself is hardly expected to increase. Even after 2030, the annual volume of cargo transported by shipping will continue to grow, partly due to the growing transport of substances and materials associated with the energy transition. The non-wind and solar-based production of hydrogen, for example, requires the import of ammonia and other chemicals. Transport of oil and gas will decrease [34].
Shipping impacts on the marine environment include operational effects such as the introduction of non-indigenous species (D2), contaminants and littering from cargo-loss incidents (D8 and D10) and underwater noise (D11). The development of environmental pressures is linked to changes in the number of vessel movements, but also to the effects of measures such as the implementation of legislation of the International Convention for the Prevention of Pollution from Ships (MARPOL), the international Ballast Water Convention, stricter regulation of discharge of substances at sea, and of technological innovations, such as electrification in shipping, which can lead to reduced underwater noise.

Oil and gas production

Fluctuations in the economic value of oil and gas production are strongly related to price fluctuations. The production value and the number of jobs in this sector decreased in the period 2017-2021. The amount of oil and gas produced in the North Sea is expected to decrease further in the coming years; a development related to the energy transition. The extent and speed of the reduction of oil and gas production will therefore be strongly determined by the pace of energy transition and the economic growth of other forms of energy extraction [35]. With that decline, the environmental pressures that may occur throughout the life cycle of these activities, from exploration to decommissioning at the end of the exploitation period, will also decrease. Environmental pressures may result from the discharge of waste water, oil, chemicals, drill cuttings (D8), physical disturbance to the seabed (D6) from the laying and removal of services and pipelines, underwater noise from seismic surveys and drilling (D11) and disruptive lighting from the services (D11) [1].

Offshore wind energy

The economic value of offshore wind power generation increased between 2015 and 2021. Both production value and added value tripled between 2015 and 2017, despite a fall in electricity prices. After that, the picture changes; the production (in kWh) and thus the production value of offshore wind energy continued to increase between 2019 and 2021 but the added value decreased, which was due to the phasing out of SDE++ subsidies.
The installed capacity of offshore wind energy will continue to grow in the coming decades. The Netherlands' future ambitions (see text box below) imply an increase in the added value of offshore wind energy by 618 to 1,249 million euros in the period to 2035 [34].
With the expansion of offshore wind power generation, negative impacts on the marine environment are also increasing:
- greater risk of rotor blade collisions, habitat loss and additional flight time due to by-passing is detrimental to bird populations (D1);
- laying cables and pipelines adversely affects benthic habitat types (D6);
- increase in underwater noise affects marine mammals (D11);
- the area where hydrographical disturbance occurs increases (D7);
- potential 'improvement' in settlement conditions for non-indigenous species (D2);
- environmental pressure due to installation and removal of plant;

- electromagnetic fields will be able to have effects on sharks and rays in a wider area.

The construction of offshore wind farms may also have positive effects. Particularly in combination with nature-inclusive construction, the foundations of the wind turbines provide surfaces to which plants and animals can attach themselves (extra hard substrate). The opportunities for these hotspots of biodiversity and richer marine life are further enhanced by the fact that fishing is not permitted in the marine area within the boundaries of the wind farms. A favourable habitat for marine life can thus develop between the wind turbines.

Extraction of sand and gravel

Around 25 million cubic metres of sand is extracted annually from the Dutch part of the North Sea; replenishment sand for coastal maintenance for water safety, and fill sand for construction and infrastructure projects. Gravel extraction is relatively rare. The production and added value of the sector experienced a dip in 2017 compared to 2015, after which a clear upward trend is visible [33].
Future demand for sand and gravel depends, among other things, on the speed of sea level rise and economic growth. More sand is expected to be extracted from the Dutch part of the North Sea in future due to climate change and the related need to keep the coast in place. Depending on the scenario of sea level rise and replenishment needs, between 1.5 and 4 times more sand will need to be extracted (https://kpzss.nl/tussenbalans/).
Increasing sand extraction can lead to increased negative impacts on the marine ecosystem including the sea-floor integrity (D6) and the communities living there, the stability of the coastal foundation and water clarity. The government is therefore studying how best to take nature into account during sand extraction, for example in the Monitoring and Evaluation Plan Sand Extraction North Sea and the OR ELSE research programme.

The energy transition

By 2050, the Netherlands aspires to have fully switched to using renewable energy sources, such as offshore wind power. The government decided to realise a total capacity of about 21 gigawatts (GW) of offshore wind power by 2032. After 2032 the government is targeting further expansion to about 50 GW of installed offshore capacity by 2040. Research is being done into whether wind energy generated at sea can be partly converted into hydrogen in the future. In addition, so-called 'energy hubs' are being developed for energy areas further offshore; these are hubs in an energy system in which different energy sources and carriers are connected.

Other activities at sea

Aquaculture, CO_2 storage, hydrogen production and electricity generation from solar energy are new activities in the North Sea that may gain economic importance in the future. How developments within these sectors affect the nature and extent of environmental pressures is not yet well understood.

The aquaculture sector (at sea) is still in the pilot phase. In recent years, interest in expanding offshore shellfish and seaweed aquaculture has increased. The government aims to develop five to ten large-scale offshore aquaculture operations in the period up to 2030. Economic and technical barriers still need to be overcome to make commercial farming of shellfish and seaweed in the North Sea viable. For example, one of the technical challenges is monitoring production at remote farming sites. The opportunities for marine aquaculture lie mainly in primary production of high-value products, innovative farming systems, and near-shore and within-wind-farm production areas, and improving shellfish farming efficiency. The environmental pressure of seaweed and shellfish farming is not considered high, with the caveat that much is still unknown, including the risks of nutrient withdrawal.

Carbon capture and storage (CCS) is a way to reduce CO_2 emissions in the atmosphere. The technique is currently not yet a practice in the Dutch part of the North Sea, but initiatives have now been launched to lead to a possible CO_2 storage of a total of 24 million tonnes per year by 2035 [34].

The deployment of hydrogen in the energy production and transportation system in the Dutch part of the North Sea is still in the future, but has the potential to become an important economic activity. In 2024, the first offshore hydrogen pilot plant (PosHYdon) will be built in the North Sea [34].

For electricity production from solar energy, only pilots have so far been started on the Dutch part of the North Sea (within the 12 nautical-mile zone). Parts of the North Sea could prove a promising location for this economic activity in the future [34].

Economic activities on land

The added value of Dutch ports amounted to 20.9 billion euros in 2021.
In addition, the set of activities focused on recreation and tourism in the coastal zone, both from its own population and from abroad, contributes significantly to the economic importance of the North Sea.

Tabel 2.1: Economic importance of the North Sea (2015-2021; source: CBS (2023); 2035 calculated from Ecorys 2023.

Sector	Indicator	2015	2017	2019	2021	2035*
Shipping	Employment	9,5	9,2	8,7	9,2	13,5 - 17,7
	Production value	6,601	6,059	6,310	7,352	10,807 - 14,189
	Added value	1,907	1,687	1,552	2,398	3,525 - 4,628
Fisheries	Employment	0,8	0,7	0,7	0,7	0,5 - 0,8
	Production value	153	151	135	142	111 - 174
	Added value	89	95	81	85	66 - 105
Oil and Gas production	Employment	4,0	2,9	2,9	2,2	3,0 - 6,0
	Production value	5,013	3,144	2,649	3,272	2,421 - 3,436
	Added value	3,405	2,071	1,676	1,945	1,440 - 2,043
Wind energy	Employment	0,1	0,1	0,1	0,3	3,0 - 6,0
	Production value	158	547	541	552	5,051 - 10,213
	Added value	88	341	339	67	618 - 1,249
Sand extraction	Employment	0,3	0,2	0,2	0,3	0,4
	Production value	145	122	149	213	256
	Added value	52	46	58	82	99
Total at sea	Employment	14,6	13,1	12,7	12,7	19,8 - 26,8
	Production value	12,071	10,023	9,784	11,531	16,603 - 27,214
	Added value	5,542	4,241	3,706	4,578	6,364 - 7,508
Sea ports	Employment	114.2	117,4	125,1	124,1	
	Production value	12,071	69,326	76,536	83,590	
	Added value	5,542	17,076	18,244	20,927	
Coastal Zone	Employment	44,1	48,3	50,0	49,9	
	Production value	4,100	4,628	4.945	4,411	
	Added value	2,183	2,493	2,662	2,292	
Total on land	Employment	158,3	165,7	175,1	174,0	
	Production value	69,796	73,954	81,480	88,001	
	Added value	18,059	19,570	20,905	23,219	

Employment x 1,000 FTEs; miscellaneous in millions of euros.
These figures are based on a scenario analysis study by Ecorys. This study presents figures for three scenarios, each assuming a different speed of implementation of sustainability policies. This study covered only offshore activities. For more information, see Ecorys 2023.
***Small differences in addition are due to rounding figures up/down.*

2.2 Costs incurred to reduce degradation of the marine environment by economic activities

The costs of marine degradation can be analysed and depicted in various ways [32]. For instance, Wageningen Economic Research (WEcR) has made an analysis based on ecosystem goods and services as well as a so-called cost-based approach [36]. The former analysis is conceptually, methodologically and empirically not yet mature enough to be applied. The Netherlands opted for the cost-based approach, a pragmatic method that provides an overview of the annual costs incurred to counter and prevent further environmental degradation.

Table 2.2 gives an overview of the financial costs incurred in 2022 to address environmental degradation on the Dutch part of the North Sea, to improve the current situation or to prevent environmental damage. The costs are, among other things, based on the MSFD programme of measures (article 13 and 14 report MSFD). This programme includes measures needed to achieve good environmental status and environmental targets. It also includes the costs of measures that, although part of standing policy, such as the Water Framework Directive and the Nitrates Directive, also contribute to improving the marine environment [36].
The categorisation in the table below is based on uses and human activities taking place at sea, or affecting the marine environment from land. This overview shows that the Netherlands spends at least between 0.7 and 2.2 billion euros annually on measures to prevent or reduce deterioration of the marine environment. For some of the costs it is not possible to determine exactly how much they contribute to protecting the marine environment; for that reason, a range is shown. Besides sectors operating on the North Sea and along the coastline, sectors on land also take many measures that contribute to the protection of the North Sea. These include measures to be taken by agriculture for the Nitrates Directive and investments in sewage treatment [36].

These costs are a lower limit to the value society places on preventing further degradation of the marine environment. Research shows that Dutch society is aware of the environmental problems in the North Sea and that a portion of those surveyed is also willing to contribute financially to achieving good environmental status. On the other hand, another portion of the respondents believes that those who pollute the most should also pay for the costs [37]. Annex VII provides a brief summary of this survey.

Table 2.2 Estimated total current minimum annual costs (in 2022) to prevent or reduce marine environmental degradation in the Dutch part of the North Sea [36].

Sector	Minimum cost (in millions of euros)
Fisheries & aquaculture	36 - 40
Shipping	52
Oil and gas production	207
Sand extraction	**
Offshore Wind Energy	32 - 86
Ports	**
Activities in the coastal zone	24 - 33
Government	161 - 365
Agriculture	2 - 11
Urban and industrial activities	193 - 1,098
Other activities	22 - 123
Total	>€ 719 - 2.015

*** Data on costs could not be obtained.*

The North Sea is one of the busiest seas in the world. Photo: Port of Rotterdam, photographer Loes Spruijt-van der Meer.

3 Pressures

3.1 Introduction

The activities described in the previous chapter exert pressures on the marine environment. This chapter describes the current status of the most relevant pressures in the North Sea, including descriptor-transcending pressures (Article 8(b) and Annex III of the MSFD). For pressures linked to descriptors, it is indicated whether they meet good environmental status (Article 9).

3.2 Biological pressures

Extraction of, or mortality/injury to species, including target and non-target catches (by commercial and recreational fishing)

For incidental by-catch of non-commercial species (criterion D1C1), see Chapter 4 (Species).

The fishing sector is one of the most important users in the North Sea ecosystem. The European Commission regulates its management (from 3 nautical miles offshore; in the 3-mile zone, member states regulate their own fisheries management), through the European Common Fisheries Policy (CFP; EU Regulation No 1380/2013). Member states are responsible for management implementation and enforcement. For commercially-exploited species, the MSFD upholds the terms and conditions of the CFP and considers the good environmental status of commercially exploited species to have been achieved when fishing pressure is below the level of a 'maximum sustainable yield'. This is measured using a maximum fishing mortality rate (criterion D3C1) and minimum spawning stock biomass (D3C2).

The assessment covers the period 2015-2020 and stocks within the International North Sea. Of 71 stocks, 20 of these (28 per cent) have good status, 19 (27 per cent) do not meet the criteria for good status and for 32 (45 per cent) no assessment was possible.

Introduction or distribution of non-indigenous species

Non-indigenous species (NIS) introduced by human activities are organisms that enter new areas outside their natural habitat. In the periods 2003-2008, 2009-2014 and 2015-2020, 17, 18 and 24 NIS respectively with an origin from outside north-western Europe settled in the Dutch part of the North Sea. Thus, the number of newly introduced NIS has not declined in the last planning period, but actually increased. However, different developments can be seen in the way they are introduced. Previously, this was done mainly through fish and shellfish transportation. This number has gradually decreased. The increase is solely due to a sharp rise in the number of introductions via fouling on vessel hulls. Although no threshold value has yet been set for this criterion, it can be concluded that good environmental status has not yet been achieved.

Apart from the pressures mentioned above, the MSFD identifies four more biological pressures in Annex III that are not directly covered by a descriptor.

Introduction of microbial pathogens – no associated descriptor

The Bathing Water Directive (2006/7/EC) [38] lays down provisions for the monitoring and classification of bathing water quality, the management of bathing water quality and the provision of information on bathing water quality to the public. The introduction of microbial pathogens is addressed in the MSFD. This also applies to coastal waters. The directive specifies measures to be taken by member states, especially for bathing water sites assessed as 'poor'. No additional policies are therefore required from the MSFD.

Introduction of genetically modified species and translocation of indigenous species – no associated descriptor

Moving shellfish from one area to another requires a permit under the Environment and Planning Act (formerly the Nature Protection Act). To minimise the sanitary, veterinary or ecological risks associated with this, the shellfish relocation policy sets strict conditions for such licensing. This minimises the introduction of invasive non-indigenous species into Natura 2000 areas. No additional policies are therefore required from the MSFD.

Loss or alteration to natural biological communities due to the breeding and cultivation of animal or plant species – no associated descriptor

Aquaculture in the Netherlands at sea (including mariculture) is still limited in scope. However, there are development opportunities for seaweed and mussel farming in the North Sea as a shared use function within wind farms. See chapter 5.

Disturbance of species by human presence - no associated descriptor

Disturbance of species by human activities is related to the quality of species' habitats. See chapter 4.

3.3 Physical pressures

Physical loss of the sea floor

Construction of wind turbines, platforms and pipelines leads to physical loss of the seabed through capping (sealed loss). Land reclamation also leads to sealed loss, but there were no initiatives in the last plan period. Bottom-fishing and resource extraction can also lead to loss of habitat (unsealed loss). This happens when intensive use substantially changes the sediment composition, causing the existing broad habitat type to change to another broad habitat type (BHT).

According to OSPAR, physical loss of the seabed (criterion D6C1) in the Dutch part of the North Sea amounts to 201 km2 (out of 58,807 km^2), or 0.34 per cent, which is almost entirely due to bottom trawling. An additional, more detailed national analysis shows that on top of this, 82 km2 (0.14 per cent) was lost due to other activities, such as the construction of navigation channels, which mainly took place in previous planning periods of the MSFD. In the last planning period, the loss barely increased.

Criterion D6C4 considers loss by habitat type. The EU threshold value entails a maximum acceptable loss of 2 per cent per BHT. According to the OSPAR analysis, in the Dutch part of the North Sea there is surface loss of offshore circalittoral silty habitat only. This loss due to bottom trawling amounts to 1.5 per cent. The habitat type occurs on and around the Central Oyster Grounds, Friese Front and Cleaver Bank. An additional national analysis shows that the area of loss due to the presence of structures (pipelines, platforms and wind turbines) and loss due to sand extraction (including deepened unloading docks) and deepening of shipping channels has been limited to a maximum of 0.56 per cent per broad habitat type. The loss of broad habitat types in the Dutch part of the North Sea thus remains below the threshold value of 2 percent and meets the standard for good environmental status for this criterion. However, it should be noted that the so-called 'other habitat types' (specific habitats such as biogenic reefs) have not yet been included in the analysis.

Permanent alteration of hydrographical conditions

Descriptor D7 deals with permanent alterations in hydrographical conditions, that is, long-term or permanent alterations in water levels and tides, currents, wave action, temperature, salinity, turbidity, sediment transport and channel bed.

The total extent of permanently hydrographically altered area since 2012 is an estimated 324 km^2; this is 0.55 per cent of the total Dutch North Sea. In the area affected, this is mainly the result of the construction of new wind farms in the last planning period. Modelling shows that due to the construction of the Gemini wind farm zone (consisting of the *Buitengaats* and *ZeeEnergie* wind farms) and of a neighbouring wind farm just across the border with Germany, the number of days of temperature stratification has decreased in an area of the sea covering 291 km^2. This effect in particular contributes to the estimated size of the area of permanent hydrographical alterations. Side note: indicators are still under development. The figure referred to above is largely determined by two factors: a model is yet to be developed and there are provisional limits. The results are therefore indicative.

Sea-floor degradation due to physical disturbance or hydrographical alterations

Criterion D6C2 deals with the spatial extent and distribution of physical disturbance on the seabed. Bottom trawling is widespread and by far the main cause of disturbance, with 66 per cent of the seabed of the southern North Sea experiencing moderate to high fishing pressure. Sand extraction is the only other human activity that causes significant disturbance. It is very localised, however, and covers 0.1 per cent of the Dutch part of the North Sea. The results of criterion D6C2 were used as input for D6C3, which assesses the spatial extent of each habitat type which is adversely affected. OSPAR used modelling to estimate habitat sensitivity and risk of degradation from fishing pressure for each habitat type. A 'medium' or higher risk on the scale of the indicator is thereby identified as normative for the status 'degraded'. In the mathematical model, this assumption leads to the result that 58 per cent of the bottom of the Southern North Sea is degraded as a result of physical disturbance by bottom trawling. Only three of the total 15 broad habitat types (see Figure 6.10 in fact sheet D6) are less than 25 per cent degraded. Additional national analysis shows that a small percentage of the 'offshore circalittoral sand', 'circalittoral sand' and 'circalittoral silt' habitat types have been degraded (0.05, 0.30 and 0.27 per cent, respectively) due to sand extraction in the Dutch part of the North Sea.

The assessment is indicative as no threshold value was used, and there are still methodological issues to be resolved. Nevertheless, given the results, it can be concluded that the current status does not correspond to good environmental status for this criterion.

Hydrographical changes (D7) can also lead to degradation and loss of benthic habitats. The loss due to permanent hydrographical alterations amounts to about 60 km^2 or 0.1 per cent of the Dutch North Sea in the assessment period 2016-2021. The area affected is considerably larger. It follows from the analysis under criterion D7C1 that an estimated 251 km^2 of benthic habitat is affected as a result of a decrease in periodic temperature stratification (due to turbulence in the water column) around the

Gemini wind farm and in 40 km^2 of Dutch territory near the Veja Mate wind farm (just across the border with Germany). Around Gemini, the area in question is the offshore circalittoral sand and circalittoral sand habitats located there; in the border area with Germany this relates to 19 km^2 of offshore circalittoral sand habitat and 21 km^2 of offshore circalittoral silt habitat. The calculated extent represents about 0.7 per cent of the total sandy habitat types.
The results of D7 have not been tested against a threshold, but serve as input for criterion D6C5. They do indicate that degradation of benthic habitats is still limited compared to the total area of the broad habitats concerned in the Dutch part of the North Sea. However, the results may be indicative of the consequences of constructing new wind farms in areas where temperature stratification is one of the habitat features, such as in the northern part of the Dutch North Sea. Analogously to D7C1, the results are indicative. Further research as carried out by research programmes Wozep and MONS is crucial.

3.4 Pollution: substances, litter, energy

Introduction of nutrients and organic material

Current environmental status with regard to descriptor D5 Eutrophication is assessed based on a combination of criteria: nutrient concentrations (D5C1), chlorophyll a concentrations (D5C2) and oxygen deficiency (D5C5). About half (49.7 per cent of the surface area) of the Dutch part of the North Sea meets good environmental status. This low percentage is mainly due to the 'moderate' status of oxygen in the Eastern North Sea (45.6 per cent of the Dutch part of the North Sea). Assessment at a finer scale shows that the oxygen-poor areas are relatively small and located in the German and Danish parts of the Eastern North Sea. The 'moderate' status assessment for the Dutch part of this area therefore gives a distorted picture.
In the remaining part that does not meet the conditions for good environmental status (4.6 per cent of the Dutch part of the North Sea), eutrophication effects are mainly found in the river plumes and at the coast. River plumes cover 4.5 per cent of the Dutch area of the sea. Chlorophyll a values here are such that the plume areas are in moderate to poor condition. The WFD coastal waters cover only a very small part of the Dutch North Sea. Of these, the Northern Delta coastal water (0.1 per cent of Dutch part of the North Sea) does not meet good status (score 'moderate'). 0
Results related to nutrients are not included in the integral assessment because not all waters with high nutrient concentrations are necessarily eutrophic. The assessment itself, based on concentrations in winter, does give a good picture of the input of nutrients to the marine environment. The status with regard to phosphate is good, but that of nitrogen is not good in the coastal waters and river plumes, except for the Wadden coast body of water (coastal waters). In general, nutrient concentrations are still declining steadily.

Introduction of chemical contaminants

Contaminants in the marine environment (D8C1) are assessed under descriptor D8 Contaminants. A number of contaminants meet the threshold values, but there are still substances that do not. These are mainly 'UPBT substances' (Ubiquitous, Persistent, Bioaccumulative and Toxic substances). Although measures have been taken to reduce or eliminate emissions of these substances, their properties make them ubiquitous and they remain present in the marine environment for a long time. Of the 19 UPBT substances assessed, 8 substances (42 per cent) do not meet the environmental quality standard. These are organic microcontaminants, including PAHs, PFOS, PBDEs and PCBs, and the metals mercury and tributyltin.
The vast majority of non-UPBT substances meet the quality standard. Of the 119 substances, 8 (6.7 per cent) exceed the threshold value. For most substances, the concentration in recent years has remained the same or decreased slightly compared to the previous plan period. This picture corresponds to that in the previous plan period. An exact comparison with previous planning periods is difficult, because in each period the list of tested substances changes and environmental standards may also be adjusted.

For assessment against the criterion for adverse effects of contaminants on species (D8C2), effects of tributyltin are determined on the basis of imposex in marine snails. Imposex is a phenomenon in which female marine snails develop male sexual organs after exposure to tributyltin. Although this persistent substance still exceeds the limit value in the environment (see D8C1), the level of imposex has decreased to the extent that, for criterion D8C2, good environmental status has been achieved in this respect.

The MSFD calls for estimating the extent of significant acute pollution events (D8C3). In the period from 2016-2021, one oil spill with a volume greater than 5m3 was identified. This oil was cleaned up immediately, preventing potential serious impacts on the marine environment. Regulation 1881/2006 should be used for descriptor D9 Contaminants in fish and other seafood. The contamination levels in fish, crustaceans (shrimps, crab and lobster) and bivalve molluscs (mussels) meet the maximum levels set by the EU in at least 90 per cent of the seafood examined. This means that good environmental status has maintained.

Introduction of litter

The MSFD identifies two primary criteria for assessing litter distribution in the marine environment: D10C1 Litter in the marine environment (> 5mm) and D10C2 Micro-litter

in the marine environment (< 5mm). The secondary criterion D10C3 deals with litter ingested by marine animals. The assessment is based on the status of litter on the coastline (D10C1) and litter found in stomachs of northern fulmars (D10C3). In the International North Sea and the Dutch part of it, there has been a significant decline in both beach litter and plastics in northern fulmars' stomachs. Nevertheless, good environmental status with regard to litter has not yet been achieved. It is not yet possible to assess the status of micro-litter (D10C2) or sea-floor litter (D10C1). However, the available data do not paint a positive picture. Litter occurs in large quantities throughout the OSPAR region. Although the composition varies by region, both on beaches and on the sea floor it is mainly fisheries-related litter and single-use plastics that are found.

Introduction of energy, including underwater noise

During the last plan period, important steps were taken in OSPAR in monitoring and assessment of impulsive underwater noise (criterion D11C1) and continuous underwater noise (criterion D11C2). Both monitoring and assessment still need to be improved. At EU level, threshold values for continuous noise and impulsive noise were set in 2022. The Netherlands is not yet adopting these threshold values, but first wants to elaborate them regionally. Nevertheless, there is enough understanding of the situation around underwater noise to be able to make an assessment.

The OSPAR analysis shows that throughout the North Sea, seismic surveys are the most dominant source of impulsive sound. There was (only) one seismic survey carried out in the Dutch part of the North Sea during the assessment period. In addition, pile driving for wind farm construction and munitions clearance caused impulsive noise. Based on expert judgement, the Netherlands concludes that the current state meets good environmental status. This assessment is supported by comparing the calculated risks of disturbance to porpoises with the stipulation for pile-driving activities for Offshore Wind Energy. The latter, which is much stricter than the European threshold, has been amply met.

Ship noise is the dominant source of continuous sound in the North Sea. This source causes an increase of 20 dB above the natural sound level in the southern part of the North Sea and along the major shipping lanes. The sound level is lowest on Dogger Bank.
The indicator needs further development and the assessment results still have a provisional status. However, the assessment results justify the conclusion that the status in the Dutch part of the North Sea does not meet good environmental status.

Descriptor D11 covers the wider concept of 'introduction of energy'. For now, criteria exist for underwater noise only. Consequently, no good environmental status has yet been formulated for other forms of energy. However, the Netherlands is exploring the effects of electromagnetic fields around power cables of wind turbines and wind farms on the marine environment; see chapter 5.

3.5 Status of pressures

The assessments, definition of good environmental status and indicators used for all pressures covered by a descriptor are summarised in Annex V. Table 3.1 shows the current status for each feature. Countries use these characteristics when assessing environmental status. For a detailed description, please refer to the fact sheets in Annex VIII of the Marine Strategy in Dutch.

Tabel 3.1. Assessment of current status by feature, of descriptors D2 Non-indigenous species, D3 Commercially-exploited fish, shellfish and crustacean species, D5 Eutrophication, D7 permanent alteration of hydrographical conditions, D8 Contaminants, D9 Contaminants in fish and other seafood, D10 Marine litter and D11 Introduction of energy, including underwater noise.
Red = not in good , green = good, grey = assessment not yet possible, black = assessment not applicable.

Descriptor	Feature
D2 Non-indigenous species	Newly introduced NIS
D3 Commercially-exploited species	Commercially-exploited species
D5 Eutrophication	Eutrophication
D7 Permanent alteration of hydrographical conditions	Hydrographical alterations Broad habitat types

Descriptor	Feature
D8 Contaminants	UPBT substances Non-UPBT substances Species Acute pollution events
D9 Contaminants in fish and other seafood	Contaminants in seafood
D10 Marine litter	Litter in the environment Micro-litter in the environment (Micro-)litter in marine species
D11 Introduction of energy, including underwater noise	Impulsive sound in water Continuous low-frequency noise

3.6 Descriptor-transcending pressures

Climate change

Climate change does not fall under an MSFD descriptor, but it is a pressure with impacts on marine organisms, ecosystems and ecosystem services. Climate change causes ocean warming, reduced oxygen concentrations, marine heat waves and sea level rise, among other things. Climate change also causes widespread changes in the water cycle, which are associated, for example, with changes in storm intensity and in the dynamics of freshwater inflow from land via rivers, and alters ocean stratification and ocean circulation. These changes in the physical and chemical conditions of the marine environment can vary widely locally but affect marine life everywhere.
A rise in both water temperature and sea level in the North Sea is expected in the coming decades. Direct effects of sea level rise are expected in the Netherlands mainly in the shallowest areas along the coast. Sandbars that are currently visible at low tide may in future be less visible or even disappear. As a result, nesting, foraging and resting opportunities for shorebirds and resting, moulting and suckling opportunities for seals will decrease. The sea level rise expected on the Dutch coast until 2100 varies, depending on the climate scenario used, from 44 cm to 124 cm [39].

Indicators that allow regional assessment of climate change impacts have not yet been agreed in OSPAR. But available data on climate change in the North Atlantic provide evidence of, for example, shifts in species distributions associated with warming, altered trophic interactions, changes in productivity and sea level rise [1]. The current environmental status of all species groups, habitats and food webs is probably already affected to some extent by climate change.

Ocean acidification

Ocean acidification is caused by emissions of CO_2. A quarter of emitted CO_2 is absorbed by the ocean and changes the chemical balance of the water, which becomes more acidic (lower pH) and in which some building blocks for calcareous structures are less available.

OSPAR (2023) concludes that ocean acidification is a major threat to marine species, ecosystems and ecosystem services. Many marine organisms are expected to be negatively affected by progressive acidification, especially when these pressures coincide with other pressures. Calcareous habitats and calcareous organisms, including many commercially-exploited species, are particularly vulnerable (e.g. mussels, oysters and cockles). In acidified seawater, it can take more energy to form a shell or calcareous skeleton, and that energy can no longer be used for growth, reproduction and defence. Ocean acidification is a process that takes place over decades. The ability of marine organisms to adapt to new conditions will depend on the rate and extent of environmental change, including acclimatisation and evolution over several generations [1].

Coastal seas such as the North Sea are much more dynamic than the open ocean. Due, for example, to the influence of nutrients supplied by rivers, primary production (and thus the uptake of CO2 by algae) varies greatly. As a result, there is a greater amplitude in acidification parameters both within a year and between years than in the oceans. As a result of this local variability, acidification trends in coastal seas may be somewhat amplified or attenuated compared to those observed in the oceans. The North Sea is expected to continue to acidify in the future.

Cumulative effects

The build-up of effects from various pressures is also known by the term 'cumulative effects'. The combination of all the pressures described above and external pressures/pressures outside the marine environment has resulted in the status of the marine environment as presented in Chapter 4. Future developments will change this, either negatively or positively (see also Chapters 2 and 5). Climate change and the substantial expansion of offshore wind (to prevent climate change) in particular are expected to lead to changes in the marine environment.

Grey seal © Dutch Maritime Productions - Peter van Rodijnen

4 State of the marine ecosystem

4.1 Introduction

The pressures described in the previous chapter affect the marine ecosystem. This chapter describes the current status (or 'State') of species groups (D1), habitat types (D1C6 and D6) and food webs (D4), and concludes whether they are in good environmental status. This satisfies the requirements of Art. 8(1a) and Art. 9 respectively, and the MSFD Annex III cited herein.

4.2 Species

Marine birds

The assessment of the current status of seabirds is based on data on population abundance (criterion D1C2) and breeding productivity (D1C3). There is still too little knowledge on the relative influence of different pressures and on cumulative effects for birds. This is why criteria D1C1 Incidental by-catch and D1C5 Quality of habitat are not yet part of the overall assessment.
Species have been divided into groups to assess seabirds. A distinction is made between surface-feeding birds, pelagic-feeding birds, benthic-feeding birds and wading birds. In the International North Sea, the group of pelagic-feeding birds meets good environmental status. Of the other three groups, significantly less than the required 75 per cent of assessed species are in 'good status' (OSPAR, 2023). If all species are considered in total (rather than by group), 14 out of 27 breeding bird species (52 per cent) are not in good environmental status. For non-breeding birds, this is 17 out of 39 species (44 per cent). A separate analysis of data from Dutch aircraft counts provides a similar picture for the Dutch part of the North Sea. Compared with the previous planning period, no species' status has changed. Many species have not been in good condition for a long time and continue to decline.

Marine mammals

The integrated assessment of marine mammals is based on information on incidental by-catch (D1C1), population abundance (D1C2) and distributional range (D1C4) of harbour porpoise, grey seal and harbour seal. For seals, pup production (D1C3) is also included.
Overall, grey seal and harbour seal show an upward trend during this planning period, leading to a positive assessment and good environmental status. This is not the case for harbour porpoise, as the by-catch threshold has been exceeded. It remains necessary to remain alert to the status of seals, however, given the sometimes sudden population trends in the past, and - in the case of the harbour seal - a flattening of the upward trend in the assessment period. There has even been a decline in population growth since 2021.

Fish

Under the MSFD, there are two descriptors for the assessment of fish: D1 Biodiversity and D3 Commercially-exploited fish and shellfish. Because commercially-exploited species contribute significantly to biodiversity, the D3 assessment of these fish is also part of D1 which considers fish biodiversity as a whole.
The overall assessment is based on population abundance (D1C2). Long term trends as well as short term trends indicate recovery of vulnerable species such as common smooth-hound, small-spotted catshark, blonde ray, thornback ray, spotted ray and undulate ray. Also, a gradual improvement is visible for demersal and benthic commercially exploited species. Insufficient information is available from many fish populations to make an assessment, making the assessment on the entire fish community uncertain. In particular, little is known about coastal and pelagic populations. Because of the design of the monitoring surveys, most is known about demersal fish (fish living on or near the seabed). Of this group, which comprises 86 populations, 29 per cent meets the threshold, 30 per cent does not, and not enough is known about the rest. None of the species groups meets good environmental status, which requires that 80 per cent of the populations within the group be in good status.

Cephalopods

The MSFD includes cephalopods under descriptor D1 Biodiversity, in addition to marine birds, marine mammals, fish and habitats. Cephalopods include squids and octopuses. Little is yet known about this group. An assessment is therefore not yet possible. Available data seem to indicate an increase in the Southern North Sea. The assumption is that this is because squids are migrating northwards due to warmer sea water as a result of climate change.

4.3 Habitat types

Pelagic habitat types

Pelagic habitat types include phytoplankton and zooplankton. Phytoplankton are plant organisms such as green algae and diatoms; zooplankton are animal organisms such as copepods and larvae of, for example, fish and benthic species. Although significant knowledge gaps remain, OSPAR has developed two indicators that allow, for the first time, an assessment of pelagic habitat types. The indicators consider changes in species composition and changes in biomass, and whether these changes are linked

to anthropogenic pressures.
Plankton communities have changed significantly both in previous periods and in the 2015-2019 planning period. Exploratory analysis suggests that these changes correlate, among other things, with warming waters in the North Sea and fluctuations in nutrient concentrations. The observed changes can probably be linked to human activity. Because of this, it is concluded that pelagic habitat types in the International North Sea are overall not in good environmental status.

Benthic habitat types
Benthic habitat types and the benthic communities associated with them have an important ecosystem role. Physical disturbance or hydrographical alterations can lead to degradation or even loss of benthic habitat types. See chapter 3 for this. This section discusses the ultimate impact of the combined pressures on benthic habitat type condition (criterion D6C5), as well as the overall assessment of descriptor D6.

For criterion D6C5, an EU threshold value has been set indicating the maximum proportion of a habitat type in an assessment area that may be substantially physically disturbed. As it is unclear what exactly is meant by 'substantially physically disturbed', the Netherlands has not yet adopted this threshold value. Under criterion D6C5, three indicators were used to determine the condition of the habitat types. Because the indicators react to different aspects, the combination gives a more complete picture of the condition than each of the three separately. The so-called BISI indicator shows that several typical, sensitive and key species are widely absent or occur in lower densities than would be expected under good conditions. This is observed in almost all broad habitat types. Relative species diversity in coastal areas is also low. However, despite the lack of specific sensitive species, several offshore habitat types are relatively species-rich.

In the overall assessment of D6, all criteria are considered together (see chapter 3 for criteria D6C1 to D6C4). Despite residual methodological limitations, it was concluded that good environmental status has not been achieved in the Dutch part of the North Sea. This assessment is based on field measurements and specifically on the BISI indicator. The results of the other indicators support this conclusion, especially the OSPAR indicator BH3 that calculates the extent to which habitat type are adversely affected (criterion D6C3; see chapter 3). Habitat loss does remain below the European threshold, however (D6C4; see Chapter 3).

4.4 Food webs

Organisms in and around the North Sea are interconnected in a food web. The food web is a network of trophic relationships and interactions between organisms, in which energy is transferred from lower to higher trophic levels in the form of 'eating and being eaten'. Phytoplankton forms the basis of the marine food web, followed by zooplankton. There is therefore a significant overlap between D4 Food webs and D1C6 pelagic habitat types (see above). Descriptor D4 considers the trophic guilds of marine food webs. The status was analysed in terms of energy transfer within the food web.
OSPAR's new and further developed indicators allow assessment of three 'guilds': primary producers (phytoplankton), secondary producers (zooplankton) and demersal fish. Good environmental status for the marine food web is achieved when all trophic guilds have productivity, density and diversity at levels that ensure food web functions now and in the future. In the North Sea, three of the six guilds are not in good status. The condition of the other three guilds is unknown. Overall, it was concluded that descriptor D4 Food Webs does not meet good environmental status in the International North Sea.

4.5 State of the marine ecosystem

The assessments, definition of good environmental status and indicators used are summarised in Annex V. Table 4.1 shows the current status for each feature. For a detailed description, please refer to the fact sheets in Annex VIII of the Marine Strategy in Dutch.

Table 4.1. Assessment of current status by feature, descriptors D1 Biodiversity, D4 Food webs and D6 Sea-floor integrity and benthic habitat types
Red = not good, green = good, grey = assessment not yet possible.

Descriptor	Feature
D1 Biodiversity (seabirds)	Surface-feeding birds Pelagic-feeding birds Benthic-feeding birds Wading birds
D1 Biodiversity (marine mammals)	Seals Small toothed cetaceans
D1 Biodiversity (fish)	Coastal Demersal Pelagic
D1 Biodiversity (cephalopods)	Coastal zone
D1C6 Pelagic habitat types*	Broad pelagic habitat types
D4 Food webs	Coastal Zone
D6 Sea-floor integrity and benthic habitat types	Broad habitat types

*: D1C6 Pelagic habitat types is a criterion, but forms a separate group under D1. See main text for explanation.

Working on reef restoration through nature-inclusive construction: vegetated oyster table in Borssele wind farm © De Rijke Noordzee.

5 Environmental targets

5.1 Introduction

The Netherlands is establishing an operationally applicable set of environmental targets to counter the main pressures on the North Sea environment. The need for this is directly related to the change and/or intensification of the use of the North Sea anticipated in the North Sea Programme 2022-2027, for instance in the fields of wind energy, shipping, fishing and coastal defence. Good environmental status must be achieved to bring sustainable use of the North Sea within the capacity of the marine ecosystem and to maintain that status. Above all, this requires specific environmental targets.

The environmental targets are set for each descriptor; they are summarised in Chapter 5. Environmental targets embody the 'Response' from the DAPSIR cycle and are intended to achieve progress in terms of reaching good status of the marine environment, or maintaining good environmental status. The Netherlands is implementing Article 10 of the MSFD by means of these environmental targets.

5.2 Progress on environmental targets

In the past planning period, the Netherlands actively pursued all environmental targets set out in the 2018 MS1. In most cases, sustained effort is needed to achieve or maintain good environmental status.

Annex VI provides an overview of the environmental targets from the previous planning period, including progress and the link to the updated environmental targets.

- Eleven of the 29 environmental targets from 2018 are essentially unchanged. Examples include further resolving fish migration bottlenecks, further reducing contaminant inputs and continuing to work on the return of biogenic reefs.
- Five environmental targets have been adjusted. For example, an overarching target for non-indigenous species is now broken down by vectors (routes of introduction). Also, the prevention of effects of impulsive noise has been further detailed by sound source.
- The remaining 13 environmental targets from 2018 are no longer applicable and have therefore been discarded, generally due to evolving insight in how the Directive should be applied. These environmental targets focused exclusively on knowledge building, the development of indicators or monitoring. They are part of the elaboration of Article 8, 9 or 11 of the MSFD and were therefore not appropriate as environmental targets (Art. 10). After all, achieving these targets does not in itself lead to achieving or maintaining good environmental status. However, knowledge development, indicators or monitoring may be required as a first stage towards an operational environmental target.

Box 5.1 Knowledge development

Several national research programmes contribute to the knowledge development needed to achieve environmental targets. Important examples are the research programmes 'Monitoring and Research Nature Enhancement and Species Protection' (MONS) and the 'Offshore wind power ecological programme' (Wozep). MONS investigates how the North Sea ecosystem will respond to the energy, food, and nature transition described in the North Sea Agreement. Wozep focuses specifically on the knowledge gaps concerning the ecological effects of wind farms on marine ecosystems. This includes research on the effects of underwater noise, electromagnetic fields, hydrographical effects of wind farms and research on animal species occurring in the wind farms. The Digital Ecological Measurements North Sea project (DEM) gives an impetus to the infrastructure for ecological monitoring in the North Sea. The government also stimulates fundamental knowledge gathering on the North Sea ecosystem through grants from the Netherlands Organisation for Scientific Research (NWO), some of them under the National Science Agenda and the Blue Route in particular.

In addition, for knowledge development in support of environmental targets, the Netherlands collaborates extensively with neighbouring countries, for instance in OSPAR and EU contexts. For instance, the Netherlands participates in the Sustainable Blue Economy Partnership (SBEP, which is part of Horizon Europe). The Netherlands is exploring possible intensification of international knowledge sharing and cooperation through various platforms. This includes putting knowledge questions to the International Council for the Exploration of the Sea (ICES) and participation in the JPI-Oceans Research Institute for good environmental status.

5.3 Updated environmental targets by descriptor

The MSFD requires member states to formulate environmental targets in a way that is SMART: specific, measurable, acceptable, realistic and timely. Each environmental target is formulated as specifically as possible, including the indicator(s) on the basis of which progress is determined, and a year by which the target is to be achieved. In addition, the way in which the environmental target is to be implemented (through existing or intended policy) is indicated. Any additional measures, including those arising from the Nature Restoration Regulation, will be addressed in the update of the MSFD programme of measures (2028). Formulating SMART environmental targets is a growth process, as shown by comparison of environmental targets from the previous planning period (MS1 2018) and the environmental targets below. In some cases, there is still a lack of sufficient knowledge to set a specific target. In those cases, it has been indicated that knowledge will be acquired as a prelude to a more specific environmental target. In other cases, the environmental target needs to strike a balance between acceptable and realistic, while at the same time being specific to some extent. The MSFD programme of measures (2028) is an important tool to make the environmental targets that provide a general direction more specific. This growth process will thus continue gradually in this and future cycles of MSFD implementation.
Where possible, the environmental targets have been made quantitative using target values. Quantitative values that apply to an environmental target on the basis of existing directives, primary and secondary legislation or agreements have been included in the updated MSFD environmental targets where possible.

Working towards good environmental status is an ongoing process. In fact, a lot is already being done to realise the environmental targets. For instance, in elaboration of the North Sea Agreement, important measures to protect areas and species, and for research have been laid down in the North Sea Programme. Much is also happening internationally and regionally: in the OSPAR context, for instance, ambitious targets have been set to help reduce litter. The Marine Strategy ratifies these agreements by including them in this third implementation cycle of the MSFD. The environmental targets are a prelude to the MSFD programme of measures (Marine Strategy Part 3, 2028). In MS3, the measures that will be used to meet the environmental targets are determined.

Environmental targets by descriptor

Below is a brief explanation of the updated environmental targets for each descriptor. A more detailed explanation of the environmental targets is included in the fact sheets (see Marine Strategy in Dutch, Annex VIII). The content of the updated environmental targets covers at least the content of the previous environmental targets..

Overarching targets (Descriptors 1 and 6)

The Netherlands has formulated three overarching environmental targets that contribute to achieving good environmental status for Descriptor 1 Biodiversity (seabirds, marine mammals, fish) and D6 Sea-floor integrity and benthic habitat types. The environmental targets are in line with objectives under the European Biodiversity Strategy and obligations under the Birds Directive and Habitats Directive. It should be noted, that in many cases the specific environmental targets benefit several descriptors.

Table 5.1. Overarching environmental targets (with target point), associated year, associated indicators and implementation (applicable to D1 Biodiversity and D6 Sea-floor integrity and benthic habitat types).

	Environmental target (with target points)	Year	Indicator	Implementation
1.1	By 2030, at least 30 per cent of the area of the Dutch marine waters is protected area under the regime of Natura 2000 and/or the MSFD[1].	2030	Area of N2000 and/or MSFD protected areas.	Designate areas under HD or BD (N2000) and/or MSFD, implement NSA area agreements.

[1] This percentage includes Wadden Sea, Ems Dollard, Eastern Scheldt and Western Scheldt.

	Environmental target (with target points)	Year	Indicator	Implementation
1.2	Achieve conservation objectives for habitat types and species in marine Natura 2000 sites.	In line with Natura2000 timeline management plans	Number of conservation targets realised.	- Implementation based on rules on Natura2000 areas in the Dutch Environment and Planning Act - International measures: all measures (existing or planned) listed in MS1 make a contribution. - Implementation of the Nature Restoration Regulation (national restoration plan) - Possible additional measures based on the evaluation of management plans or species protection plans.
1.3	Stop the nationwide decline of marine habitat types (HD) and species (HD and BD). This environmental target is in line with the objectives from the EBS.	2030	Number of habitat types and species declining/not declining.	- Implementation based on rules on Natura2000 areas in the Dutch Environment and Planning Act - International measures: all measures (existing or planned) listed in MS1 make a contribution. - Implementation of the Nature Restoration Regulation (national restoration plan) - Possible additional measures based on the evaluation of management plans or species protection plans.

1.4	Phase 1: Gain insight into the bycatch of vulnerable bird species, common seal, and non-commercial fish species such as sharks and rays. Phase 2: Minimizing bycatch of vulnerable bird species, marine mammals, and non-commercial fish species such as sharks and rays.	Phase 1: 2030 Phase 2: Ongoing	Birds and marine mammals: indicator D1C1, fish: under development	- CIBBRiNA project: Implementing mitigating measures to minimize and, where possible, eliminate bycatch. Duration: Sep. 2023 - Sep. 2029. - MONS study on gillnet fishing (start 2025). - Brown Bank semi-annual gillnet restriction (Oct. 1 - Mar. 31) (expected from 2027). - cf. North Sea Agreement 4.40: Frisian Front no fishery zone (expected in 2027) and semi-annual gillnet restriction (since March 2023), along with fishery restrictions in the coastal zone (since 2016). - No new gillnet fishing will be allowed in Natura 2000 and MSFD areas (cf. North Sea Agreement 4.45). - Shark and Ray Action Plan 2022-2027. - Further efforts to increase the survival chances after discarding and to improve fishing gear selectivity, focusing on target species.

D1 Biodiversity marine birds

Despite measures taken, the overall status for marine birds has hardly improved over the last planning period. The updated environmental targets for birds focus on reducing key pressures and actively restoring seabird populations.
The designation of additional areas will expand the area covered under the Birds Directive. In addition, the Netherlands will draw up species protection plans in the coming years to restore the population size of several marine bird species.

In the coming planning period, potentially important bottlenecks will receive extra attention; these are the incidental by-catch of seabirds and food availability. Research will show whether these are significant pressures for birds, and will guide possible measures.

The roll-out of offshore wind energy calls for an environmental target to reduce the impacts of new offshore wind farms that could impede progress towards good environmental status. For instance habitat loss, displacement and risk of fatal collisions with wind turbines. To elaborate this environmental target, both the KEC (see Box 5.2) and species protection plans are used. The Netherlands also wants to reduce significant pressures on land, such as disturbance and predation of breeding birds.

Table 5.2. Environmental targets (with target values), associated year, associated indicators and implementation (D1 Biodiversity marine birds).

	Environmental target (with target values)	Year	Indicator	Implementation
1.5	Improving the status of seabirds by expanding the area of special protection areas at sea under the Birds Directive. Note: The number of km2 is to be determined after additional research on BD area designation, which is expected to be completed in 2025.	Ongoing	The surface area of new Birds Directive areas.	Four protected bird areas (Frisian Front, Brown Bank, North Sea Coastal Zone, Voordelta) already designated. Processes for research and designation of additional areas are ongoing. Draft and implement N2000 management plans.
1.6	Restoring the population abundance of bird species for which good environmental status has not been attained or maintained, by achieving at least a positive trend for each species.	Ongoing	1: Indicator of population abundance by species (D1C2). 2: link to species protection plans (evaluations)	Draft and implement (2024-2030) species protection plans for KEC species + for EBS species (various species of marine birds + shorebirds) + IUCN Red List species (North Sea Agreement 6.9).
1.7	Phase 1: Understanding whether food availability is a limitation for vulnerable bird species Phase 2: ensuring and, if necessary, restoring sufficient food availability for vulnerable bird species	Phase 1: 2030 Phase 2: ongoing	Indicator D1C1.	Fase 1: Uitkomsten MONS-onderzoek voedselbeschikbaarheid (start 2024). Instellen no-fishery zone op Friese Front (conform NZA 4.40). Fase 2: Mogelijk zijn op basis van de uitkomsten na 2030 meer maatregelen nodig om voedselbeschikbaarheid te herstellen.
1.8	Mitigating effects of new offshore wind farms (habitat loss, displacement and collision victims) on marine birds and migratory birds.	Ongoing, based on roll-out of offshore wind energy roadmaps	Indicator to be developed (partly based on species protection plans, and Wozep outcomes)	Use the KEC and VECI (ecological assessment framework) in planning. Include mitigation measures in plot decisions, including implementation of best practices such as the start/stop procedure. North Sea Nature Enhancement Programme (duration to 2030) Draft and implement (2024-2030) species protection plans.

	Environmental target (with target values)	Year	Indicator	Implementation
1.9	Reducing disturbance and predation on breeding birds so that fecundity is improved.	Continually	1: Fecundity of shorebirds (gulls, common tern, eider, oystercatcher, avocet, ringed plover, Kentish plover and terns) according to indicator for D1C3. 2: Align with evaluations N2000 management plans	Existing measures in N2000 coastal areas (reducing disturbance (recreation, driving on the beach) for fecundity and protection against predation by foxes in particular). Draft and implement (2024-2030) species protection plans (with exploration of opportunities for breeding colonies outside N2000 areas).

Box 5.2 Cumulative effects
In parallel with the development of offshore wind farms, the Netherlands has drawn up the Framework for Assessing Ecological and Cumulative Effects (KEC).This framework is regularly updated with the latest knowledge, and in 2025, KEC 5.0 came into effect . The KEC analyses and determines the potential cumulation of effects of wind farms on birds and bats (collisions and habitat loss), marine mammals (underwater noise), the ecosystem and MSFD indicators. The latter two categories are currently assessed qualitative. The KEC is anchored in policy in the North Sea Programme 2022-2027 and is therefore a mandatory instrument in site selection for wind farms in the Dutch part of the North Sea. Cumulative effects are determined qualitatively when designating areas for wind energy in the North Sea Programme. Prior to plot decisions (e.g. when developing a Roadmap), this must be done quantitatively.

The Netherlands plays a leading role in OSPAR and GNSBI in developing methods for analysing cumulative impacts of human activities in the marine ecosystems of the North-East Atlantic. Given the expected increase in various activities (including offshore wind farms), guidelines are being developed in the OSPAR context to promote sustainable development in a way that minimises cumulative environmental impacts.

D1 Biodiversity marine mammals

The main human-induced pressures for marine mammals are by-catch, disturbance from underwater noise, contaminants and disruption or loss of habitat (including from shipping, military exercises, recreation and climate change). In addition, limited food availability and viral diseases are important pressures. In recent decades, measures have led to reductions in contaminant concentrations. Despite the progress made, continued efforts are needed; concentrations of UPBT (ubiquitous, persistent, bioaccumulative and toxic) substances in particular are decreasing very slowly. Measures to reduce underwater noise are already in place, but attention to this pressure remains necessary, given the intensification in activities whose cumulative effects are not yet well understood.

The updated environmental targets for marine mammals focus on achieving and maintaining healthy populations through species protection plans and specifically on reducing underwater noise and by-catch pressures. The Framework for Assessing Ecological and Cumulative Effects (KEC) is an effective tool to quantify impulsive sound during wind farm construction. The European CIBBRiNA project, initiated by the Netherlands, is expected to contribute significantly to reducing incidental by-catch of marine mammals and other vulnerable species. All measures to achieve environmental targets for marine mammals are laid down in species protection plans. By reviewing these every two years and revising them if necessary, new developments can continuously be taken into account.

The environmental targets under descriptors D8 Contaminants, D10 Marine Litter and D11 Introduction of energy, including underwater noise contribute to D1 Biodiversity (Marine Mammals).

Table 5.3. Environmental targets (with target values), associated year, associated indicators and implementation (D1 Biodiversity marine mammals).

	Environmental target (with target values)	Year	Indicator	Implementation
1.10	Integrated approach to reach and maintain healthy populations of marine mammals.	Ongoing	Align with species protection plans (evaluations).	Implement species protection plans: Porpoise Protection Plan (biennial review) and Seal Management Plan.
1.11	Limiting the effects of underwater noise on marine mammals.	Ongoing	Number of porpoise disruption days (in relation to Offshore wind energy). Indicator for other activities yet to be developed.	Noise limit for pile driving, Passende beoordeling for large-scale construction projects at sea, use of acoustic deterrent devices (ADDs) in explosives clearance, management plans in EEZ areas + number of measures still under investigation. Application of the ecological assessment framework (KEC) in planning, and by developing and implementing mitigation measures. Some measures are still under investigation (slow navigation, quiet areas).

D1 Biodiversity fish

The updated environmental objectives for fish focus on continuing to mitigate the negative effects of bycatch, as is done in the Shark and Ray Action Plan and the European LIFE CIBBRiNA project to limit by-catch.
Other goals put into practice under the WFD focus on removing priority fish migration bottlenecks, restoring populations of vulnerable species and nature-inclusive construction of large-scale wind farms, which also create new habitats for fish. In this latter goal, the Netherlands has a stimulating role.
Specifically for sharks and rays, gathering knowledge is still an important condition for further specifying environmental targets for this species group.

Table 5.4. Environmental targets (with target values), associated year, associated indicators and implementation (D1 Biodiversity fish).

	Environmental target (with target values)	Year	Indicator	Implementation
1.12	Priority fish migration bottlenecks in Dutch (inland) waters have been resolved.	2027	Number of structures that can be negotiated by fish.	WFD measures
1.13	Phase 1: Understanding distribution, habitat use and population abundance of sharks and rays. Phase 2: Where necessary, restoring distribution, habitat use and population abundance of sharks and rays.	Phase 1: 2027 Phase 2: Ongoing, in line with Action Plan	Alignment with the most recent evaluation of the Shark and Ray Action Plan (every two years).	Implementation of Shark and Ray Action Plan 2022-2027, specifically increasing the knowledge base around habitat use and species recognition, with a view to identifying leads for any additional measures needed.
1.14	Achieving population growth or at least conservation of (vulnerable) commercial and non-commercial fish species.	Ongoing	Indicator D1C2 (based on project monitoring)	Species recovery plans (for eel, sharks and rays, cod, N2000 species). North Sea Nature Enhancement Programme (duration to 2030) Knowledge development for building of structures inside and outside wind farms and nature-inclusive construction of wind turbines. Explore need for (season-specific) protection of spawning grounds.

D1 Biodiversity cephalopods

No specific environmental targets apply to cephalopods, but the environmental targets for D1 Biodiversity fish, D3 Commercially-exploited fish and shellfish, and D6 Seafloor integrity and benthic habitat types also benefit this species group.

D1 Biodiversity: pelagic habitats

The environmental target for D4 Food webs, which relates to plankton, also applies to criterion D1C6 Pelagic habitats. Furthermore, the environmental targets under D5 Eutrophication also benefit D1C6.

Box 5.3 Network of marine protected areas

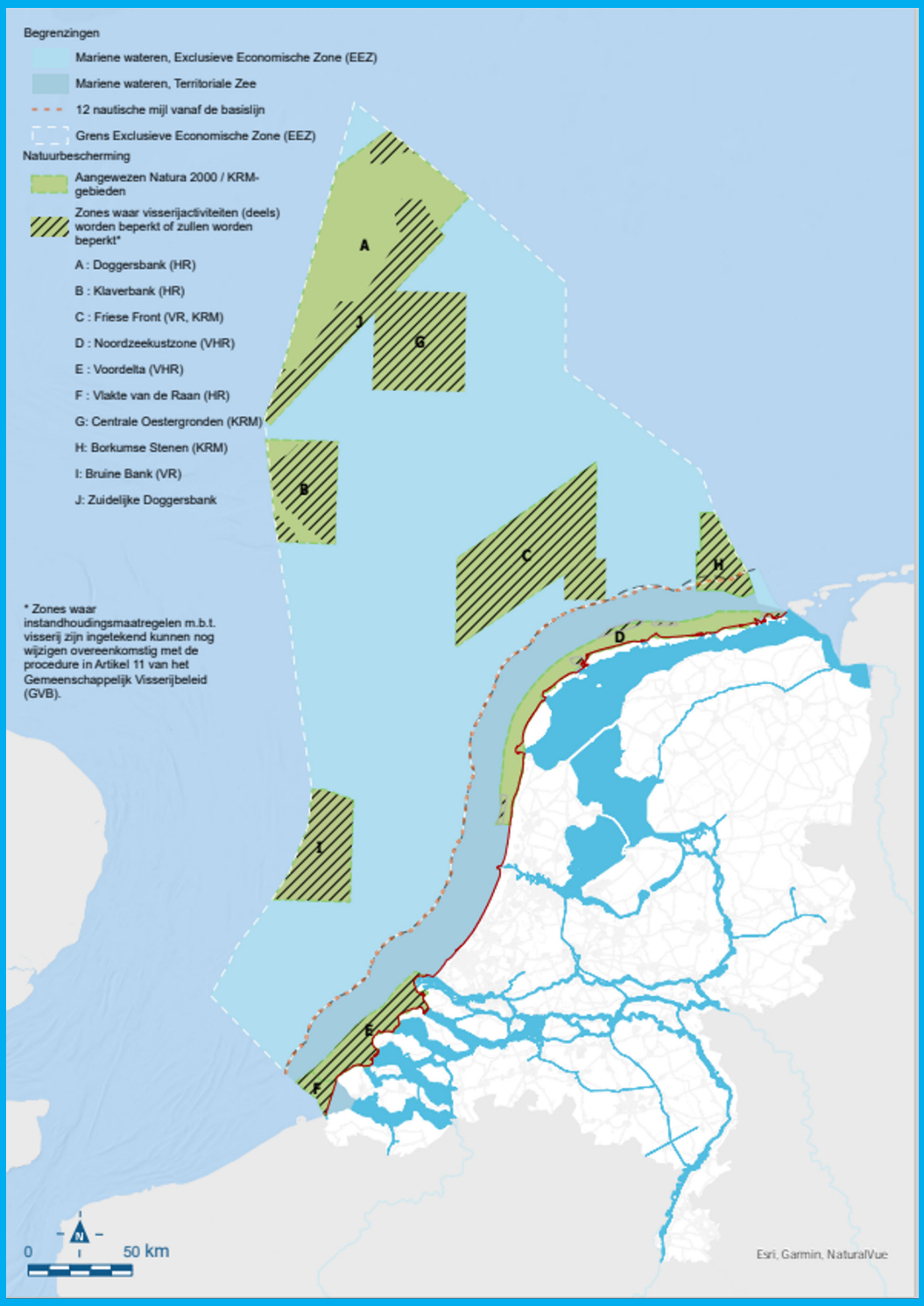
Following the Convention on Biological Diversity, the MSFD is working towards a coherent and representative network of marine protected areas. In the Dutch part of the North Sea, seven Natura 2000 areas have now been designated under the BD and HD, and three areas under the MSFD. Together, these areas cover about 25 per cent of the Dutch North Sea. The Southern Dogger Bank may be added as an MSFD area as part of the Partial Revision of the North Sea Programme.

For Natura 2000 areas, agreements on the protection and regulation of activities are laid down in management plans. For the MSFD areas, agreements were made in the North Sea Agreement, which were adopted in the MSFD programme of measures (2022). For example, since 2023 there has been a ban on bottom-fishing in three nature areas in the Dutch North Sea: Cleaver Bank (HD), Central Oyster Grounds (MSFD), and Frisian Front (MSFD). This covers 5 per cent of the Dutch sea floor. A six-month ban on gill and tangle net fishing applies in the Frisian Front Birds Directive area and specific areas have been designated in the coastal zone where commercial fishing is (partially) prohibited. The network of protected areas with fishing restrictions will be further expanded in the coming years to a total of 15 per cent sea floor protection in 2030 (see environmental target 6.2, putting Article 4.38 of the North Sea Agreement into practice under the MSFD).

At the regional level, OSPAR sets the goal that by 2030, the network of marine protected areas (MPAs) - including other effective conservation measures (OECMs) - should cover at least 30 per cent of the OSPAR area. This network must be representative, ecologically coherent and effectively managed to achieve its objectives (NEAES, 2030).

The 20 per cent share of marine protected areas in the entire North Sea is relatively high within the Northeast Atlantic. Much progress has been made, including in terms of representativeness: the network of sites is geographically well distributed and 76 per cent (31 out of 41) of the identified threatened species or habitats have one or more protected areas designated (OSPAR, 2023). But while great strides have been made, in many cases it is not easy to estimate if and when environmental targets will be achieved. It takes time for recovery to take place, and changes that occur can usually only be identified after long-term monitoring.

Map 5.1. Protected areas in the Dutch part of the North Sea. N2000 areas with year of designation: Voordelta (2000; BD/HD), North Sea Coastal Zone (2009; BD/HD), Raan Flats (2010; HD), Dogger Bank (2016; HD), Cleaver Bank (2016; HD), Friese Front (2016; BD), Brown Bank (2021; BD). MSFD areas: Frisian Front (2012), Central Oyster Grounds (2012), Southern Dogger Bank (2025) and Borkum Stones (2022).



D2 Non-indigenous species

Because of the lack of actionable options for removing non-indigenous species already in the marine environment, efforts have been focused entirely on preventing introductions via the main routes: ship hull fouling, shellfish transport and ballast water. Policies already in place seem to be bearing fruit: the number of introductions via the last two mentioned routes has decreased. This does not apply to hull fouling; on the contrary, an increase is visible via this route.

During the coming planning period, efforts will be continued on three levels to reduce new introductions of non-indigenous species: national (NL), European/regional (OSPAR), and international worldwide (IMO). In this respect, the spotlight is on introductions via ship hull fouling. The existing policy on shellfish transport and the implementation of the Ballast Water Convention will be pursued in order to perpetuate the reduction achieved. Finally, it is important to identify potential new introduction routes in time and act accordingly.

Table 5.5. Environmental targets (with target values), associated year, associated indicators and implementation (D2 Non-indigenous species).

	Environmental target (with target values)	Year	Indicator	Implementation
2.1	Minimising introductions of non-indigenous species through vessel hull growth and ballast water (at least a decrease compared to the previous plan period).	Ongoing	Number of new introductions via vessel hull growth and ballast water.	Continuation of policy support in development of guidelines and regulations aimed at risk minimisation of this vector at national (NL), European (OSPAR), and global (IMO) levels. Continuation of Ballast Water Convention policy
2.2	Minimising introductions of non-indigenous species through shellfish transport, aquaculture through other vectors, e.g. due to new activities..	Ongoing	Number of new introductions through shellfish transport and aquaculture, and via other routes.	Continuation of shellfish transport policy 2023-2033. Implement marine/aquaculture projects within the framework of EU Regulation 1143/2014 on the prevention and control of the introduction and spread of invasive alien species. Make part of EIA and license new type of activities at sea.

D3 Commercially-exploited fish and shellfish

The policy brief for D3 is fully consistent with the commitments through the CFP, such as limiting fishing through fishing quotas to achieve sustainable catches. Environmental targets of D1 Fish, D4 Food webs and D6 Sea-floor integrity also benefit D3..

D4 Food webs

Due to important knowledge gaps around food webs, environmental targets for this descriptor are qualitative in nature.

The closure of areas (Frisian Front) to all fishing provides an opportunity to gain more insight into food web relationships and possible recovery measures. In cooperation with OSPAR, the Netherlands is focusing on restoring and ensuring the resilience of the food web by expanding the coherent and representative network of protected areas and areas designated as OECM . By reducing fishing pressure, the Netherlands is also committed to restoring the size structure of top demersal predators (fish living close to the sea floor). Sea-floor protection (see environmental targets D6 Sea-floor integrity) also contributes significantly to this target. Finally, a target has been set for limiting potential negative effects on the food web due to hydrographic disturbance caused by the construction of offshore wind farms; this environmental target is linked to D7 Permanent alteration of hydrographical conditions.

The character of D4 as a resultant of the other descriptors means that the environmental targets of all other descriptors also contribute to improving environmental status for the food web. Thus, the environmental targets of D5 Eutrophication contribute significantly to primary production, the basis of the food web.

Table 5.6. Environmental targets (with target values), associated year, associated indicators and implementation (D4 Food webs).

	Environmental target (with target values)	Year	Indicator	Implementation
4.1	Restoring food webs to healthy levels with natural energy transfer between trophic levels.	Continually	Indicator yet to be developed for food availability at different trophic levels.	Closure of Frisian Front for all fishing (2.8%) (North Sea Agreement 4.40) Further consultation between fisheries and NGOs to determine whether additional possibilities exist for establishing no-fishery zones within the areas closed to bottom-disturbing fishing (NZA 4.39). Understand changes in trophic level relationships and their impacts (MONS, 2030). If necessary, take additional measures based on lessons learnt (after 2030).
4.2	Working towards a coherent and representative network of protected areas and areas designated as OECM to restore and ensure the resilience of the food web, which represents improvement compared with the previous policy period.	Ongoing	OSPAR indicator of coherence between protected areas (further development in OSPAR Ecoherence Project).	Designated areas for nature (protected areas + OECM). Future areas to be designated + OECM.

	Environmental target (with target values)	Year	Indicator	Implementation
4.3	Recovery of size distribution of predators in the trophic demersal sub-apex level	Ongoing	D4C3 Size distribution within guilds measured by (a) size structure, (b) maximum mean length, (c) proportion of large fish.	Fishery measures (art 11) as per NSA (2030). Adjust as necessary based on evaluation of effects of reduced fishing pressure on sub-apex predators in 2036.
4.4	Phase 1: Exploring the effects of human activities affecting stratification in plankton communities. Phase 2: If necessary, minimising the disruptive effects of human activities.	Phase 1: 2030 Phase 2: to be determined	Hydrographical conditions indicator (D7); further development Composition phytoplankton See also environmental target 5.3 indicators, nutrient inputs and abstraction: - Year-round nutrient concentrations (N total and P total). - Concentrations of chlorophyll a - Primary production (gC/m2/y).	In EIA and licensing, consider effects of mitigation through site selection and design of wind farms and other initiatives that may affect stratification. Research through Wozep and OSPAR (2030).

D5 Eutrophication

The policy task regarding eutrophication in the Dutch part of the North Sea lies in reducing chlorophyll a concentrations in WFD coastal waters and river plumes. Chlorophyll a levels are largely determined by nutrient inputs via rivers. Environmental targets are primarily aimed at reducing riverine nutrient loads, especially nitrogen.

Addressing riverine nutrient loads is part of the river basin management plans under the WFD. It is uncertain whether achieving the WFD targets will also achieve the threshold values at sea. OSPAR is therefore working on a more far-reaching guidance for action and any possible additional measures. The Netherlands will work in the international river commissions (Rhine and Meuse) to reduce the input of nitrogen from the hinterland.

New activities at sea should not adversely affect environmental status. The expected scaling-up of aquaculture at sea is therefore a focus of attention. Finally, in an OSPAR context, continued exploration of the possibility of further reducing the nutrient load of large rivers by natural means is on the programme.

Table 5.7. Environmental targets (with target values), associated year, associated indicators and implementation (D5 Eutrophication).

	Environmental target (with target values)	Year	Indicator	Implementation
5.1	Reducing nutrient inputs from rivers to the sea, aiming at achieving and maintaining WFD targets for chlorophyll a concentrations in coastal waters, and OSPAR targets in river plumes.	2027 resp. 2030	Total nitrogen load from the rivers Concentrations of nitrogen (winter DIN) and chlorophyll a in WFD coastal waters. Concentrations of nitrogen (winter DIN) and chlorophyll a in river plumes (OSPAR assessment areas)	River basin management plans 2022/2027 After implementation of WFD measures, determine in OSPAR context the remaining task and its action perspective for chlorophyll a concentrations in river plumes; this serves as input for the 2028 RBMPs. Nitrates Directive Action Programme Implementation plan of OSPAR's North-East Atlantic Environmental Strategy 2030 (NEAES).
5.2	Focusing on reducing foreign inputs of nutrients (nitrogen) via the international river commissions.	Ongoing	Total nitrogen load at border measuring points.	NL is putting this on the agenda in international river commissions.

	Environmental target (with target values)	Year	Indicator	Implementation
5.3	Input and abstraction of nutrients due to new activities at sea, such as large-scale aquaculture, are limited to a level where no demonstrable negative impacts on primary production occur.	Doorlopend	Year-round nutrient concentrations (N total and P total). Concentrations of chlorophyll a Primary production (gC/m^2/y).	Studies for EIAs and permits for new activities. An assessment framework may be developed for this purpose, e.g. in relation to choice of location and level of nutrient abstraction or input.
5.4	Increasing natural retention of nutrients in catchments if research shows this to be effective.	Phase 1, research: 2030 Phase 2, implementation: after 2030	Load of N.	OSPAR identifies which interventions can contribute to retention, e.g. through deployment of nature-based solutions (2030). Implementation after evaluation.

D6 Sea-floor integrity and benthic habitat types

The environmental targets mainly focus on the passive restoration of benthic habitats and therefore also on the reduction of key pressures. At least 10 per cent of the seafloor of the Dutch North Sea, will be completely free of all manageable human activities by 2030. For the main pressure, bottom-fishing, that percentage will be at least 15 per cent by 2030, according to the the North Sea Agreement.
For each broad habitat type, the aim is to reduce the impact of physical disturbance.
In areas where bottom fishing is restricted, the ultimate goal is an improvement in the quality of benthic habitats.

Loss of benthic habitats due to disturbing activities is minimised. The ultimate target, restoration of benthic habitats, implies improvement in the condition of all broad habitat types relevant to the Netherlands. Where the reduction of relevant pressures does not automatically result in recovery of biogenic reefs, recovery measures will be implemented as an additional effort to promote reef formation.

The environmental targets for D7 Permanent alteration of hydrographical conditions, which aim to reduce disturbance to benthic habitats, support the targets under D6.

Table 5.8. Environmental targets (with target values), associated year, associated indicators and implementation (D6 Sea-floor integrity and benthic habitat types).

	Environmental target (with target values)	Year	Indicator	Implementation
6.1	By 2030, 10 per cent of the entire seafloor in the Dutch part of the North Sea will be safeguarded from all manageable human activities that have effects on the seafloor.	2030	Indicators D6C1, D6C2 and D7C1. Record potentially seafloor disturbing activities and structures, including suppletion and shallow sand extraction (national).	Fisheries measures (Art. 11 CFP) in line with North Sea agreement (NSA 4.38). Draw up assessment framework for other activities.

	Environmental target (with target values)	Year	Indicator	Implementation
6.2	By 2030, 15 per cent of the Dutch North Sea within ecologically valuable areas will be completely free of sea-floor disturbance by bottom fishing (of which 2.8 per cent for all forms of fishing).	2030	Area where fisheries measures are in force, combined with indicator D6C2.	Fisheries measures (Art. 11 CFP) as per North Sea agreement (4.38).
6.3	Reduce the impact of physical disturbance by broad habitat type from fishing activities, to at least a decreasing trend by 2030 compared to the previous planning period.	Ongoing	Indicator D6C3	Fisheries measures (Art. 11 CFP) as per North Sea agreement (4.38).
6.4	Quality improvement of benthic habitats in areas where fishing is restricted as well as each of the broad habitat types whose extent and/or quality is significant in the Dutch part of the North Sea.	Ongoing	BISI index / Margalef index.	Measures that restrict fishing (Art. 11 CFP) in accordance with North Sea agreement (4.38). Draw up consideration framework for other activities in MSFD areas (2028) Additional measures if possible and appropriate through North Sea Nature Enhancement Programme (NNEP) (2030).
6.5	Continue to comply with the EU threshold of 2 per cent physical loss of benthic habitat by minimising infrastructure projects, sand extraction and fishing,	Ongoing	Indicator D6C4	Threshold is currently met, so goal is to maintain GES.

	Environmental target (with target values)	Year	Indicator	Implementation
6.6	Return and restoration of biogenic reefs, including flat oyster beds, in ecologically valuable areas and in wind farms.	Ongoing	Area of biogenic reefs.	Recovery measures in valuable ecological areas: establish oyster recovery areas in Friese Front c.f. article 4.43 North Sea agreement (2025). North Sea Nature Enhancement Programme (NNEP) (2030) Nature-inclusive construction of wind farms serving flat oyster (ongoing). Fisheries measures (Art. 11 CFP) cf. article 4.35 North Sea agreement for the purpose of restoring sandbox worm reefs (2030).

D7 Permanent alteration of hydrographical conditions

With the intensification of activities in the North Sea, the area of hydrographical alterations will increase. Given the intended scale-up of offshore wind power, wind farms are by far the most important factor for D7. Consequently, a major part of the effort is aimed at limiting degradation of seabed habitats due to hydrographical alterations resulting from wind farm construction.

Although sand extraction has permanent hydrographical impacts to a much lesser extent, an environmental target has also been included for this. Impacts due to medium and deep sand extraction (extraction wells of 6 metres or more) must be limited to temporary disturbance of sea floor habitats, or if there is permanent disturbance (degradation or loss) this must be limited to a percentage area to be determined for each broad habitat type. Finally, a target is also set to limit habitat loss and disturbance caused by other, new activities at sea.

Table 5.9. Environmental targets (with target values), associated year, associated indicators and implementation (D7 Permanent alteration of hydrographical conditions).

	Environmental target (with target values)	Year	Indicator	Implementation
7.1	Degradation of benthic habitats due to permanent alteration of hydrographical conditions by wind farm construction to be limited to the direct impact zone around individual piles, avoiding interaction with other wind farms.	2030	Indicator D7C1 (under development)	Consider hydrographical impacts on site selection during planning, environmental impact assessments and licensing of initiatives. Promote innovation in plot decisions and permit requirements. Here, specific attention to regions characterised by (seasonal) stratification or freshwater influence.

	Environmental target (with target values)	Year	Indicator	Implementation
7.2	Limiting effects of permanent alteration of hydrographical conditions due to mid-depth and deep sand extraction (extraction wells of 6 metres or more) to temporary disturbance of benthic habitats, and limit permanent disturbance (degradation or loss) of each broad habitat type (in conjunction with the threshold value for D6C4).	2030	Indicator D7C2 (in development)	Continued implementation of sand extraction strategy. Environmental impact assessment and licensing section sand extraction (excavation).
7.3	New activities such as 'solar at sea', aquaculture, hydrogen production and transport, energy hubs and other uses inside and outside wind farms, should not lead to habitat loss or permanent hydrographical alteration beyond a direct impact zone yet to be defined for each activity (unless ecological added value is demonstrated).	2030	Indicator D7C1 (under development)	Take effects into account in environmental impact assessment and licensing with the aim of mitigating measures if relevant.

D8 Contaminants

In recent decades, much progress has been made in reducing contaminants in the marine environment. Nevertheless, good environmental status has not yet been achieved. The environmental targets for contaminants therefore focus on further reducing pollution from the main sources: land-based polluting activities addressed through the WFD, shipping, offshore installations and new activities. Specifically for lead use in sport fishing, the environmental target is included to work towards a phase-out by 2027. Cleaning up incidental pollution continues to require ongoing attention. The State is committed to reducing the discharge and spread of emerging substances, such as PFAS.

Table 5.10. Environmental targets (with target values), associated year, associated indicators and implementation (D8 Contaminants)

	Environmental target (with target values)	Year	Indicator	Implementation
8.1	Reducing inputs of contaminants via freshwater into the marine environment to meet WFD targets.	2027	Loads of contaminants to coastal waters Indicators, D8C1	WFD measures in the RBMPs, supplemented where necessary by measures in the WFD impulse programme.
8.2	Preventing and limiting significant acute pollution events by cleaning up the substances released in incidents as soon as possible.	Ongoing	D8C3: spatial extent of acute pollution events.	Existing deployment incident response and Implementation Framework for Combating Coastal Pollution Rijkswaterstaat (UBKR). Bonn Agreement.
8.3	Ceasing the use of lead by 2027, by phasing out in marine recreative fishing and encouraging the use of alternatives to achieve this.	2027	Concentrations of lead as reported under D8C1. Screening and Logbook Surveys for monitoring the use of alternatives.	Cooperation agreement Sport fishing Lead-Free 2025-2029 EU ban on the use of fishing lead (expected 2026/2027).
8.4	Minimising pollution from maritime navigation.	Ongoing	Environmental violations in the Dutch part of the North Sea reported by coast guard (possible substance, location and quantity). Estimated annual loads from maritime shipping and fishing (coatings en scrubbers)	Existing legislation including MARPOL legislation, EU Directives (including review marine pollution) and OSPAR regional agreements. Explore measures to prevent discharge of scrubber wash water.

	Environmental target (with target values)	Year	Indicator	Implementation
8.5	Minimising introduction of contaminants from (new) offshore activities, such as wind farms, 'solar at sea', aquaculture, CO2 storage, hydrogen electrolysis and offshore installations.	Ongoing	Align with requirements from legislation and permits.	Existing legislation, licensing procedures (including deployment of BAT). An assessment framework for new activities at sea may be developed, including future use of medicines in aquaculture, among other things.
8.6	Reducing harmful effects of substances used for corrosion protection, including zinc, including on platforms and in wind farms.	Ongoing	Align with requirements from legislation and permits. Estimated annual loads of zinc.	Existing legislation, EIA and licensing procedures (including deployment of BAT).
8.7	Reducing copper contamination of shipping and promoting environmentally friendly alternatives for antifoulants if possible.	Ongoing	Copper concentrations in the environment (D8C1). Estimated annual loads of copper.	Existing legislation based on Environment Act. Hull and propeller cleaning only allowed with capture. Waste water must be filtered (collection of wash water when cleaning ships mandatory in the Netherlands). At IMO level, the Netherlands is pushing for international regulations on collecting wash water when cleaning ships.
8.8	Reducing discharge and spread of PFAS containing substances and other emerging substances including drug residues, thereby reducing inputs to marine waters.	Ongoing	Concentrations of the substances concerned	Measures included in the National Water Programme 2022-2027 and implementation of PFAS in water Action Programme. Research on effects of PFAS on marine environment. (National 2024/2025; OSPAR ongoing).

D9 Contaminants in fish and other seafood

There are no specific environmental targets for D9. The environmental targets for D8 Contaminants contribute to (maintaining) the good environmental status of D9

D10 Marine litter

The updated environmental targets for marine litter focus on further reducing pollution from rivers, fishing, shipping and beach recreation. Where possible, the environmental targets have been made quantitative. This mainly concerns the environmental targets for beaches: a relatively large proportion of monitoring data are available for these. As the Netherlands attaches importance to an internationally coordinated approach, the OSPAR target for single-use plastic and marine litter is an important basis for the environmental targets. This target from the OSPAR NEAES 2030 includes, for example, small plastic bottles (0.5 L) and balloons. For 2030, this target has also been made specific for plastic netting and fisheries-related litter. Other litter types for which a reduction target has been set include pellets (microplastics), cigarette filters and single-use plastics. To achieve good environmental status, litter must not only be reduced on beaches, but also floating litter and litter that ends up on the sea floor.

Table 5.11. Environmental targets (with target values), associated year, associated indicators and implementation (D10 Marine Litter)

	Environmental target (with target values)	Year	Indicator	Implementation
10.1	Reducing the amount of single-use plastic items (including small plastic bottles and caps, and balloons) and of marine-related plastic items on Dutch beaches: by at least 50% by 2025 and by at least 75% by 2030, compared to 2015/2016. *This environmental target is in line with the operational target from the OSPAR strategy (NEAES 2030).*	2025/2030	Indicator D10C1 Beach litter Amount of pellets and mesoplastics on the beach.	Existing package of measures from MS3 2022 (including action on balloons), including measures based on the SUP Directive. If necessary, additional measures based on a new RAP ML from 2026 and the SUP revision (2026).
10.2	By 2030, the amount of plastic netting and other fisheries-related litter, especially fishing net trimmings, on beaches will be reduced by 75% compared to 2015/2016.	2030	Indicator D10C1 Beach litter.	Existing measures from MS3 2022, specifically phasing out plastic netting. Implementation agenda for the vision on food from the sea and fresh water bodies. Possible, additional measures based on the revision of the SUP Directive (2026), OSPAR RAPML 2022-2030 and new OSPAR RAPML from 2030 onwards.

	Environmental target (with target values)	Year	Indicator	Implementation
10.3	By 2030, the amount of pellets on beaches must be significantly reduced compared to 2023/2024.	2030	Indicator D10C1 Beach litter Amount of pellets and mesoplastics on the beach.	Existing measures from MS3 2022, specific measures RAP ML in relation to pellets and the Microplastics Policy Programme. Possible additional measures: - EU regulations prevent loss of pellets during production and transport process (2024/2025);possible specification of pellets as hazardous substance through deployment of IMO.
10.4	The amount of floating litter reduces: the number of northern fulmars with too much plastic in their stomachs decreases significantly: to less than 38% by 2030.	Onhoing	Indicator D10C3: plastic in the stomachs of northern fulmars.	Measures from MS3 2022-2027, specifically the SUP directive and RAP ML. IMO directives, including MARPOL. Possible additional measures: - EU regulations prevent loss of pellets during production and transport process (2024/2025); - adapted requirements of marine transport of pellets via possible assignment of pellets as a hazardous substance within IMO.
10.5	By 2030, the amount of litter in catchments will have decreased significantly (or substantially by a percentage to be determined) compared to 2024/2025.	2030	Litter in river basins with macro litter monitoring on river banks	Existing measures from MS3 2022, specifically river basin approach. Existing national litter policy (including the Litter Collection Scheme). If necessary, additional measures based on, the revision of the SUP Directive (2026) and new OSPAR RAPML from 2030 onwards.

	Environmental target (with target values)	Year	Indicator	Implementation
10.6	By 2030, the amount of cigarette butts on recreational beaches will be reduced by 70% compared to the period 2018-2022.	2030	Shortened OSPAR measurements on recreational beaches in beach season	Measures from MS3 2022-2027, specifically Clean Beaches programme approach. National policy around tackling cigarette filters in the environment.
10.7	By 2030, the presence of single-use plastic items on recreational beaches will be reduced by at least 75% compared to the period 2018-2022.	2030	Shortened OSPAR measurements on recreational beaches in beach season	Measures from MS3 2022-2027, specifically Clean Beaches programme approach and SUP directive. National policy around tackling litter.
10.8	The amount of waste released to the sea floor from maritime sources is minimised	Ongoing	Indicators focusing on litter composition: - Indicators D10C1 beach litter and sea floor - Information from clean-up operations (FFL) and Port Reception Facilities (PRF) - Potentially Bottom-scraper Monitoring D6C5	Measures from MS3 2022-2027, specifically Fishing for Litter. Possible additional measures: regional cooperation OSPAR and EU TGML; commitment within IMO to tightening international regulations.
10.9	Minimise paraffin discharges.	Ongoing	Annual number of reports to Rijkswaterstaat of assistance required in clearing up more than 5m3 of paraffin. Environmental violations in the Dutch part of the North Sea, reported by the Coast Guard (location). Quantities of paraffin (mg) recorded in bird stomachs (D10C3) and on the beach (D10C1).	MS3 measures, specifically the paraffin covenant and improved pre-wash procedure for washing discharged tanks at IMO.

D11 Introduction of energy, including underwater noise

Impulsive sound is mainly caused by pile-driving activities (mainly for the construction of wind farms), seismic surveys for CCS (Carbon Capture and Storage) and oil and gas exploration, and explosions at sea to clear up unexploded ordnance (UXO). Although the assessment of impulsive sound for the Dutch part of the North Sea indicates good environmental status, attention to regulation and application of the latest techniques remains important, especially in view of the planned scaling-up of wind farms.

Continuous sound in water comes mainly from shipping. Regulation of international shipping is mainly assigned to the IMO (International Maritime Organisation). The Netherlands focuses on regionally exploring opportunities to promote silence and quiet areas where this is valuable for vulnerable species. In the Dutch part of the North Sea, the commitment is not to increase spatially distributed continuous sound in water. The most effective way to limit continuous sound is to reduce the noise production of ships. To this end, innovation within the sector will be encouraged, using the IMO guidelines on Underwater Radiated Noise (URN) from 2023.

Finally, an environmental target has been included for electromagnetic fields (EMF). In anticipation of the development of a criterion, the Netherlands wants to define a target for this already. Because there is still insufficient knowledge about the extent of EMF and its environmental impact, this target is initially mainly aimed at developing a toolbox to assess the ecological impact of EMF.

Table 5.12. Environmental targets (with target values), the associated year, associated indicators and implementation (D11 Introduction of energy, including underwater noise).

	Environmental target (with target values)	Year	Indicator	Implementation
11.1	Limiting impulsive and continuous sound in construction projects (pile driving) and impulsive sound from seismic surveys and explosives clearance.	Ongoing. Additional milestones: Phase 1: Regional Action Plan Under Water Noise (RAP UW 2025) Phase 2: implement RAP UW from 2025 onwards	Indicator D11C1. Administrative check on conditions in permits and EIA Continuous sound as a result of construction work: under development.	Include requirements in permit conditions regarding underwater sound generation. Connect to developments in the OSPAR context through the Regional Action Plan Under Water Noise. Include requirements in the licence conditions regarding seismicity, such as mandatory application of best available techniques (BAT). Implementation in line with Defence protocol, which is reviewed periodically. Explore options for further research on low-noise or alternative explosives clearance.

	Environmental target (with target values)	Year	Indicator	Implementation
11.2	Regionally exploring opportunities for promoting silence and quiet areas where this is valuable for sensitive species.	Phase 1: *Regional Action Plan Under Water Noise (RAP UW 2025)* Phase 2: implement RAP UW from 2025 onwards	Surface area of area meeting the silence criterion (still to be developed regionally).	RAP UW to be drafted (2025). Land-use planning measures (areas to be avoided) and adjusting boating behaviour (e.g. sailing slower) to reduce noise production. Implementation goal 11.4 also contributes to goal 11.3.
11.3	Encouraging innovation in the development of low-noise technologies in maritime shipping.	2030	Number of actions to promote and use low-noise techniques.	Based on outcomes of research: - SATURN (2021-2025) Study on effects of propeller design on reduction of sound in water (start 2024).
11.4	Phase 1: developing a toolbox to assess the ecological impact of electromagnetic fields (EMF) Phase 2: Where possible/necessary, mitigating potential negative effects of EMF from cables and pipes on species sensitive to them (especially sharks and rays)	Tbd	Still to be developed in coming plan period.	Make part of EIA and permits based on outcomes of TenneT research and other scientific studies on the subject.

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Annex II

Abbreviations

BAT	*Best available techniques*
BD	*Bird Directive*
CBD	*Convention on Biological Diversity*
BHD	*Bird and Habitat Directive*
CCS	*Carbon Capture and Storage*
CFP	*Common Fisheries Policy*
CIS	*Common Implementation Strategy*
DAPSIR	*Drivers Activities Pressures Status Impact Response*
EC	*European Commission*
EEZ	*Exclusive Economic Zone*
EU	*European Union*
EUNIS	*European Nature Information System*
GES	*Good Environmental Status*
GNSBI	*Greater North Sea Basin Initiative*
HD	*Habitat Directive*
ICES	*International Council for the Exploration of the Sea*
IenW	*Ministry of Infrastructure and Water Management (Ministerie van Infrastructuur en Waterstaat)*
IMO	*International Maritime Organization*
KEC	*Kader Ecologie en Cumulatie*
LVVN	*Ministry of Agriculture, Fisheries, Food Security and Nature (Ministerie van Landbouw, Visserij, Voedselzekerheid en Natuur)*
MARPOL	*International Convention for the Prevention of Pollution from Ships*
MER/mer	*Milieueffectrapport/milieueffectrapportage*
MONS	*programma Monitoring Onderzoek Natuurversterking en Soortbescherming*
MPA	*Marine Protected Area*
MS1, MS2, MS3	*Marine Strategy part 1, 2 en 3*
MSFD	*Marine Strategy Framework Directive*
MSY	*Maximum Sustainable Yield*
N2000	*Natura 2000*
NEAES	*North-East Atlantic Environmental Strategy 2030*
NRL	*Nature Restoration Law*
NZA	*Noordzeeakkoord*
OECM	*Other effective area-based conservation measures*
OFL	*Overlegorgaan Fysieke Leefomgeving*
OSPAR	*Convention for the protection of the marine environment of the North-east Atlantic*
PAH's	*Polycyclic aromatic hydrocarbons*
PBDE's	*Polybrominated diphenyl ethers*
PCB's	*Polychlorinated biphenyls*
PFAS	*Per- and polyfluoroalkyl substances*
PFOS	*Perfluorooctane sulfonates*
PNN	*Programma Natuurversterking Noordzee*
QSR	*Quality Status Report*
RAP	*Regional Action Plan*
SMART	*Specific, Measurable, Achievable, Relevant and Time-bound*
SUP	*Single Use Plastics*
TBT	*Tributyltin*
UBKR	*Uitvoeringskader Bestrijding Kustverontreiniging Rijkswaterstaat*
UN	*United Nations*
UNCLOS	*United Nations Convention on the Law of the Sea*
WEcR	*Wageningen Economic Research*
WFD	*Water Framework Directive*
Wozep	*Wind op Zee Ecologisch Programma*

Annex III

MSFD article 8, 9, 10

Article 8, 9 en 10 of the Marine Strategy Framework Directive (2008/56/EC).

Article 8 Assessment

1. In respect of each marine region or subregion, Member States shall make an initial assessment of their marine waters, taking account of existing data where available and comprising the following:

(a) an analysis of the essential features and characteristics, and current environmental status of those waters, based on the indicative lists of elements set out in Table 1 of Annex III, and covering the physical and chemical features, the habitat types, the biological features and the hydro-morphology;

(b) an analysis of the predominant pressures and impacts, including human activity, on the environmental status of those waters which:
(i) is based on the indicative lists of elements set out in Table 2 of Annex III, and covers the qualitative and quantitative mix of the various pressures, as well as discernible trends;
(ii) covers the main cumulative and synergetic effects; and
(iii) takes account of the relevant assessments which have been made pursuant to existing Community legislation;

(c) an economic and social analysis of the use of those waters and of the cost of degradation of the marine environment.

2. The analyses referred to in paragraph 1 shall take into account elements regarding coastal, transitional and territorial waters covered by relevant provisions of existing Community legislation, in particular Directive 2000/60/EC. They shall also take into account, or use as their basis, other relevant assessments such as those carried out jointly in the context of Regional Sea Conventions, so as to produce a comprehensive assessment of the status of the marine environment.

3. In preparing assessments pursuant to paragraph 1, Member States shall, by means of the coordination established pursuant to Articles 5 and 6, make every effort to ensure that:
(a) assessment methodologies are consistent across the marine region or subregion;
(b) transboundary impacts and transboundary features are taken into account.

Article 9 Determination of good environmental status

1. By reference to the initial assessment made pursuant to Article 8(1), Member States shall, in respect of each marine region or subregion concerned, determine, for the marine waters, a set of characteristics for good environmental status, on the basis of the qualitative descriptors listed in Annex I.
Member States shall take into account the indicative lists of elements set out in Table 1 of Annex III and, in particular, physical and chemical features, habitat types, biological features and hydro-morphology.
Member States shall also take into account the pressures or impacts of human activities in each marine region or subregion, having regard to the indicative lists set out in Table 2 of Annex III.

2. Member States shall notify the Commission of the assessment made pursuant to Article 8(1) and of the determination made pursuant to paragraph 1 of this Article within three months of completion of the latter.

3. Criteria and methodological standards to be used by the Member States, which are designed to amend non-essential elements of this Directive by supplementing it, shall be laid down, on the basis of Annexes I and III, in accordance with the regulatory procedure with scrutiny referred to in Article 25(3) by 15 July 2010 in such a way as to ensure consistency and to allow for comparison between marine regions or subregions of the extent to which good environmental status is being achieved. Before proposing such criteria and standards the Commission shall consult all interested parties, including Regional Sea Conventions.

Article 10 Establishment of environmental targets

1. On the basis of the initial assessment made pursuant to Article 8(1), Member States shall, in respect of each marine region or subregion, establish a comprehensive set of environmental targets and associated indicators for their marine waters so as to guide progress towards achieving good environmental status in the marine environment, taking into account the indicative lists of pressures and impacts set out in Table 2 of Annex III, and of characteristics set out in Annex IV. When devising those targets and indicators, Member States shall take into account the continuing application of relevant existing environmental targets laid down at national, Community or international level in respect of the same waters, ensuring that these targets are mutually compatible and that relevant transboundary impacts and transboundary features are also taken into account, to the extent possible.

2. Member States shall notify the Commission of the environmental targets within three months of their establishment.

Annex IV

MSFD descriptors and criteria

In Annex I, the MSFD lists eleven elements, or 'descriptors', on the basis of which member states are required to determine good environmental status. In Commission Decision 2017/848/EU the descriptors are elaborated into so-called primary and secondary criteria. In principle, all primary criteria must be applied. Exceptions may only be made in 'justified cases'. The choice of which secondary criteria to take into account is up to the member states themselves, except where the Commission Decision provides otherwise. In that case, this is done (sub)regionally (D5 and D8) or at Union level (D10).

The table below shows all the descriptors and associated criteria that the Netherlands is addressing with this update. These are almost all primary criteria. Exceptions are D3C3 and the directly related D1C3 fish. Cephalopods have not yet been elaborated either, and incidental by-catch only to some degree. See the relevant fact sheets in Annex VIII for further details.
Under descriptor D1 Biodiversity, species are divided into seabirds, marine mammals, fish and cephalopods (D1C1 to D1C5). Pelagic habitat types are part of criterion D1C6. Benthic habitat types are part of D6. Benthic macroinvertebrate species are also included here.

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D1 Biodiversity (marine birds, mammals, fish, cephalopods)	Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.	
D1C1 Incidental by-catch	The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured.	Primary
D1C2 Population abundance	The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured.	Primary
D1C3 Demographic characteristics	The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures.	Primary for commercially- exploited fish and cephalopods and secondary for other species
D1C4 Distributional range	The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.	Primary for species covered by Annexes II, IV or V to Directive 92/43/EEC and secondary for other species

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D1C5 Habitat condition	The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.	Primary for species covered by Annexes II, IV and V to Directive 92/43/EEC and secondary for other species
D1C6 Pelagic habitat types	The condition of the habitat type, including its biotic and abiotic structure and its functions (e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), is not adversely affected due to anthropogenic pressures.	Primary
D2 Non-indigenous species	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.	
D2C1 Newly-introduced non-indigenous species	The number of non-indigenous species which are newly introduced via human activity into the wild, per assessment period (6 years), measured from the reference year as reported for the initial asessment under Article 8(1) of Directive 2008/56/EC, is minimised and where possible reduced to zero.	Primary
D3 Commercially-exploited fish and shellfish	Populations of all commercially-exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.	
D3C1 Fishing mortality rate of commercially-exploited species	The Fishing mortality rate of populations of commercially-exploited species is at or below levels which can produce the maximum sustainable yield (MSY).	Primary
D3C2 Spawning stock biomass of populations of commercially-exploited species	The Spawning Stock Biomass of populations of commercially-exploited species are above biomass levels capable of producing maximum sustainable yield.	Primary
D4 Food webs	All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.	

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D4C1 Diversity of trophic guilds	The diversity (species composition and their relative abundance) of the trophic guild is not adversely affected due to anthropogenic pressures.	Primary
D4C2 Balance between trophic guilds	The balance of total abundance between the trophic guilds is not adversely affected due to anthropogenic pressures.	Primary
D4C3 Size distribution of individuals within trophic guilds	The size distribution of individuals across the trophic guild is not adversely affected due to anthropogenic pressures.	Secondary
D4C4 Productivity of trophic guilds	Productivity of the trophic guild is not adversely affected due to anthropogenic pressures.	Secondary
D5 Eutrophication	Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.	
D5C1 Nutrients	Nutrient concentrations are not at levels that indicate adverse eutrophication effects.	Primary
D5C2 Chlorophyll a	Chlorophyll a concentrations are not at levels that indicate adverse effects of nutrient enrichment.	Primary
D5C5 Oxygen	The concentration of dissolved oxygen is not reduced, due to nutrient enrichment, to levels that indicate adverse effects on benthic habitats (including on associated biota and mobile species) or other eutrophication effects.	Primary
D6 Sea-floor integrity and benthic habitat types	Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.	
D6C1 Physical loss of the seabed	Spatial extent and distribution of physical loss (permanent change) of the natural seabed.	Primary
D6C2 Physical disturbance to the seabed	Spatial extent and distribution of physical disturbance pressures on the seabed.	Primary

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D6C3 Benthic habitat types adversely affected by physical disturbance	Spatial extent of each habitat type which is adversely affected, through change in its biotic and abiotic structure and its functions (e.g. through changes in species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), by physical disturbance.	Primary
D6C4 Loss of benthic habitat types	The extent of loss of the habitat type, resulting from anthropogenic pressures, does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.	Primary
D6C5 Condition of habitat types	The extent of adverse effects from anthropogenic pressures on the condition of the habitat type, including alteration to its biotic and abiotic structure and its functions (e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.	Primary
D7 Permanent alteration of hydrographical conditions	Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.	
D7C1 Permanent alteration of hydrographical conditions	Spatial extent and distribution of permanent alteration of hydrographical conditions (e.g. changes in wave action, currents, salinity, temperature) to the seabed and water column, associated in particular with physical loss of the natural seabed.	Secondary
D7C2 Benthic habitat types adversely affected due to permanent alteration of hydrographical conditions	Spatial extent of each benthic habitat type adversely affected (physical and hydrographical characteristics and associated biological communities) due to permanent alteration of hydrographical conditions.	Secondary

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D8 Contaminants	Concentrations of contaminants are at levels not giving rise to pollution effects.	
D8C1 Contaminants in the marine environment	1. Within coastal and territorial waters, the concentrations of contaminants do not exceed the following threshold values: (a) for contaminants set out under point 1(a) of criteria elements, the values set in accordance with Directive 2000/60/EC; (b) when contaminants under point (a) are measured in a matrix for which no value is set under Directive 2000/60/EC, the concentration of those contaminants in that matrix established by Member States through regional or subregional cooperation; (c) for additional contaminants selected under point 1(b) of criteria elements, the concentrations for a specified matrix (water, sediment or biota) which may give rise to pollution effects. Member States shall establish these concentrations through regional or subregional cooperation, considering their application within and beyond coastal and territorial waters. Beyond territorial waters, the concentrations of contaminants do not exceed the following threshold values: (a) for contaminants selected under point 2(a) of criteria elements, the values as applicable within coastal and territorial waters; (b) for contaminants selected under point 2(b) of criteria elements, the concentrations for a specified matrix (water, sediment or biota) which may give rise to pollution effects. Member States shall establish these concentrations through regional or subregional cooperation.	Primary
D8C2 Adverse effects of contaminants	The health of species and the condition of habitats (such as their species composition and relative abundance at locations of chronic pollution) are not adversely affected due to contaminants including cumulative and synergetic effects.	Secondary
D8C3 Significant pollution events	The spatial extent and duration of significant acute pollution events are minimised.	Primary

*: the description of criterion D8C1 has been shortened for readability reasons.

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D9 Contaminants in fish and other seafood	Contaminants in fish and other seafood for human consumption do not exceed levels established by Union legislation or other relevant standards.	
D9C1 Contaminants in fish and other seafood	The level of contaminants in edible tissues (muscle, liver, roe, flesh or other soft parts, as appropriate) of seafood (including fish, crustaceans, molluscs, echinoderms, seaweed and other marine plants) caught or harvested in the wild (excluding fin-fish from mariculture) does not exceed: (a) for contaminants listed in Regulation (EC) No 1881/2006, the maximum levels laid down in that Regulation, which are the threshold values for the purposes of this Decision; (b) for additional contaminants, not listed in Regulation (EC) No 1881/2006, threshold values, which Member States shall establish through regional or subregional cooperation.	Primary
D10 Marine litter	Properties and quantities of marine litter do not cause harm to the coastal and marine environment.	
D10C1 Litter in the marine environment	The composition, amount and spatial distribution of litter on the coastline, in the surface layer of the water column, and on the seabed, are at levels that do not cause harm to the coastal and marine environment.	Primary
D10C2 Micro-litter in the marine environment	The composition, amount and spatial distribution of micro-litter on the coastline, in the surface layer of the water column, and in seabed sediment, are at levels that do not cause harm to the coastal and marine environment.	Primary
D10C3 (Micro-)litter in marine species	The amount of litter and micro-litter ingested by marine animals is at a level that does not adversely affect the health of the species concerned.	Secondary

Descriptors / criterion	Description (MSFD and Commission Decision 2017/848/EU)	Primary/secondary criteria
D11 Introduction of energy, including underwater noise	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	
D11C1 Impulsive sound in water	The spatial distribution, temporal extent, and levels of anthropogenic impulsive sound sources do not exceed levels that adversely affect populations of marine animals.	Primary
D11C2 Continuous sound in water	The spatial distribution, temporal extent and levels of anthropogenic continuous low-frequency sound do not exceed levels that adversely affect populations of marine animals.	Primary

Annex V

Overview of good environmental status, current environmental status, indicators and threshold values

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D1 Biodiversity marine birds	Marine birds are not harmed by anthropogenic stresses, ensuring the long-term viability of populations.	The current status in the International North Sea meets good environmental status for pelagic-feeding birds. This is not the case for wading birds, surface-feeding birds and benthic-feeding birds. The status is unchanged from the previous policy period.	n/a	n/a
D1C1 Incidental by-catch	Incidental by-catch in the Dutch part of the North Sea does not pose a threat to marine bird populations.	The assessment of incidental by-catch is indicative and based on expert judgement due to lack of data. Given their life characteristics, it can be expected that most surface-feeding birds and wading birds in the Dutch part of the North Sea are not at significant risk of by-catch. Birds foraging in the water column or on the seabed are potentially at risk, but in the absence of data, the judgement 'unknown' is made for them.	[Pilot: B5 Marine bird by-catch (OSPAR)] Qualitative (expert judgement)	[In development]

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D1C2 Population abundance	The population abundance of marine species indicates healthy populations and meets OSPAR threshold values in the International North Sea.	The population abundance of marine birds in the International North Sea is similar to the previous period, with no species showing a change in status. Of the surface-feeding birds, benthic-feeding birds and wading birds, 42 per cent, 25 per cent and 58 per cent respectively meet the threshold value. The number of breeding birds in particular is low. Most pelagic-feeding birds (82 per cent) meet the threshold value. The picture in the Dutch part of the North Sea is similar to that of the entire North Sea.	B1 Bird abundance (OSPAR) *Bird abundance Netherlands (national)*	Current number is ≥70% (or ≥80%) of the number in 1991-2000 (OSPAR) *Current number ≥70% (or ≥80%) of the number in 1991-2000, or current number ≥GRP (national)*
D1C3 Demographic characteristics: breeding productivity	Breeding productivity of marine birds indicates healthy populations in the International North Sea and meets OSPAR threshold values.	Most pelagic-feeding birds meet the threshold value for breeding success (83 per cent). Among surface-feeding birds this is 21 per cent and among wading birds 33 per cent. Overall, 39 per cent of the assessed species meet the threshold value. The criterion level status is unchanged from the previous assessment period. In the International North Sea, the breeding productivity of marine birds for the majority of species assessed is so low that, if it does not improve, these species are likely to eventually receive Red List status, if they do not already have it. Bird species that forage at sea for fish in the upper water layers are particularly poor in this respect. Such species include most marne birds breeding in the Netherlands.	B3 Breeding productivity of marine birds (OSPAR) *Breeding productivity of shorebirds (national)*	Average breeding productivity over 6 years is sufficient to prevent a population decline of ≥30% over 3 generations (OSPAR) *Average breeding productivity is sufficient to avoid a population decline (national)*

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D1C5 Habitat condition	The spatial extent and condition of the habitat are suitable for marine bird populations in the Dutch part of the North Sea.	The condition of seabird habitat in the Dutch part of the North Sea has been assessed as 'unknown', because there is no assessment system yet in place and too little knowledge about causal relationships and ecological preconditions. However, a qualitative assessment based on expert judgement is possible. The main pressures threatening marine bird habitat in the North Sea are: disturbance by anthropogenic activities, reduced availability of prey fish as a result of fishing and climate change, direct effects of climate change, predation in breeding areas, pollution and - recently - highly pathogenic avian flu. It is not yet sufficiently clear how great the influence of each of these factors individually is, whether and how they interact and how they can be combined into an integrated assessment of habitat condition.	*Qualitative (expert judgement)*	*n/a*
D1 Biodiversity marine mammals	Marine mammal populations are not harmed by anthropogenic stresses, ensuring long-term viability.	Good environmental status has been achieved for the grey seal and harbour seal. This is not the case for harbour porpoise, as the by-catch threshold has been exceeded.	n/a	n/a
D1C1 Incidental by-catch	Incidental by-catch in the International North Sea poses no threat to populations of harbour porpoise and grey seal, and remains below OSPAR threshold values.	Good environmental status has been achieved for grey seal, but not for harbour porpoise.	M6 - Incidental by-catch of marine mammals (OSPAR)	Porpoise: 1622/yr, grey seal: 7171/yr (OSPAR)

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D1C2 Population abundance	The population sizes of harbour porpoise, harbour seal and grey seal indicate healthy populations and meet the threshold values of OSPAR (Sub-areas of the International North Sea) and the Habitats Directive (Dutch part of the North Sea).	Good environmental status with regard to population size has been maintained for the three species of marine mammals. The harbour porpoise population appears stable. Numbers of both seal species are still increasing.	M4 abundance and distribution of cetaceans (OSPAR) M3 abundance and distribution of seals (OSPAR) Population (HR)	Annual population decline <1.6% plus no decline > 30% compared to base year 1994 (OSPAR) No decline in numbers > 1% per year (approx. 6% in the last 6 years) plus no decline > 25% compared to base year 1992 (OSPAR) Harbour porpoise: 60,000, grey seal: 1000-5000, harbour seal: 2000-5000 (FRP from HR)
D1C3 Demographic characteristics: pup production	The pup production of grey seal (International North Sea sub-areas) and harbour seal (Dutch part of the Wadden Sea) indicates healthy populations and meets the OSPAR threshold value for grey seal.	The pup production of grey seal and harbour seal continues to increase. Grey seal meets the OSPAR threshold value for this aspect. Although no threshold value has been set for harbour seals, it is likely that good environmental status has also been achieved for this species. Good environmental status is thus maintained for both species.	M5 Grey seal pup production (OSPAR) Harbour seal pup production (trilateral Wadden consultations)	The grey seal birth rate must not decrease by more than 1% annually since the last assessment and 25% since 1992 (OSPAR) Not available
D1C4 Distributional range	The distributional range of harbour seal, grey seal and harbour porpoise in the Dutch part of the North Sea meets the threshold value of the Habitats Directive.	There have been no significant changes in the geographical distribution of harbour porpoise, grey seal and harbour seal. Good environmental status has been maintained.	Distributional range (HR) M3 Distribution, harbour seal (OSPAR) M3 Distribution, grey seal (OSPAR)	Porpoise: 724, grey seal: 728, harbour seal: 762 (FRR from HR) *none* *none*

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D1C5 Habitat condition	The spatial extent and condition of the habitat are suitable for harbour seal, grey seal and harbour porpoise in the Dutch part of the North Sea.	The main pressures for marine mammals are known, but there is still little knowledge on precise and especially cumulative effects, causal relationships and ecological preconditions. For this reason, for harbour seal, grey seal and harbour porpoise D1C5 Habitat condition has been assessed as 'unknown'.	*Qualitative (expert judgement)*	*n/a*
D1 Biodiversity fish	Fish populations are not harmed by anthropogenic stresses, ensuring long-term viability.	Long term trends as well as short term trends indicate recovery of vulnerable species such as common smooth-hound, small-spotted catshark, blonde ray, thornback ray, spotted ray and undulate ray. Good environmental status for fish in the International North Sea has not yet been achieved, despite improvement in many fish populations in recent years. Of coastal populations, 8 per cent meet the threshold values. Of demersal and pelagic populations, this is 29 and 40 per cent meet the threshold values, respectively. Of coastal populations, this is 8 per cent. Good environmental status for fish in the International North Sea has not yet been achieved. There are still important knowledge gaps in this assessment.	n/a	n/a
D1C1 Incidental by-catch	Incidental by-catch in the International North Sea does not pose a threat to the conservation of fish populations.	Not yet possible	[In development]	[In development]
D1C2 Population abundance	The population size of fish species indicates healthy populations and at least meets the objectives of OSPAR (vulnerable fish species) and the CFP (commercially-exploited species) in the International North Sea, and the HR in the Dutch part of the North Sea.	Of coastal fish populations, 8 per cent are estimated to be in good condition. Of demersal fish populations, it is 29 per cent and of pelagic fish 40 per cent. Insufficient information is available on many populations for analysis.	FC1 vulnerable fish species (OSPAR) Commercially-exploited species (CFP) *Population (HR)*	No decrease from previous period SSB > MSY Btrigger (CFP), averaged over the plan period *FRP (HR)*

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D1C4 Distributional range	The distributional range of migratory fish in the Dutch part of the North Sea meets the threshold value of the Habitats Directive.	The distribution of most migratory fish has been assessed as favourable in line with the HR report (2019). Only the assessment for river lamprey is moderately unfavourable. Too few data are available on shad and sturgeon.	*Ditributional range of migratory fish (HR)*	*FRR (HR)*
D1C5 Habitat condition	The spatial extent and condition of habitat in the Dutch part of the North Sea is suitable for migratory fish under the HR.	The habitats for houting, sea lamprey and river lamprey are assessed as 'favourable'. For shad, the status is 'very unfavourable', and for salmon 'unknown'. For shad and sturgeon, data are lacking and an assessment is not possible. All assessments are based on expert judgement.	*Habitat of the species (HR)*	*n/a*
D1 Biodiversity cephalopods	Populations of cephalopods are not harmed by anthropogenic stresses, ensuring their long-term viability.	Assessment is not yet possible.	[In development]	[In development]
D1C6 Pelagic habitat types	The functioning and composition of pelagic habitats (phyto- and zooplankton) in the International North Sea are not adversely affected by human activities.	Pelagic habitat types (phyto- and zooplankton) in the International North Sea do not meet good environmental status as the habitat types 'continental shelf' and 'coastal zone' were assessed as 'not good'. The status of the 'variable salinity' habitat type is unknown.	PH1 Changes in plankton communities (OSPAR) PH2 Changes in plankton biomass and/or abundance (OSPAR) PH3 Changes in biodiversity (OSPAR, pilot)	Assessment by trend analysis linked to pressures (OSPAR) (all indicators)

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D2 Non-indigenous species	Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem.	See D2C1	n/a	n/a
D2C1 Newly-introduced non-indigenous species	The number of newly introduced non-indigenous species in the Dutch part of the North Sea via human activity is minimised.	The number of newly introduced non-indigenous species in the Dutch part of the North Sea has not decreased in the last planning period, meaning that good environmental status has not yet been achieved. This assessment is based on a Dutch analysis, using the OSPAR methodology and supplementing the dataset from the QSR (OSPAR, 2023) with more recent data.	NIS3 Number of newly-introduced non-indigenous species (OSPAR)	Under development; provisional: decrease compared to previous plan period
D3 Commercially-exploited fish and shellfish	Populations of all commercially-exploited fish and shellfish species remain within safe biological limits, exhibiting demographic characteristics of a healthy stock.	A gradual improvement is visible for demersal and benthic species (ICES, 2022a). Of 71 commercially-exploited fish and shellfish stocks, 20 of these (28 per cent) have good status, 19 (27 per cent) do not meet the criteria for good status and for 32 (45 per cent) there is insufficient information available for assessment. This means that good environmental status has not been achieved.	n/a	n/a
D3C1 Fishing mortality rate of commercially-exploited species	The fishing mortality of each commercially-exploited stock in the International North Sea meets the threshold value based on the CFP.	See D3	Fishing mortality of commercially-exploited stocks (CFP)	F≤Fmsy (CFP), averaged over the plan period
D3C2 Spawning stock biomass of commercially-exploited species	The spawning stock biomass of each commercially-exploited stock in the International North Sea meets the threshold value based on the CFP.	See D3	Spawning biomass of commercially-exploited stocks (CFP)	SSB > MSY Btrigger (CFP), averaged over the plan period

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D4 Food webs	All trophic guilds in the marine food web, as far as they are known, have productivity, density and diversity at levels that ensure food web functioning.	'Food webs' in the International North Sea do not meet good environmental status. The density, distribution and productivity of key groups representing different trophic guilds are subject to change. These changes are linked to environmental changes, probably due to human activities.	n/a	n/a
D4C1 Diversity of trophic guilds	The diversity (species composition and their relative abundance) within the assessed trophic guilds (primary and secondary producers) in the International North Sea is not harmed by anthropogenic stresses.	The composition of phytoplankton and zooplankton has changed significantly over an extended period, and these changes are associated with human-induced environmental changes. Therefore, the diversity of these trophic guilds in the International North Sea does not meet good environmental status.	FW5 Changes in phyto- and zooplankton (OSPAR)	Not anticipated, assessment by trend analysis linked to pressures (OSPAR)
D4C2 Balance between trophic guilds	The balance between the total densities of assessed trophic guilds (phytoplankton, zooplankton, fish) in the International North Sea is not impaired by anthropogenic stresses.	The balance of trophic guilds in the International North Sea does not meet good environmental status. This outcome reflects changes in phyto- and zooplankton. It is not yet possible to assess the food guilds of the fish community against good environmental status because GES for these guilds has not yet been defined.	FW5 Changes in phyto- and zooplankton (OSPAR). FW7 Fish biomass and abundance of food guilds (OSPAR)	Not anticipated, assessment by trend analysis linked to pressure factors (OSPAR) No threshold, trends (OSPAR)]
D4C3 Size distribution of individuals within trophic guilds	The size distribution of specimens across the assessed trophic guild (demersal sub-apex predators) of the International North Sea is not impaired by anthropogenic stresses.	The size distribution within the assessed guild in the International North Sea does not meet good environmental status. This outcome is determined by the demersal sub-apex predator element, where three indicators produced the judgement 'not good'. The signs of recovery observed in the previous planning period have not continued and the status has deteriorated.	FC2 Share of large fish (OSPAR) FC3 Mean maximum length of fish (OSPAR) FW3 Size composition in fish community (OSPAR)	0.17 (LFI) (OSPAR) No threshold, trend (OSPAR) No threshold, trend (OSPAR)

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D4C4 Productivity of trophic guilds	The productivity of the assessed trophic guild (primary producers) is not negatively affected by anthropogenic pressure factors.	There is no official assessment for this criterion as the indicator is in a pilot phase. Initial results from the pilot indicator seem to indicate that trophic guild productivity in the International North Sea does not meet good environmental status.	FW2 Production of phytoplankton (OSPAR)	[No threshold, trend (OSPAR)]
D5 Eutrophication	Anthropogenic eutrophication, and especially its harmful effects, have been minimised.	In the Dutch part of the North Sea, 49.7 per cent of the area meets the criteria for good environmental status. This low percentage is a distorted picture due to the area classification applied in the OSPAR assessment, in which a 'moderate' score for criterion D5C5 Oxygen in the Eastern North Sea is mainly caused by the oxygen-poor areas in the German and Danish part of that area. About 45.6 per cent of the Dutch North Sea lies in the Eastern North Sea. The remaining 4.6 per cent of the Dutch North Sea that does not comply concerns the river plumes and Northern Delta coast. There, chlorophyll a concentrations are too high. Nutrient concentrations are assessed as well, but do not count in the integral assessment of environmental status (see D5C1).	n/a	n/a

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D5C1 Nutrients	Nutrient concentrations meet the threshold values of the Water Framework Directive (Dutch coastal bodies of water) and OSPAR (assessment areas of the International North Sea), so there are no adverse effects of eutrophication.	In total, 94 per cent of the Dutch part of the North Sea meets good environmental status with regard to winter DIN concentrations. The Meuse and Rhine river plumes and Scheldt plume 1 do not comply, and of the WFD waters only the Wadden coast (coastal water) complies. Good environmental status with regard to winter DIP has been achieved in all areas. Overall, there is a slight improvement compared to the previous planning period(s), especially as regards winter DIP.	Nutrient concentrations (winter DIN) in Dutch coastal bodies of water (WFD) Nutrient concentrations (winter DIN and DIP) beyond 1 nautical mile (OSPAR)	DIN 0.46 (33) (KRW) Rhine plume: DIN 29.7, DIP 1.15; Meuse plume: DIN 40.7, DIP 1.35; Scheldt plume 1: DIN 25.9, DIP 1.31; Scheldt plume 2: DIN 33.3, DIP 1.02; Southern North Sea: DIN 13.0, DIP 0.70; Eastern North Sea: DIN 7.3, DIP 0.6; Northern North Sea: DIN 10.3, DIP 0.71; Dogger Bank: DIN 7.2, DIP 0.76; (OSPAR)
D5C2 Chlorophyll a	Chlorophyll a concentrations meet the threshold values of the Water Framework Directive (Dutch coastal bodies of water) and OSPAR (assessment areas of the International North Sea), so there are no adverse effects of eutrophication.	Little has changed in chlorophyll a levels since the previous planning period. Almost all OSPAR areas in the Dutch part of the North Sea meet good environmental status. Despite declining trends in nutrient concentrations, river plumes do not yet meet the threshold values. The assessment of WFD coastal waters is 'good' in most cases, except for the Northern Delta coast.	Concentrations of chlorophyll a in Dutch coastal bodies of water (WFD) Chlorophyll a concentrations beyond 1 nautical mile (OSPAR)	90 percentile: Ems-Dollart Coast: 10.13; Northern Delta Coast, Holland Coast: 16.88; Zeeland Coast, Wadden Coast: 15 (WFD) mean: Rhine plume: 6.8; Meuse plume: 8.0; Scheldt plume l: 5.0, Scheldt plume 2: 8.9; Southern North Sea: 3.8; Eastern North Sea: 1.2; Northern North Sea: 1.1; Dogger Bank: 1.3 (OSPAR)

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D5C5 Oxygen	Oxygen concentrations meet the threshold values of the Water Framework Directive (Dutch coastal bodies of water) and OSPAR (assessment areas of the International North Sea), so there are no harmful effects of eutrophication.	Good environmental status has been achieved in all areas, with the exception of the Eastern North Sea, which scores 'moderate'. Assessment on a finer scale shows that the oxygen-poor part is relatively small and lies in the German and Danish part of the North Sea. This makes the condition assessment of the Dutch part of this area biased. The oxygen conditions are similar to those in the previous planning period.	Oxygen saturation (growing season) in Dutch coastal bodies of water (WFD) Oxygen concentrations near the seabed (growing season) beyond 1 nautical mile (OSPAR)	>60 (WFD) Rhine plume, Meuse plume, Scheldt plume 1, Scheldt plume 2, Southern North Sea, Eastern North Sea, Northern North Sea, Dogger Bank: 6 (OSPAR)
D6 Sea-floor integrity and benthic habitat types	Sea-floor integrity such that the structure and functions of ecosystems are safeguarded and benthic ecosystems, in particular, are not disproportionately affected.	Habitat loss remains below the threshold value (D6C4). Despite the lack of threshold values for the other criteria, it can be said that good environmental status has not been achieved in the Dutch part of the North Sea. This conclusion is mainly based on the moderate to poor condition of different habitat types (D6C5). Despite a slight decrease in fishing pressure (D6C2), the status is virtually unchanged compared to the previous planning period.	n/a	n/a
D6C1 Physical loss of the seabed	n/a (this criterion serves as input for D6C4 and D7C1)	The loss hardly increased in the current planning period. In the Dutch part of the North Sea, 283km2 (0.48%) of habitat has been lost. This is due to intensive fishing and other activities in previous planning periods.	*BH4 Area of habitat loss (OSPAR)* *BH4 Area of habitat loss (detailed analysis, national)*	*n/a* *n/a*
D6C2 Physical disturbance to the seabed	n/a (this criterion serves as input to D6C3)	Demersal fishery is widespread and by far the main cause of disturbance, with 66 per cent of the Southern North Sea seabed experiencing moderate to high fishing pressure. Nonetheless, a slight decrease in fishing pressure is visible over the longer term. Sand extraction is the only other human activity that causes significant disturbance. It is very localised and covers 0.1 per cent of the Dutch part of the North Sea.	*Fishing pressure: BH3 Physical damage to predominant and special habitats (OSPAR)* *Sand extraction and other physical disturbance (national)*	*n/a* *n/a*

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D6C3 Benthic habitat types adversely affected by physical disturbance	n/a (This criterion for assessing the spatial extent of degraded benthic habitat types due to physical disturbance serves as input to D6C5)	A large proportion (58 per cent) of the seabed in the Southern North Sea is estimated to be 'medium' to 'heavily' impacted as a result of physical disturbance from bottom trawling. The impact varies by habitat, but most habitat types (10 out of 15) are estimated to be affected at least 30 per cent to 'medium' level. In the Dutch North Sea, degradation by sand extraction is limited (maximum 0.3 per cent of sandy habitat types). This assessment is qualitative, as no threshold value has yet been set for 'degraded' status.	BH3 Physical damage to predominant and special habitats (OSPAR) *Registration of replenishment and shallow sand extraction (national)*	Under development (concerns limit above which impact occurs)
D6C4 Loss of benthic habitat types	The loss of broad habitat types in the Dutch part of the North Sea due to human activities is limited and meets the European threshold value.	Surface loss per broad habitat type in the Dutch part of the North Sea is less than 2 per cent, meaning good environmental status is maintained. Demersal fisheries has only led to loss of offshore circalittoral mud habitat (1.5 per cent). In the Dutch North Sea, this mainly concerns areas on and around the Central Oyster Grounds, Frisian Front and the south of Cleaver Bank. Loss due to the presence of objects and structures (pipes, platforms and wind turbines) and due to sand extraction (including deepened unloading banks) and channel deepening is limited. The total habitat loss per habitat type remained comparable to the previous period (2010-2015). The proportion per disturbing activity has also remained almost the same. Habitats with biogenic reefs have not been taken into account because their extent and location are not yet sufficiently known.	BH4 Area of habitat loss (OSPAR) *BH4 Area of habitat loss (detailed analysis, national)*	*2% (EU)* *2% (EU)*

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D6C5 Condition of habitat types	The impact of anthropogenic activities on the condition of benthic habitat types in the Dutch part of the North Sea is limited.	Good environmental status has not yet been achieved. The status is virtually unchanged compared to the previous planning period.	BH2b relative Margalef diversity (OSPAR) BISI index (national) BEQI-2 (WFD; national)	In development (EU threshold not yet deployable) In development (EU threshold not yet deployable) ≥0.6
D7 Permanent alteration of hydrographical conditions	Permanent alteration of hydrographical conditions does not harm marine ecosystems.	Permanent hydrographical alterations in an estimated 324 km2 in the Dutch North Sea, which is 0.55 per cent of the total area (58,807km2). In the area affected, this is mainly due to impacts from the construction of new wind farms in the last planning period. This has increased the percentage of affected habitats. Disturbance is largely caused by a decrease in the stratification period in (common) sandy habitats. Of these, an estimated 0.65 per cent are affected. Side note: Indicators are still under development. The figure referred to above is largely determined by two factors: a model is yet to be developed and there are provisional limits. The results are therefore indicative.	n/a	n/a
D7C1 Permanent alteration of hydrographical conditions	n/a (this criterion serves as input to D7C2)	The spatial extent of permanent changes to hydrographic conditions in the Dutch part of the North Sea in the last planning period is estimated at 315km2. This brings the total area of disturbed sea floor since 2012 to 324km2. This is 0.55 per cent of the Dutch part of the North Sea. The calculated extent is largely based on a model yet to be developed and on provisional limit values. The results are therefore indicative.	Extent of permanent alterations of hydrography (national)	n/a

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D7C2 Benthic habitat types adversely affected due to permanent alteration of hydrographical conditions	n/a (This criterion involves the extent of benthic habitats impaired by permanent hydrographical alterations. The results and assessment of criterion D7C2 serve as input to the assessment of criterion D6C5).	As a result of permanent hydrographical alterations, an estimated total of 374km2 of benthic habitat has been affected, corresponding to 0.63 per cent of the Dutch part of the North Sea. For the period 2016-2021, an estimated 60km2 of benthic habitat is considered lost. This habitat loss has hardly changed compared to previous periods. However, the proportion of degraded habitats (310km2) has increased significantly. Sandy habitats in particular have been affected: an estimated 0.6 per cent of the offshore circalittoral and the circalittoral, and 0.1 per cent of the offshore circalittoral silt. The results are indicative.	Extent of loss and degradation of benthic habitats due to hydrographical alterations (national).	There is no threshold, but a limit above which there is 'harm'. The limit values used here are provisional (national).
D8 Contaminants	Concentrations of contaminants are at levels not giving rise to pollution effects.	During the past planning period, the levels of most substances remained the same or decreased slightly. This picture is similar to that in the previous period. Good environmental status has not yet been achieved. Especially the ubiquitous, persistent, bioaccumulative and toxic substances (UPBT substances) exceed the environmental quality standard (8 out of 19 substances). Of the 119 non-UPBT substances, 8 do not meet the standard and 3 are not testable because their concentrations are below the reporting limit. Although tributyltin in the environment still exceeds the threshold value, reproductive harm (imposex) in marine snails has decreased to such an extent that good environmental status has been achieved for this criterion. No acute severe oil pollution events occurred during the last planning period.	n/a	n/a

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D8C1 Contaminants in the marine environment	The concentrations of contaminants relevant to the marine environment (UPBT and non-UPBT) meet the threshold values set at European (WFD, Dutch part of the North Sea) and regional level (OSPAR, Southern North Sea).	The current status of contaminants in water, biota and sediment has not changed since the previous planning period: good environmental status has not been met. Among the ubiquitous persistent substances (UPBT), 8 out of 19 substances do not meet the environmental quality standard. Of the non-UPBT substances, this applies to 8 out of 119 substances.	Concentrations of priority and specific pollutants in water (WFD) Concentrations of priority and specific pollutants in biota (WFD) Metals, PAHs, PBDE, PCBs in biota (OSPAR) Metals, organotin, PAHs, PBDE, PCBs in sediment (OSPAR)	Priority substances: EU thresholds, other substances: national thresholds (cf. Directive 2008/105/EC) Priority substances: EU thresholds, other substances: national thresholds (cf. Directive 2008/105/EC) Assessment criteria (OSPAR) Assessment criteria (OSPAR)
D8C2 Adverse effects of contaminants	The health of species (marine snails) in the Southern North Sea is not harmed by contaminants (tributyltin) and meets the OSPAR threshold.	Adverse effects of TBT on marine snails have been greatly reduced. The reproductive capacity of marine snails in the southern North Sea has been restored such that good environmental status has now been met in this respect.	Imposex in marine snails (OSPAR)	Vas deferens sequence Tritia reticulata, Buccinum undatum <0.3, Nucella lapillus <2
D8C3 Significant pollution events	Significant pollution events in the Dutch part of the North Sea have been minimised.	No significant oil pollution events occurred during the last planning period.	Registration of incidental serious pollution (national) Oil and oily substance pollution (Bonn Agreement)	n/a n/a
D9 Contaminants in fish and other seafood	Contaminants in seafood do not exceed limits set by EU legislation for human consumption.	See D9C1	n/a	n/a

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D9C1 Contaminants in fish and other seafood	The concentrations of contaminants in edible tissues of fish, crustaceans and bivalve molluscs in the Netherlands meet the maximum levels set by Regulation (EC) No 1881/2006.	Pollution levels in tissues of fish, crustaceans and bivalve molluscs for human consumption are below the threshold values. Good environmental status has thus been maintained.	Concentrations of dioxins, PCBs, PAHs and metals (cadmium, lead, mercury) in seafood (regulation 1881/2006/EC)	Maximum levels of contaminants in food cf. Regulation 1881/2006/EC.
D10 Marine litter	Marine litter does not cause harm to the marine and coastal environment.	The amount of litter in the marine environment is still decreasing. However, good environmental status has not yet been achieved.	n/a	n/a
D10C1 Litter in the marine environment	The marine environment is not harmed by litter and to this end meets the European threshold for beach litter in the Dutch part of the North Sea.	The condition at criterion level has improved, but good environmental status has not yet been achieved in the Dutch part of the North Sea.	Litter on the beach (OSPAR) Litter on the sea floor (OSPAR)	20 items/100m beach length (EU) Under development (EU)
D10C2 Micro-litter in the marine environment	The amount of micro-litter in seabed sediment is at a level that does not cause harm to the marine environment.	Not yet possible	Microplastics in seabed sediment (OSPAR, EU)	In development (EU)
D10C3 (Micro-)litter in marine species	The amount of litter and micro-litter ingested by marine animals in the South-eastern North Sea is not harmful to their health, and to this end meets the OSPAR threshold for northern fulmars.	The criterion-level status has continued to improve, but good environmental status has not been achieved.	Plastic in stomachs of northern fulmars (OSPAR)	Maximum 10% of birds have >0.1g of plastic in the stomach (OSPAR)

Descriptor/criterion	Good environmental status (Art. 9)	Current environmental status (Art. 8)	Indicator(s) and (reference)	Thresholds
D11 Introduction of energy, including underwater noise	Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	In accordance with the OSPAR assessment, the Netherlands does not apply threshold values for D11. Nevertheless, the assessment results justify the conclusion that the condition in the Dutch part of the North Sea does meet good environmental status with regard to impulsive noise, and not with regard to continuous noise.	n/a	n/a
D11C1 Impulsive sound in water	The spatial extent, temporal extent and level of impulsive noise in the Dutch part of the North Sea are not detrimental to porpoise populations.	Despite the lack of a threshold value, it is concluded that the Dutch part of the North Sea meets good environmental status with regard to impulsive noise.	Distribution of impulse noise in the sea (OSPAR) Risk of porpoise being disturbed by impulse noise in the sea (OSPAR)	n/a In development
D11C2 Continuous sound in water	The spatial extent, temporal extent and level of anthropogenic continuous low-frequency noise in the Dutch part of the North Sea do not harm populations of marine animals.	Although results are still preliminary and OSPAR does not use a threshold value, it is very likely that good environmental status has not been achieved in the Dutch part of the North Sea.	Level and distribution of continuous noise in the sea (OSPAR)	In development

Annex VI

Progress on environmental targets 2018 and link to updated environmental targets

- Environmental target essentially unchanged
- Environmental target adjusted
- Environmental target no longer relevant

Environmental Target Code 2018	Environmental targets 2018	Progress/comments	Link to environmental targets 2024
D1T1 (2018)	Contribute to further development of bird population assessment and identification of key pressure factors at regional level (OSPAR)	Progress: Significant steps have been taken by OSPAR. The updated environmental targets have been broken down by potential pressure. This environmental target has been dropped: it focuses purely on knowledge building and development of an assessment indicator under Article 8 which does not fit into the systematics of environmental targets (Article 10).	
D1T2 (2018)	Restore rest for marine mammals and birds by reducing fishing in the Raan Flats and the North Sea coastal zone (under the VIBEG agreement).	Progress: restoration of rest remains a point of attention. This environmental target is part of environmental target 1.2 relating to achieving conservation objectives.	Link to 1.2
D1T3 (2018)	Create and implement the management plans for the Natura 2000 marine protected areas.	Management plans have been drawn up and are following their own trajectory. Some new environmental targets adopt agreements from management plans, others are complementary and also help to achieve N2000 conservation objectives.	Link to 1.1, 1.2, 1.5, 1.4, 1.9, 1.12, 1.13, 6.4
D1T4 (2018)	Implement mitigation measures under the 2012 Porpoise Protection Plan, including: - By-catch monitoring and research on application of mitigation measures (pingers) - Preventing or reducing harmful effects of impulsive sound in water on porpoise populations (Dutch Nature Conservancy Act) - Further research into the effects of construction and operation of offshore wind farms on porpoise populations (in the context of WOZEP).	Implementation of the Porpoise Protection Plan continues. Progress has been made on all the points mentioned.	1.10

Environmental Target Code 2018	Environmental targets 2018	Progress/comments	Link to environmental targets 2024
D1T5 (2018)	Knowledge target for sharks and rays combined with taking mitigation measures as set out in the Shark and Ray Action Plan: communication and education; reducing unwanted by-catch; increasing survival.	The Shark and Ray Action Plan 2022-2027 has been adopted. The Marine Strategy is consistent with the biennial reviews and actions that follow.	1.13
D1T6 (2018)	Address remaining fish migration bottlenecks in the Netherlands to restore connectivity between water systems.	Since 2009, work has been under way to make priority bottlenecks passable for migratory fish. Between 2009 and 2015, 42 per cent of the bottlenecks were removed. About 1110 remaining fish migration bottlenecks must still be removed, of which 606 are scheduled to be removed before 2027. After 2027, this leaves 504 remaining bottlenecks.	1.12
D1T7 (2018)	Research into the necessity of no-fishing zones around engineering structures to promote migration opportunities for migratory fish (WFD). Monitoring bird collisions with wind turbines (WOZEP)	Progress: research into necessity of no-fishing zones completed. The precise implementation in the Wadden Sea and at Haringvlietsluis is currently being considered. As monitoring in itself is not an environmental target, the second part of the environmental target is no longer relevant. Bird collisions with wind turbines are investigated in MONS.	
D1T8 (2018)	Further research into cumulative effects in OSPAR.	Progress: research on cumulative effects is carried out in both OSPAR and MONS. This environmental objective has been dropped: it focuses purely on knowledge building and is therefore not appropriate for Article 10; research does not improve status.	
D2T1 (2018)	Minimise the risk of new introductions of non-indigenous species via shellfish transport, ballast water and hull fouling.	Continue existing policy. It is likely that reductions in introductions via shellfish transport and ballast water are at least partly due to this policy. However, more effort is needed on introduction via ship's hulls. Environmental targets are now broken down.	Broken down into: 2.1, 2.2
D3T1 (2018)	The management of all commercially exploited fish stocks satisfies F=Fmsy and a spawning stock biomass above the precautionary MSY B trigger level.	The environmetnal target was actually a description of good environmetnal status.	

Environmental Target Code 2018	Environmental targets 2018	Progress/comments	Link to environmental targets 2024
D4T1 (2018)	Develop and test regional assessment methods that can be used in future assessments of food webs.	Progress: Significant steps have been taken in this regard by OSPAR. This environmental target has been dropped: it focuses on developing an indicator assessment under Article 8, which does not fit into the systematics of environmental targets (Article 10).	
D5T1 (2018)	Lower nutrient inputs where they do not meet WFD targets, in line with the time frame of the river basin management plans.	The updated environmental target also focuses on reducing nutrient inputs, but with the aim of reducing chlorophyll a concentrations in coastal waters.	Link to 5.1
D5T2 (2018)	Concentrations of nutrients already compliant with WFD standards must not be allowed to rise, and if possible should be further reduced.	This environmental target is redundant: it is related to the previous environmental target (D5T1(2018)).	
D6T1 (2018)	10-15% of the surface area of the Dutch part of the North Sea is not significantly affected by human activities.	At least 10 per cent of the seafloor of the Dutch North Sea will be free from all manageable human activities that affect the seafloor.	6.1
D6T2 (2018)	Improved condition of the assessed areas and habitat types.	Reduction of seabed disturbance should gradually improve condition. This is expected to take more than one plan period.	6.4
D6T3 (2018)	No increase over time of physical disturbance of the total seabed of the Dutch Continental Shelf by fishing activities, or of the habitats described in the MSFD.	Fishing pressure has decreased slightly. The updated environmental target pushes for further decrease.	6.3
D6T4 (2018)	Further development and testing of regional assessment methods (OSPAR) that can be used in future assessments of benthic and pelagic habitat types.	Progress: Significant steps have been taken in this regard by OSPAR. This environmental target has been dropped: it focuses on developing an indicator assessment under Article 8, which does not fit into the systematics of environmental targets (Article 10).	
D6T5 (2018)	Return and recovery of biogenic reefs.	This environmental target has been taken up in the framework of The Rich North Sea, and is followed up in the North Sea Nature Enhancement Programme.	6.6

Environmental Target Code 2018	Environmental targets 2018	Progress/comments	Link to environmental targets 2024
D7T1 (2018)	All developments must meet the criteria for the existing legal framework (e.g. the Dutch Environmental Management Act and the Nature Conservancy Act) and statutory reviews must be carried out in such a way that potential effects of permanent changes to hydrographical conditions, including cumulative effects, must be taken into consideration at the most suitable planning level using specifically developed guidelines. (EUNIS level 3, reference year 2012).	Progress: all developments comply with existing legal requirements. Updated environmental targets for D7 Permanent alteration of hydrographical conditions have been made more specific.	7.1, 7.2, 7.3
D8T1 (2018)	Coastal waters: reduction in the introduction of contaminants not yet meeting the WFD targets pursuant to the timeline of the water basin management plans. Concentrations of contaminants that already meet WFD standards must not rise.	Continued implementation through river basin management plans (WFD). Most substances meet the standard. Concentrations of persistent substances in particular are slowly decreasing. The substance list is subject to change: some substances are no longer relevant, but there are also emerging substances such as PFAS. Continued efforts remain necessary.	8.1
D8T2 (2018)	Offshore: Where established meet the OSPAR Environmental Assessment Criteria and/or Background Assessment Criteria. Where these standards have not yet been formulated, the target is a declining trend in contaminant concentrations or their polluting effects.	Progress: Most substances meet the established environmental standards, although persistent substances in particular are only slowly decreasing in concentration. This environmental target has been dropped because it defines good environmental status (Article 9) and is therefore not appropriate as an environmental target (Article 10).	
D8T3 (2018)	Regional monitoring of copper concentrations now that this heavy metal is used as a replacement for TBT (OSPAR).	Progress: copper is routinely monitored in the environment. This environmental target has been dropped: it focuses purely on monitoring (Art. 11) and thus does not fit into the system of environmental targets (Art. 10). (Monitoring in itself does not lead to improvement of status).	
D8T4 (2018)	Reduce inputs of heavy metals in the marine environment	This environmental target has been deleted: the updated environmental targets under D8 focus not only on metals but on all contaminants and are broken down by source.	

Environmental Target Code 2018	Environmental targets 2018	Progress/comments	Link to environmental targets 2024
D8T5 (2018)	Clean up significant pollution events as soon as possible, where necessary in cooperation under the terms of the Bonn Agreement.	The Marine Strategy reflects this agreement, and developments arising from it. Partly because of this agreement, there have been no significant oil spills during the last planning period.	8.2
D8T6 (2018)	Reduce use of lead, for example in sport fishing (WFD)	For lead use in sport fishing in particular, the environmental target is included to work towards a phase-out by 2027.	8.3
D9T1 (2018)	The levels of contaminants (including PAHs, dioxins and heavy metals) in fish and fishery products from the North Sea do not exceed the maximum values set in EU Regulation EC 1881/2006.	Progress: Good environmental status has been maintained. This environmental target has been deleted because it defines good environmental status (Article 9) and is therefore not appropriate as an environmental target (Article 10).	
D10T1 (2018)	In the longer term work towards quantitative (regional) targets for beach litter (30% reduction) and plastic in the stomachs of northern fulmars (10% of birds; OSPAR EcoQO). Assess how such targets can be met in conjunction with the EU Circular Economy process, and carefully co-ordinated with neighbouring countries.	Progress: OSPAR adopted targets/ thresholds for beach litter and plastics in northern fulmar stomachs in 2020. Environmental targets have been tightened accordingly. The environmental target has been dropped: partly because it related to thresholds for assessment under Article 8, partly because the aforementioned alignment has taken place.	
D11T1 (2018)	Pursue the tighter rules for the prevention of harmful effects of impulsive noise.	Knowledge has increased considerably and there is now a 'KEC' that pile-driving activities at sea (main source of impulse noise Dutch North Sea) must comply with.	11.1
D11T2 (2018)	Develop a limit for the number of disruption days at regional level (OSPAR)	Progress: OSPAR is testing the MSFD thresholds for the OSPAR area and will formulate a substantiated opinion on them in the Regional Action Plan Underwater Noise. This environmental target has been dropped: it focuses on threshold development (Art. 8/9) and is therefore not appropriate as an environmental target (Art. 10).	

Annex VII

The North Sea in the eyes of Dutch citizens

In May 2022, the Vrije Universiteit's Institute for Environmental Issues, in collaboration with Rijkswaterstaat, conducted a survey to gain insight into, among other things, perceptions of the North Sea and knowledge about the problems it faces (Van Schendel, 2022). The responses from 400 respondents show that the Dutch feel committed to the North Sea, are knowledgeable about it and are concerned about its environmental state. Dutch people frequently visit the North Sea coast. More than half of the respondents had travelled there in the 12 months prior to the survey (summer 2022) and likewise half said they planned to visit the coast in the next 12 months. Respondents said they attach great value to various cultural ecosystem services such as landscape and nature experiences, the North Sea region as a habitat for plants and animals and the positive impact that flora and fauna have on the landscape. Almost two-thirds of respondents said they were (very) satisfied with the quality of nature, and more than half felt that visiting the North Sea area had stress-reducing effects. On the other hand, respondents also mentioned negative triggers from the coastal zone: litter in the sea and on the beach, murky water and the sight of wind farms on the horizon, for example.

A majority of respondents said they knew a little to quite a lot about the current environmental state of the North Sea. Most said they were familiar with the environmental problem of marine litter. The risk that wind farms pose to birds, and the disturbance of North Sea nature by fishing were also known to the majority.
Respondents were much less knowledgeable about all the problems of the North Sea environment. For instance, only a limited number of respondents had heard about the problems of underwater noise. There seems to be a relationship between the level of awareness of environmental problems and support for measures to counter them. Respondents felt, for example, that measures should mainly focus on litter and to a much lesser extent on countering underwater noise.

Asked about willingness to contribute financially to achieving the good environmental status of the North Sea, respondents were found to be willing to contribute on average between 30 and 40 euros per household per year. This amount is higher in Finland and Germany, according to similar research conducted there. This may be due to the difference in focus between the Dutch and foreign studies; e.g. eutrophication (abroad) versus underwater noise (the Netherlands). Eutrophication has a more tangible and direct effect on recreational activities, while the effects of underwater noise remain relatively abstract.
The main reasons cited by respondents for wanting to contribute financially to achieving the good environmental status of the North Sea are that they want to ensure a healthy sea for future generations and that the existence of a healthy ecosystem is important. However, there is also a large group that does not want to contribute to the costs for this aim, with the main motive being that those who pollute the North Sea the most should also have to bear the costs (the 'polluter pays' principle), and that funding should come from the government and not from individual contributions.

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