

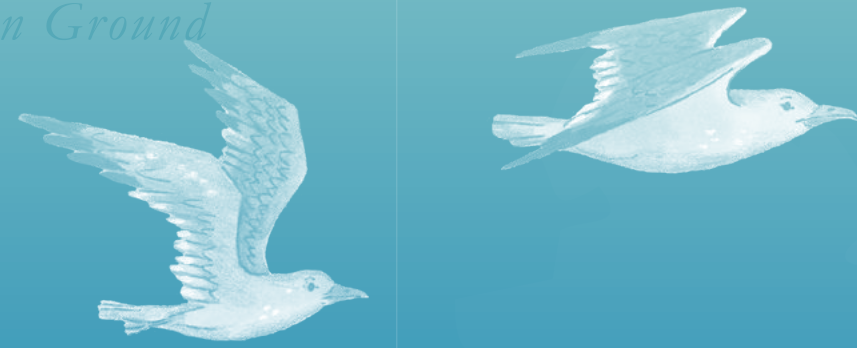
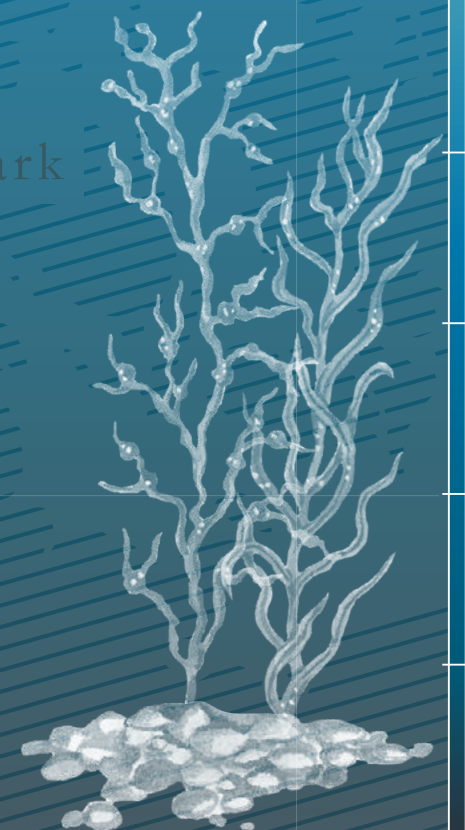
The North Sea 2040

A VISION FOR A HEALTHY NORTH SEA
WITH SUSTAINABLE USE

NATUUR
& MILIEU



Vogelbescherming
NEDERLAND



The North *Sea* 2040

A vision for a healthy North *Sea*
with sustainable use

The North Sea is one of Europe's largest nature areas. Well over a century ago it was teeming with life. Oyster beds, large rays, a strong and healthy ecosystem was commonplace^{1,2,3}.

However, the ecological quality has been deteriorating for decades now.⁴ The seabed is damaged. Natural hard substrate and natural reefs are less widespread. We, human beings, are the main cause for all this.


In an area that has much to offer, there is also much to gain. Over the past century, more and more sectors started to make use of the North Sea: for fishing, laying cables and pipelines and establishing shipping routes, for military drills and extracting sand, oil and gas and for building wind farms.

¹ Smaal et al. 2017 "Platte oesters in offshorewindparken".

² Floris P. Bennema 2018 "Long-term occurrence of Atlantic bluefin tuna *Thunnus thynnus* in the North Sea: contributions of non-fishery data to population studies"

³ Bom, R.A., Brader, A., Batsleer, J. et al. 2022 "A long-term view on recent changes in abundance of common skate complex in the North Sea."

⁴ OSPAR 2023 "Quality status report"



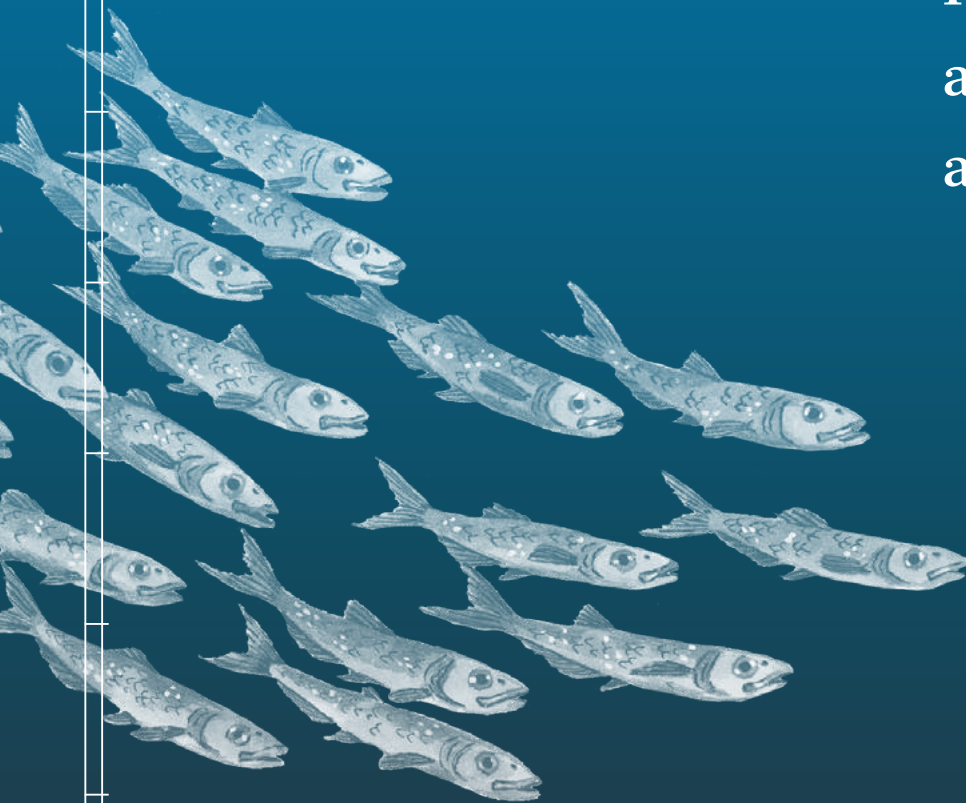
All this made for increased pressure on the North Sea. And it is still increasing. In fact, in the near future, CO₂ storage (CCS), large-scale wind farm growth and solar parks and perhaps new human activities will also have a major impact on the ecosystem. Add to this our dependence on the ecosystem and the (increasing) effects of climate change, there is only one possible outcome:

we need to better protect and enhance North *Sea* nature, as well as adapt our activities to what the North *Sea* can handle.

If we do not, we will deplete the North Sea. Increasing parts of the North Sea's nature will be lost, and there will be less and less opportunity for us to fish, sail, and do business and therefore less to win. It is about time we put nature first again. We, together with other North Sea countries can do this by looking at the North Sea as a whole and do more than just tinker with the fragmented activities of different sectors.

This document outlines Natuur & Milieu, The North Sea Foundation, Vogelbescherming and WWF's vision for what a new, healthy and robust ecosystem can look like and what actions are needed to achieve that.

It is up to the governments of the North Sea countries to take charge and create an international masterplan that will once again turn the North Sea into a rich natural area, with (designated) space for sustainable activities. An area full of life and future.



**NATUUR
& MILIEU**



Norwegian Trench

Norway

Fladen Ground

Skagerrak

Kattegat

PART 1

Current situation and vision for the *future*

Denmark

Dogger Bank

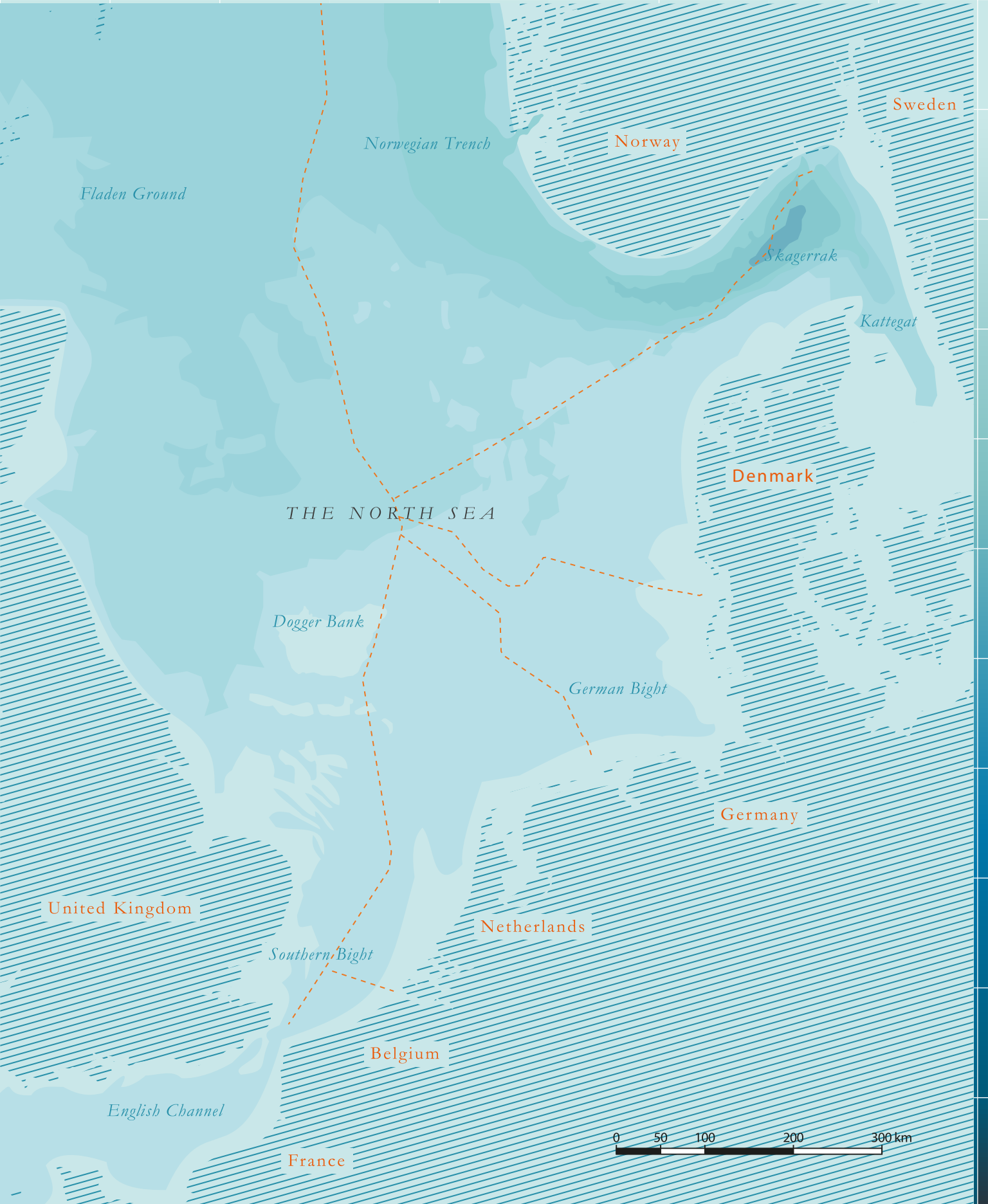
German Bight

How we regard the North Sea spatially

In this vision we talk about the North Sea. But where exactly does it begin and end? We use a widely accepted definition: the North Sea runs from Norway to the English Channel and from the Baltic to Scotland⁵. The Waddenzee and the Zeeland Delta are not part of the North Sea, but when we manage to restore nature, it will undoubtedly have positive effects on those (adjacent) saline waters.

Figure 1
The North Sea
with the North Sea
countries

⁵ This is the definition of the Greater North Sea ecoregion.



What the North *Sea* gives us

We humans are the main cause of the deterioration and change in the North Sea ecosystem. At the same time, we also depend on that ecosystem. But we also depend on that ecosystem. For our food, but also for the activities in and quality of life of our environment.

The benefits humanity derives from ecosystems are called ecosystem services: services that are indispensable for our wellbeing and our prosperity. They exist in four categories:

1. Provisioning services

All products that an ecosystem offers us directly. Resources. For example, in case of the North Sea these are: fish, oil, gas and renewable energy (sun, wind, tidal, etc.).

2. Regulating services

By this we mean everything an ecosystem regulates. For example, the North Sea provides CO₂ storage, temperature regulation and water purification. For other ecosystems, you can think of pollination.

3. Cultural services

Enjoying a day at the seaside, birdwatching, sailing, diving, a walk on the beach; all examples of cultural services. All non-material benefits are part of these services. For example, coastal areas and beaches are important for tourism and recreation, they have aesthetic value, and can give people a nice feeling or spiritual experience.

4. Supporting services

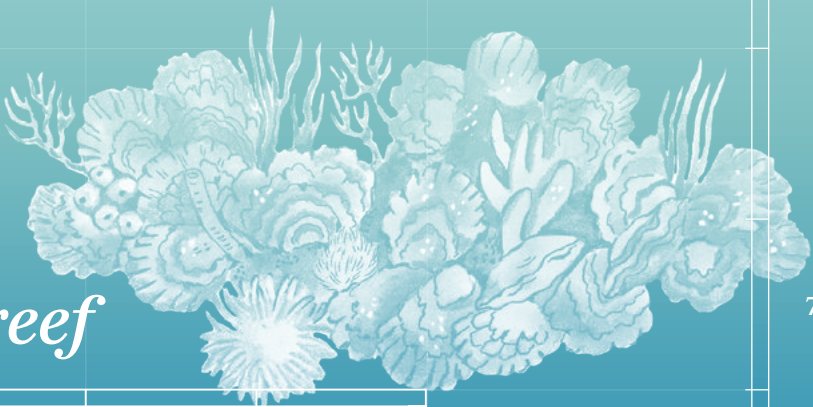
These are services that are necessary to produce other ecosystem services. For example, the North Sea has musselbeds and seagrass fields. These are essential for fish reproduction. Hence, they support biodiversity, provide habitat and play a role in nutrient cycling.

The vision for the future

A healthy North Sea, rich in nature with a resilient ecosystem. That is what we want to achieve. A North Sea where species have room to thrive, forage, reproduce and migrate, without human activity continually pushing them back further. A space where we partly regain the many oyster reefs that were present in 1880 as well as a space with partly new nature that did not exist in 1880.

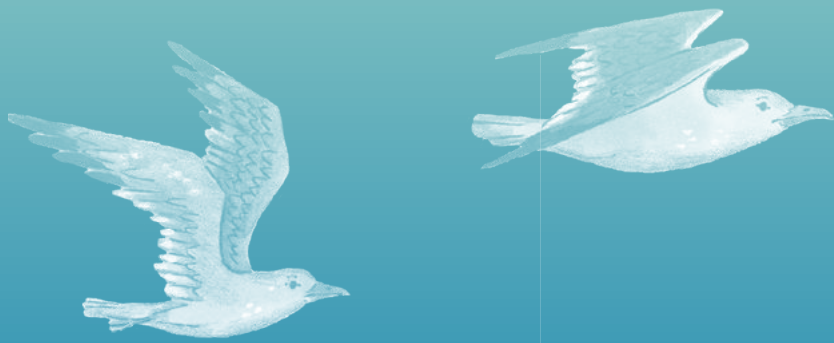
That nature is changing is not a bad thing: the North Sea is a dynamic ecosystem that is allowed to change. The challenge is to achieve an ecosystem which is at least as robust, species-rich, healthy and resilient as the ecosystem that existed 150 years ago. Nature will then be resilient to the effects of climate change (climate adaptation) and better able to absorb the consequences of climate change (climate mitigation). For example, if the seabed remains undisturbed it can support the ecosystem as well as store more CO₂^{6,7}.

⁶ Sanders M, Henkens R et al. 2016 “Kansen voor ontwikkeling van robuuste natuur in Nederland”
⁷ NIOZ 2022 [“How coastal seas help the ocean in absorbing carbon dioxide from the atmosphere”](#)



Oyster reef

Lives attached to harder substrates on sand and mud bottoms, from the low-water line to depths of several tens of meters. The animals are protandric hermaphrodites and change sex multiple times during their lives. In the past, extensive 'wild' oyster beds were also found in deeper waters of the North Sea. However, these have almost entirely disappeared in the early 20th century.



Robust, healthy, species-rich and resilient means:

- Healthy populations of skate, Atlantic cod, harbour porpoise, fulmar and other threatened or vulnerable species.
- Strong food chains in which all species and levels are productive enough to maintain the system. This means many large fish species are present (sharks, rays) but also enough (small) forage fish such as cod, herring and sandeel. The foundation is strong: The plankton population/production is high and stable allowing a functional ecosystem to exist including reef-building filter feeders and other plankton eaters. Together they provide important ecosystem services like oxygen production, habitat and food.

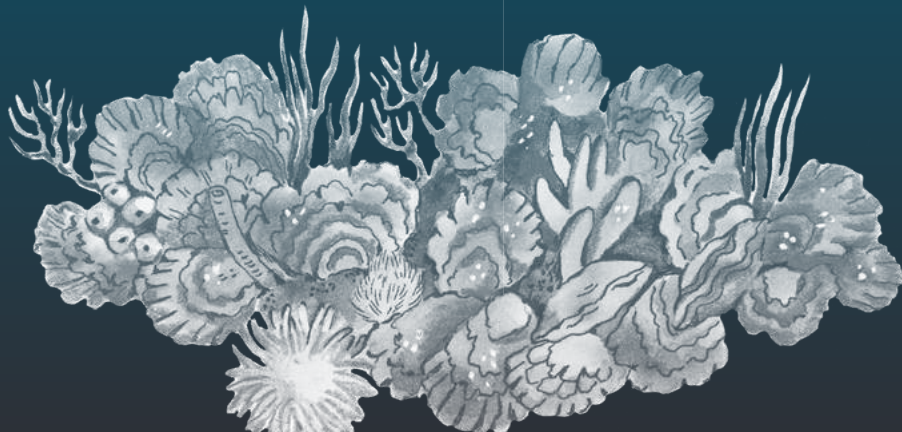
- Fully protected habitats within designated areas (N2000 & MSFD), which (are starting to) recover. Benthic communities living on the seabed flourish here. Also larger, long living species that are sensitive to disturbance, like long living shellfish (horse mussel, ocean quahog) and burrowing megafauna (worms and shellfish) that play a pivotal role in the seabed’s ecosystem.

- A healthy seabed (physically, chemically and biologically) that provides habitat for reproduction, feeding and shelter.
- Restored biogenic reefs. This has happened naturally for species such as Ross worms, thanks to spatial protection and wind farms that provide more peace and less seabed disturbance.

- New European flat oyster reefs, back through active restoration efforts (prompting further natural recovery).

- Nature-enhancing mariculture in coastal areas and wind farms. This makes biodiversity flourish as well as biogenic reef species like mussels (that are harvested for sustainable food).
- Restored seabird populations.
- Migratory birds are able to safely cross the North Sea.
- Healthy sea mammal populations, that have peace and space to reproduce and forage. There are also quiet zones with only natural under water sound.

The above points imply that all OSPAR indicators score above threshold and all MSFD descriptors are in line with a good environmental status.





Black-legged kittiwake

The Healthy North Sea

The North Sea 2040



Atlantic horse mackerel



Harbour porpoise



Common minke whal



Grey seal



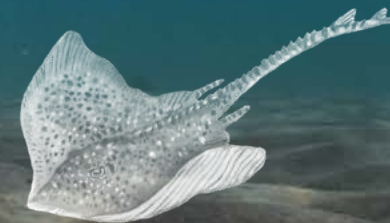
European squid



Atlantic cod



Altantic herring



Thornback ray



European plaice



Starfish



*Plumose sea anemone,
Dead man's fingers*

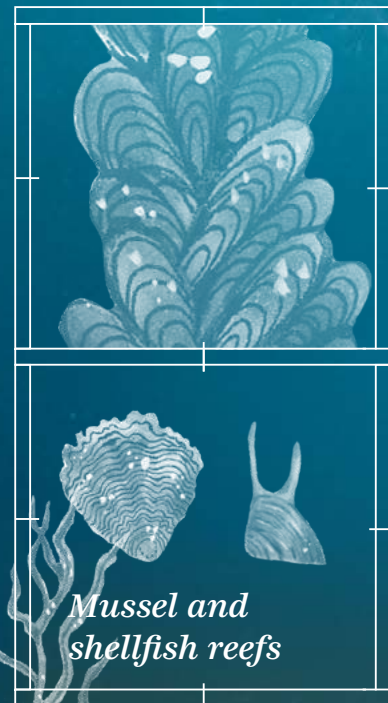


European lobster



Edible crab

Biogenic reefs



*Mussel and
shellfish reefs*



*Common heart
urchin,
Whelk, Sandeel*

Busy on the North *Sea*

Natural processes provide the abiotic (non-living) and biotic (living) characteristics of North Sea nature. As humans we usually cannot influence or control these ecosystems directly. However, we do have a direct influence on human activities that worsen or change ecosystems.

In this image, you can see how busy the North Sea is. It shows the shipping movements on the North Sea over the course of a year. Besides these shipping movements, there are also around a thousand oil and gas platforms on the North Sea, hundreds of fishing boats operate, millions of cubic meters of sand are extracted, and large wind farms are being constructed. All these existing and new human activities in the North Sea contribute to the deteriorating state of the North Sea's natural environment.



Figure 2
This image shows the shipping movements on the North Sea over the course of a year.

How can we reduce the pressures?

With this vision we would like to show what levers we can and should turn to achieve that healthy, resilient, robust and species-rich ecosystem. If we manage to reduce the (cumulative) impact of various sectors and at the same time strengthen the ecosystem, it will be possible for nature to fully thrive again.

There are a great many pressure factors that negatively impact the North Sea. All of these are interconnected. All sectors must work together towards reducing this negative impact and seize the opportunities to strengthen the ecosystem. This means taking a broad and holistic approach to staying within ecological boundaries, rather than on a project-by-project basis. Whereby economic activities contribute positively to nature as much as possible. This is not only important for the North Sea, but also for the surrounding areas like the Dutch dunes and the bird breeding areas in Scotland.

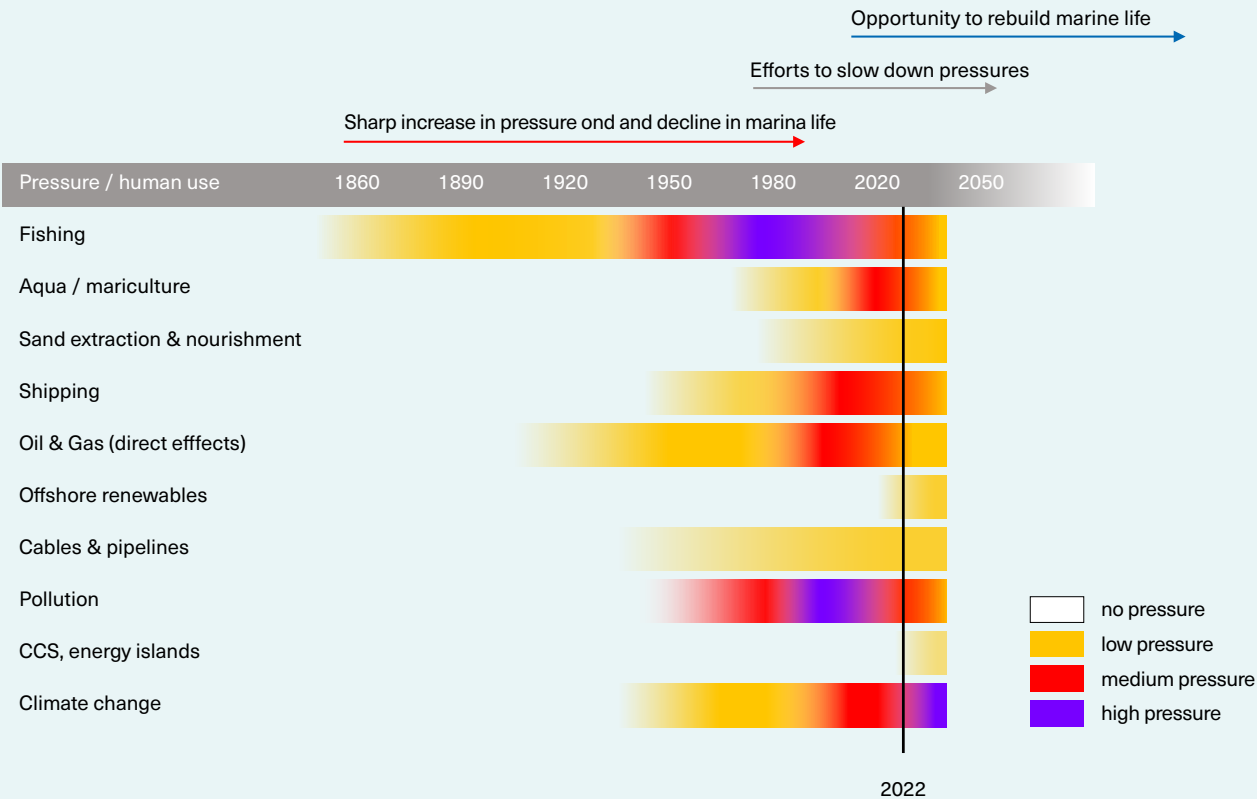


Figure 3
This image shows a pressure scale of different human activities, which together lead to cumulative pressure acting upon the ecosystem.

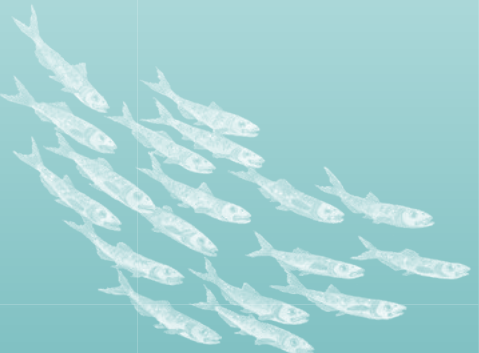
The quality of North Sea’s nature must be a priority in all current and planned activities. This requires an international masterplan wherein the governments of the countries bordering the North Sea agree on how we will manage nature quality and how that translates into (designated) space for activities. That plan should be legally anchored as much as possible. The ecosystem needs adequate management to regulate human impact on marine life.

Such a plan also ensures that the North Sea can continue to provide services that are currently under threat. It is not an easy task. It will also require (financial) sacrifices of both the sectors and society as a whole. But they will definitely be worth it⁸.

⁸ The European Commission estimates that investments in nature restoration provide a return of between €8 and €38 for every euro spent, due to the wider benefits provided by ecosystem services that support food security, human health and well-being, and climate mitigation and adaptation. See <https://www.eea.europa.eu/publications/importance-of-restoring-nature>



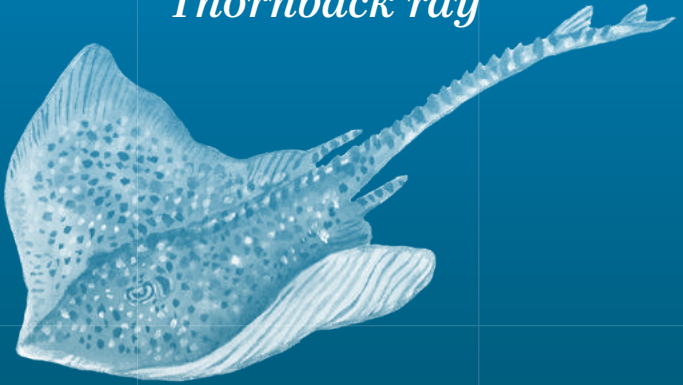
Harbour porpoise



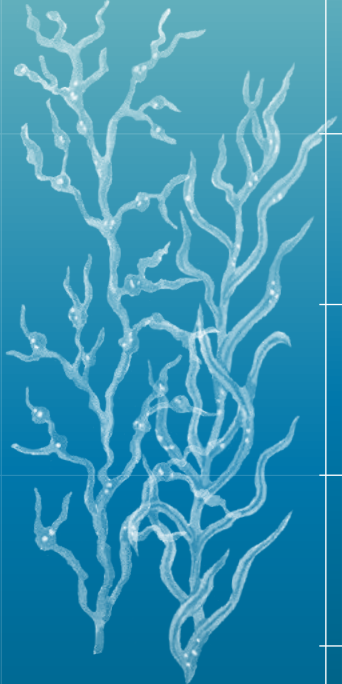
Atlantic herring



Plumose sea anemone



Thornback ray



Seaweed

Norwegian Trench

Norway

Fladen Ground



Skagerrak

Kattegat

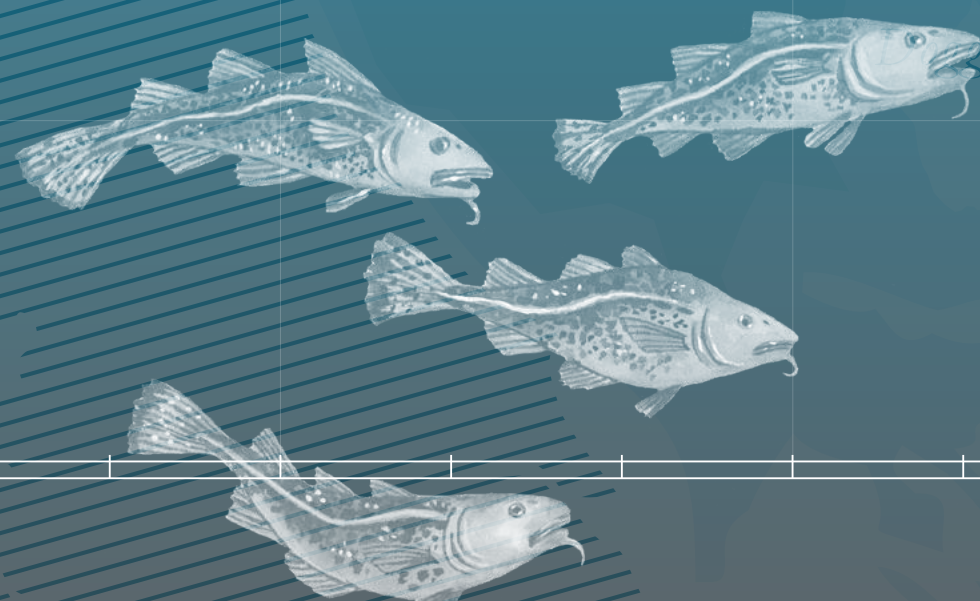
PART 2

Towards a *sustainable* future

Six solution avenues for a strong North Sea nature

Denmark

German Bank



German Bight

Towards a *sustainable* future

In this vision we present six solution avenues that will bring a healthy, robust and resilient North Sea within reach. Of course we have looked at experiences from the past while looking ahead to the future.

The six solution avenues are:

1. An international master plan
2. Spatial measures
3. Quality measures
4. Monitoring and adjustment
5. Nature investment fund
6. Policy harmonisation

Below we explain what those avenues entail and focus on what they mean for the various sectors. After all, it is not only up to the governments of the North Sea countries to draw up a master plan, but there is also a great responsibility on all users of the North Sea. Together, we must ensure that North Sea nature recovers and that we can (to a certain extent) continue to use the North Sea.



Harbour porpoise

Harbour porpoises use echolocation, both to orient themselves and to find food. With their sonar they can discover fish which dug themselves into the sand.

1. An international master plan

The idea is for all other North Sea countries (The Netherlands, Great Britain, Norway, Denmark, Germany, France, Belgium, Ireland and Sweden) to create an integral and overarching master plan for the North Sea. The Greater North Sea Basin Initiative (GNSBI) could then take this further. It could also form the basis for national development of marine spatial plans and implementation of current and future nature policy (e.g. N2000, MSFD, EU Biodiversity Strategy, EU Nature Restoration Regulation) and potential nature restoration programmes and efforts.

2. Spatial measures

To regain a robust, resilient and healthy ecosystem we must, of course, also consider the spatial planning and organisation of the North Sea. These measures will help nature further:

• Expansion of protected areas

The best chance for recovery of North Sea’s nature lays in the creation of an international network of protected areas: parts of the North Sea where nature will be left alone^{9,10,11,12}. Protected areas must be added, which together with existing areas form an internationally coherent, representative and ecological network in the North Sea. This means that 30% of the North Sea will be an effectively protected area of which a third (10% of the total surface area) will be strictly protected. These percentages are in line with the 2030 EU biodiversity strategy.

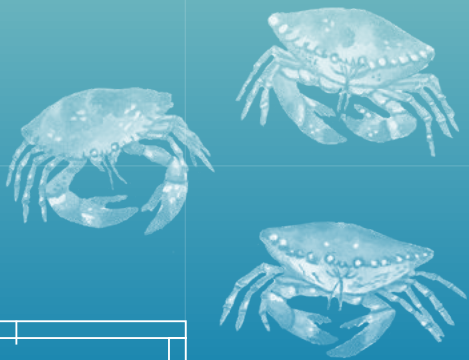
• Smart Spatial planning and shared use

- Marine spatial planning needs to ensure the ecosystem is central to policy development and management of the North Sea. Ecological, social and

⁹ UNEP-WCMC 2008 “National and Regional Networks of Marine Protected Areas: A Review of Progress.”
¹⁰ Williams MJ, Ausubel J, Poiner I, Garcia SM, Baker DJ, Clark MR, et al. 2010 “Making Marine Life Count: A New Baseline for Policy.”
¹¹ Elizabeth McLeod et al. 2008 “Designing marine protected area networks to address the impacts of climate change”
¹² Graham J. Edgar et al. 2014 “Global Conservation Outcomes Depend on Marine Protected Areas with Five Key Features”

Edible crab

The North Sea crab is a large, slow species with an orange to reddish-brown carapace that is twice as wide as it is long. They have substantial claws with black tips. The crab primarily lives near hard substrates, and in the North Sea, it often inhabits wrecks en masse.



economic considerations all play a role in decisions regarding the sustainable use of marine resources. The various sectors need to collaborate to address the cumulative effects of human activity on the ecosystem. We can measure what those effects are with instruments like SYMPHONY¹³ en Tool4MSP¹⁴. Those instruments are already in use on the North Sea. Various countries have included them in their marine spatial planning.

- Making space for nature by using as little space as possible for human activities. That is the starting point for the spatial distribution of activities on the North Sea. We aim to avoid disruption in protected areas (Natura 2000 and MSFD areas), vulnerable nurseries and spawning grounds. That is why we are looking for opportunities to bundle activities in one area. We call this multi or shared use. This way we maximise space for nature and stabilise the cumulative pressure. For example, it is often possible to combine the activities of sand extraction, fishing and defence. Food production, raw material production and (more) energy production can take place in the space within wind farms, as long as that combination leads to a net reduction in pressure on the North Sea and does not lead to increased pressure on the wind farms. We can investigate if food production is possible around platforms outside the zone that needs to be kept clear from a safety perspective. Of course, nature always takes centre stage when it comes to shared use¹⁵.
- For each platform and wind farm we need to assess if nature-friendly decommissioning is desirable or if all human materials need to be removed entirely. This depends on the location.

¹³ <https://maritime-spatial-planning.ec.europa.eu/practices/symphony-tool-ecosystem-based-marine-spatial-planning>

¹⁴ <http://data.tools4msp.eu/>

¹⁵ See the [position paper](#) of the North Sea Foundation on nature friendly multi-use



European lobster

The European lobster usually does not grow larger than 50 cm. Specimens of nearly one meter have been observed. However, due to fishing, these large old specimens are rarely seen anymore. Under favorable conditions, the animals can weigh up to 5 kilograms and live for 20 years.

3. Quality measures

In order to raise the quality of North Sea’s nature to a higher level, we will also have to set high quality standards for the measures we will take. Better protection, proper management and control and utilisation of the best techniques. This is how we do that:

- **Minimise disturbance through human activity**

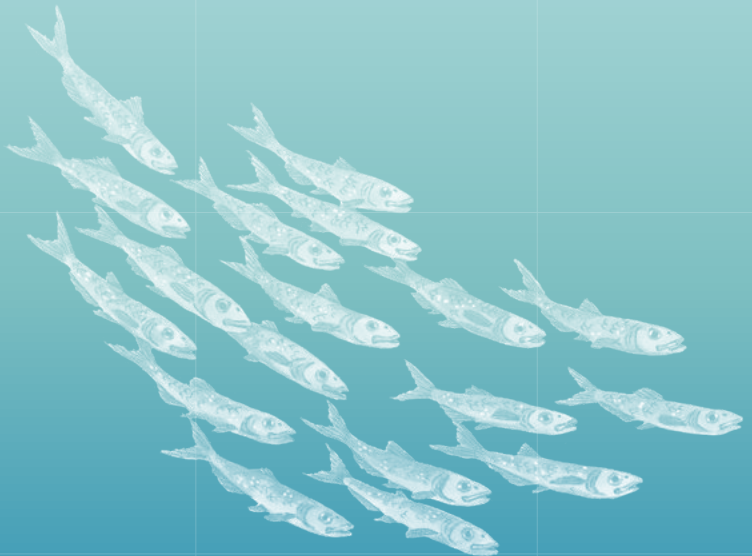
Additional measures are necessary to more effectively protect current and future protected areas (Natura 2000 and MSFD) We therefore phase out all human activity that (directly or indirectly) puts pressure on the ecological components. The standard is to leave nature be. Active nature restoration measures will take place only if it needs a kickstart (For example in the design of the Programme Nature Enhancement North Sea). New activities are not permitted when it is not clear if we can curb or compensate their effects. Thus, protected areas become actual sanctuaries where nature can recover.

- **Management plans**

All protected areas will have clear management plans, appropriate monitoring protocols and effective control and enforcement measures. This will secure significant protection for the areas against harmful activities. We consider the area holistically, using the ‘whole-site approach’. This approach replaces the current one which is feature-based.

- **Species protection plans**

As established in the North Sea agreement, more species protection plans will be introduced for threatened and vulnerable and species, including measures within and outside protected areas. The plans must, among other things, ensure proper ecosystem food availability. For example, we look at the required size of the (forage) fish populations that serve as food for birds or mammals. Combating



Atlantic herring

The herring is an elongated fish with strong scales. Herrings form large schools. In the North Sea, there are different populations that spawn either in the spring or in the autumn. Herrings produce sounds (herring farts) caused by gas released from their swim bladders. These animals can live up to 22 years.

pollution, (like plastic) noise pollution and other forms of disturbance can also be part of species protection plans.

• **Non-statutory Best Available Techniques**

It is important that all sectors minimise the effects of their (new and existing) activities and contribute as much as possible to the enhancement of North Sea nature. This means that for all activities the non-statutory level of the application of Best Available Techniques (BAT) will be applied. If those BAT are not yet available for nature protection and enhancement, they will be drawn up according to the definition in the North Sea agreement. The government ensures this will not be at the expense of the pace of the energy transition and that companies are transparent about the extent to which they apply BAT over and above statutory limits. Within the BAT, the most effective technique is chosen on a case-by-case basis.

4. Monitoring and adjustment

Ecological monitoring takes place for all offshore activities. Policy and activities are adjusted when necessary (*adaptive management*). An overarching international research programme will be established. This will be connected to existing institutions and will build on existing national research programmes. This way we bundle existing (international) knowledge and make it publicly available. This broad outlook allows us to supplement or fill in missing knowledge and thus adjust policy as needed.



Grey seal

This seal is larger than the common seal and is recognizable by its streamlined, robust body and straight snout. They rest on rocks at low tide, and in the Netherlands, mainly on sandbanks that become exposed. They primarily eat fish, but also consume crustaceans, mollusks, and sometimes even porpoises.

5. Nature investment fund

A fund for offsetting (see box) and nature enhancement will be established. All sectors that use the ecosystem services on the North Sea contribute to that fund based on their economic size and capacity. They will do this in addition to the measures they are already taking. The fund exists to mitigate the cross-sector cumulative effects and to better use the nature enhancement opportunities together. We will tackle the fund's design and implementation together with the other North Sea countries as much as possible. In doing so we can make use of the progress we make at national level.

6. Policy harmonisation

All North Sea countries are currently working on visions and policies for the North Sea. It will be hugely beneficial for the North Sea if we harmonise relevant policy from the different North Sea countries and remove obstacles. For example, this includes the interrogation of BAT based on shared research, but also the adjustment of the clearance obligation to preserve natural value.

Offsetting

Through offsetting we want to compensate possible remaining negative impact of an activity by enhancing nature at a different location. For example by better protecting the onshore breeding areas of certain (affected) bird species. Offsetting only takes place when other (three) mitigation steps (avoidance, minimalisation and rehabilitation/restoration) do not have the desired effects. (See image 1). These first three steps can be taken at the activity's location. Offsetting explicitly takes place at a different location.

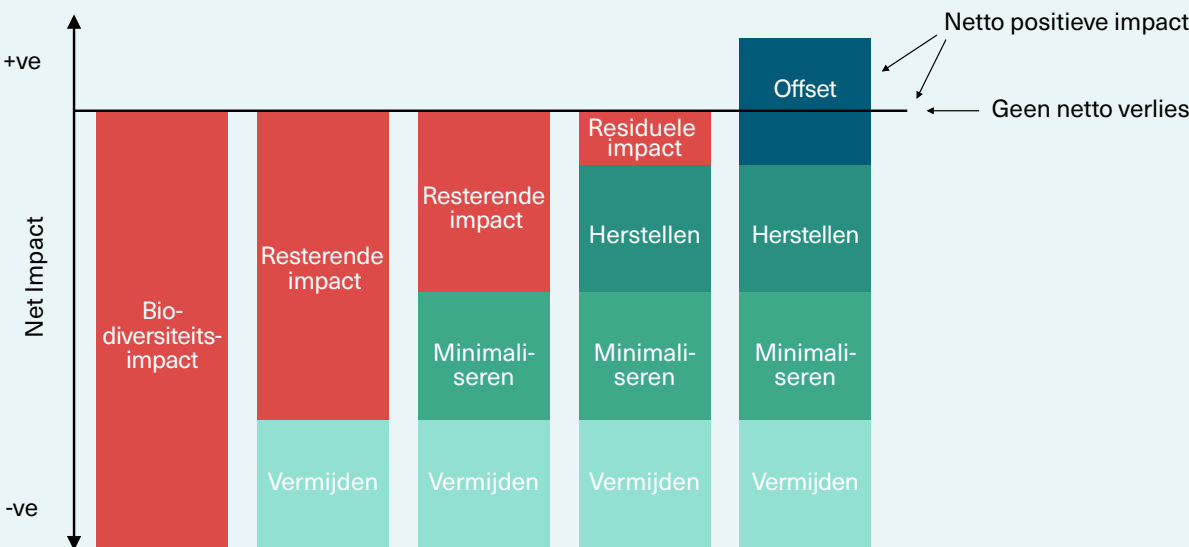


Figure 4
The mitigation hierarchy. Source: <https://www.thebiodiversityconsultancy.com/>

Norwegian Trench

Norway

Fladen Ground

Skagerrak

Kattegat

PART 3

Sectoral interpretation

How are we going to make a difference in each sector?

Denmark

Dogger Bank

German Bight

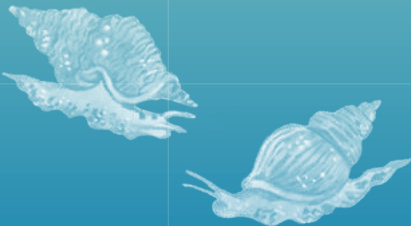
How are we going to make a difference in *each sector*?

Man cannot fully and directly influence the ecosystems, but it can influence human activities that impacts those ecosystems. That is why this vision’s focus is on organising these activities in a nature friendly way, which allows us to improve North Sea nature. This part zooms in on those activities that can have the best possible impact. What does it mean for these activities to be organised in a nature friendly manner by 2040?

The sectors are:

- Wind energy
- Food
- Platforms
- Infrastructure (cables and pipelines)
- Sand extraction
- Shipping
- Ministry of Defence

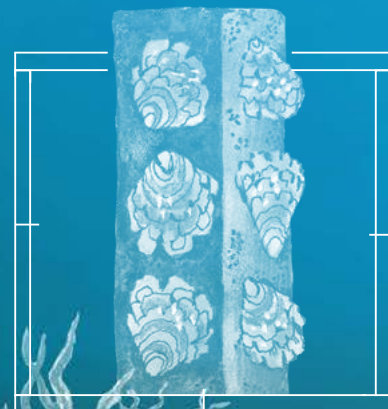
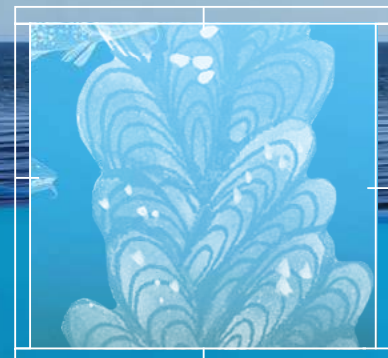
Whelk



The whelk is a marine snail. They can grow up to approximately 8.5 cm (up to 12 cm). Their color is beige with occasional dark bands, spots, or spiral lines. It is a long-living species that can live up to 30 years and benefits from a stable seabed.

Wind energy

The North Sea 2040



Wind energy

When we dive into a wind farm of the future, we see rich North Sea nature which profits from all the nature enhancing measures that have been implemented. The foundations and stone deposits around those foundations are teeming with life. Reefs structures like oyster reefs, Ross worm reefs and mussel beds form again. Food is produced sustainably in part of the wind farm. Birds and bats are not impacted much by the wind farms because they are not built on important migration routes. The wind farms are equipped with an international shutdown facility that prevents many casualties and is befitting a stable energy supply. There are no wind farms at all in protected areas. Of course, the sector can continue to build but only with nature friendly measures and exclusively within the carrying capacity of the North Sea. The government provides the right incentives and support for this and creates the right conditions.

To realise this vision of the future, the following measures are needed:

Spatial measures

• Location choice

Firstly, before we designate wind areas, we take a good look at the possible ecological impact. Only when it is (all but) certain that it is possible to mitigate or compensate (this can also be within other sectors) the impact, will a wind farm be designated and developed. There will be no wind farms in protected areas.

• Corridors

Where effective, there will be broad corridors within or between wind farms, such as in bird and bat migration routes.

• Multifunctional use of space

By facilitating production of food and raw materials (seaweed and shellfish farming) or energy production (solar and tidal) in wind farms, the available space is used more efficiently. This maximises space for nature. Of course, we always keep in mind the carrying capacity of the ecosystem and it is only possible if multi-use of space leads to a net pressure reduction on nature and there is no pressure increase in the wind farms. Active (seabed-disturbing) fishing is prohibited in wind farms. The North Sea Foundations' position paper show what is required to put nature centre stage when it comes to shared use¹⁶.

¹⁶ See the [position paper](#) of the North Sea Foundation on nature friendly multi-use

Quality measures

• Destratification

There will be measures to avoid destratification in wind farms as much as possible. Destratification is the mixing of water layers caused by the turbulent current around the turbine foundation. This mixing has an (negative) effect on turbidity as well as the distribution of nutrients between the various layers of water. This in turn can have a negative influence on the ecosystem.

• Non-statutory Best Available Techniques

During the development, construction, operation, and decommissioning of wind farms, non-statutory Best Available Techniques (BAT) are used to protect nature and the environment. This limits negative impacts, such as noise pollution. Underwater, the wind farm is designed to be as nature-enhancing as possible, utilizing BAT. If the BAT are not yet available, they are established according to the definition of the Dutch North Sea Agreement.

• Standardisation

Standards for circularity and nature are drawn up based on scientific insights. These standards are developed internationally as much as possible. For example, the minimal foundation life span, re-useability of the foundation, minimum and maximum tip height, and a longer concession duration can all be part of the standards. We regularly evaluate the standard’s effectiveness for nature as well as the market and adjust them as necessary. This prevents standardisation hampering new designs that put nature first.

• Bundling of traffic movements and minimising impact

There will be a smart bundling of shipping traffic and shipping lanes. This requires less singular traffic movements in a smaller area. Besides this we will focus on cleaner and quieter ships.

• Decommissioning

When decommissioning we always search (case by case) for a method that is optimised for local nature. We adjust policy accordingly as well. Decommissioning currently requires everything to be removed. When research shows this destroys valuable nature, it should be possible to choose a different method. This may mean that part of the construction remains in place.

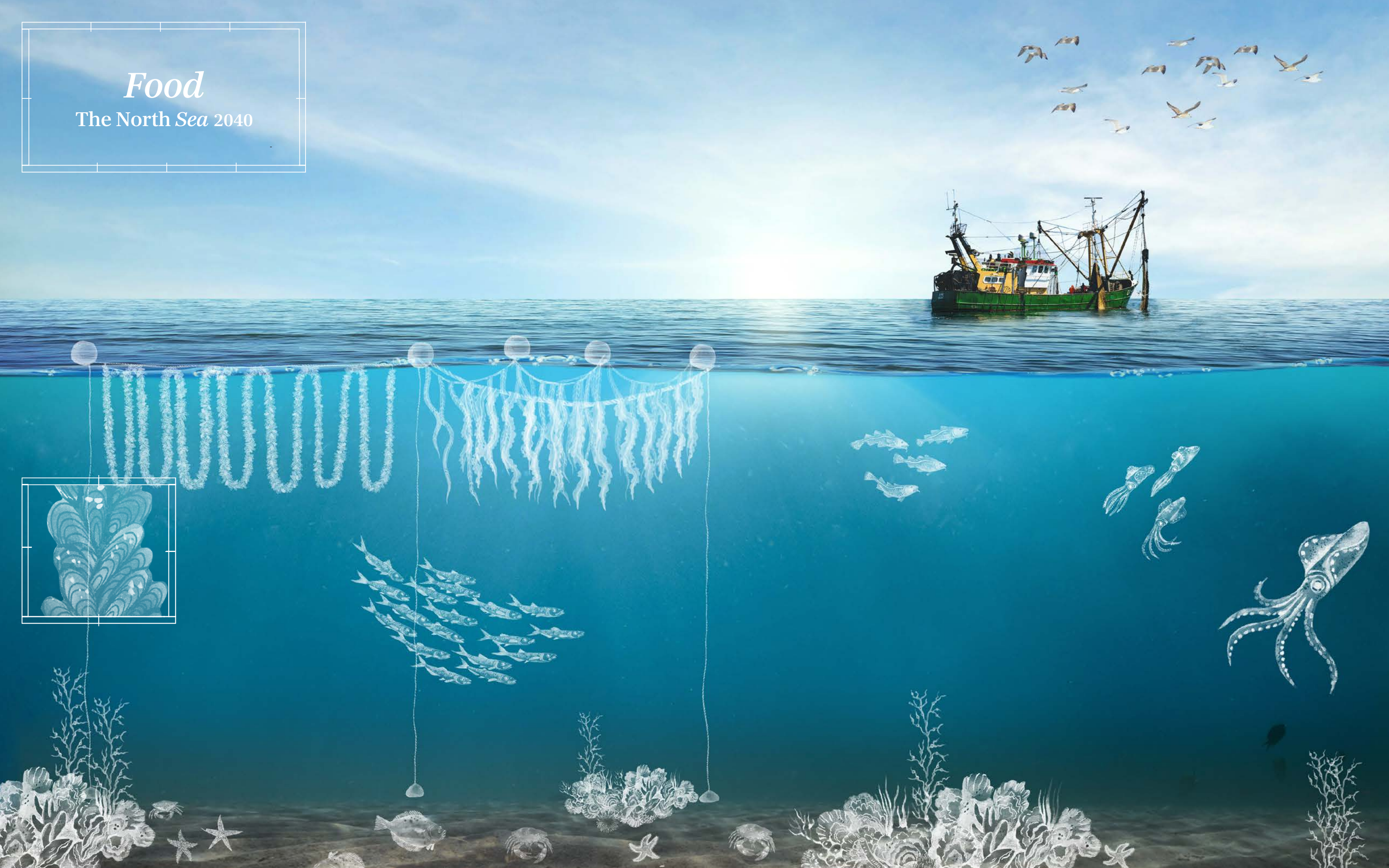
Monitoring and adjustment

Ecological monitoring takes place in all wind farms before and during the planning, building, operational and decommissioning phases. The government compiles and shares the monitoring results and adjusts policy and activities when necessary. Each wind farm and site decision tender include provisions with the most recent insights regarding nature-inclusive development, building, operation and decommissioning. This will align current processes as well as ecological knowledge gained by wind farm owners.

Nature investment fund

The sector contributes to the fund for offsetting and nature enhancement.

Food
The North Sea 2040



Food

The food sector depends on a healthy, diverse and clean North Sea ecosystem. A robust and healthy North Sea nature must be capable of sustainably providing part of the protein we require. Not only by means of the wild catch of species that come from a healthy population but also in the form of seaweed and shellfish farming. In the near future, the sector needs to facilitate the move to sustainable forms of fishing and other forms of food and raw material production. The government stands together with the fishermen and helps them innovate. This way, by 2040, we will be able to achieve a fishing industry that maintains the integrity of the pelagic (water column) and benthic (seabed) ecosystems, has minimal bycatch, a low CO₂ footprint and does not release waste into the sea. The government, together with the sector, safeguards the North Sea's quality and ensures effective enforcement. If nature recovers and is environmentally healthy, a sustainable future perspective for the marine food sector on the North Sea will emerge. The following measures are necessary to achieve that:

Spatial measures

- **Combination of spatial use**

Fishing is combined with sand extraction and defence areas where possible. There will also be a combination of shellfish and seaweed farming as well as sustainable forms of fishing that have separate functions. These can be located in parts of wind farms but also in areas around platforms (taking into account the safety perimeter). Strengthening the ecosystem is the starting point while using an ecosystem based approach and habitat suitability mapping.

Quality measures

- **Ecosystem based fisheries management**

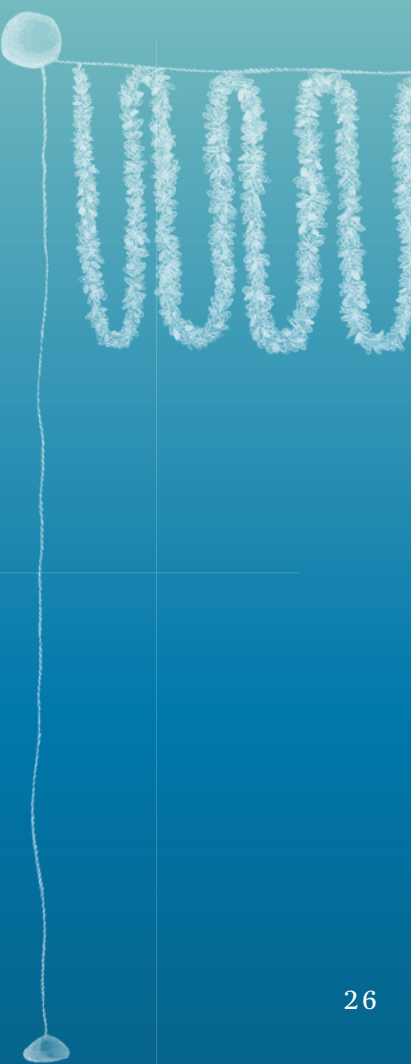
Ecosystems are connected and within ecosystems, species depend on each other. We do not manage individual species anymore, but regard commercially fished species more holistically: not just the species' status but also the state of the broader ecosystem. We take precautions to optimise the functioning of the ecosystem. Thus, minimising pressure from fishing and conserving the integrity of the pelagic and benthic ecosystems. In turn this ensures, for example, enough forage fish for birds and sea mammals.

- **Transition support**

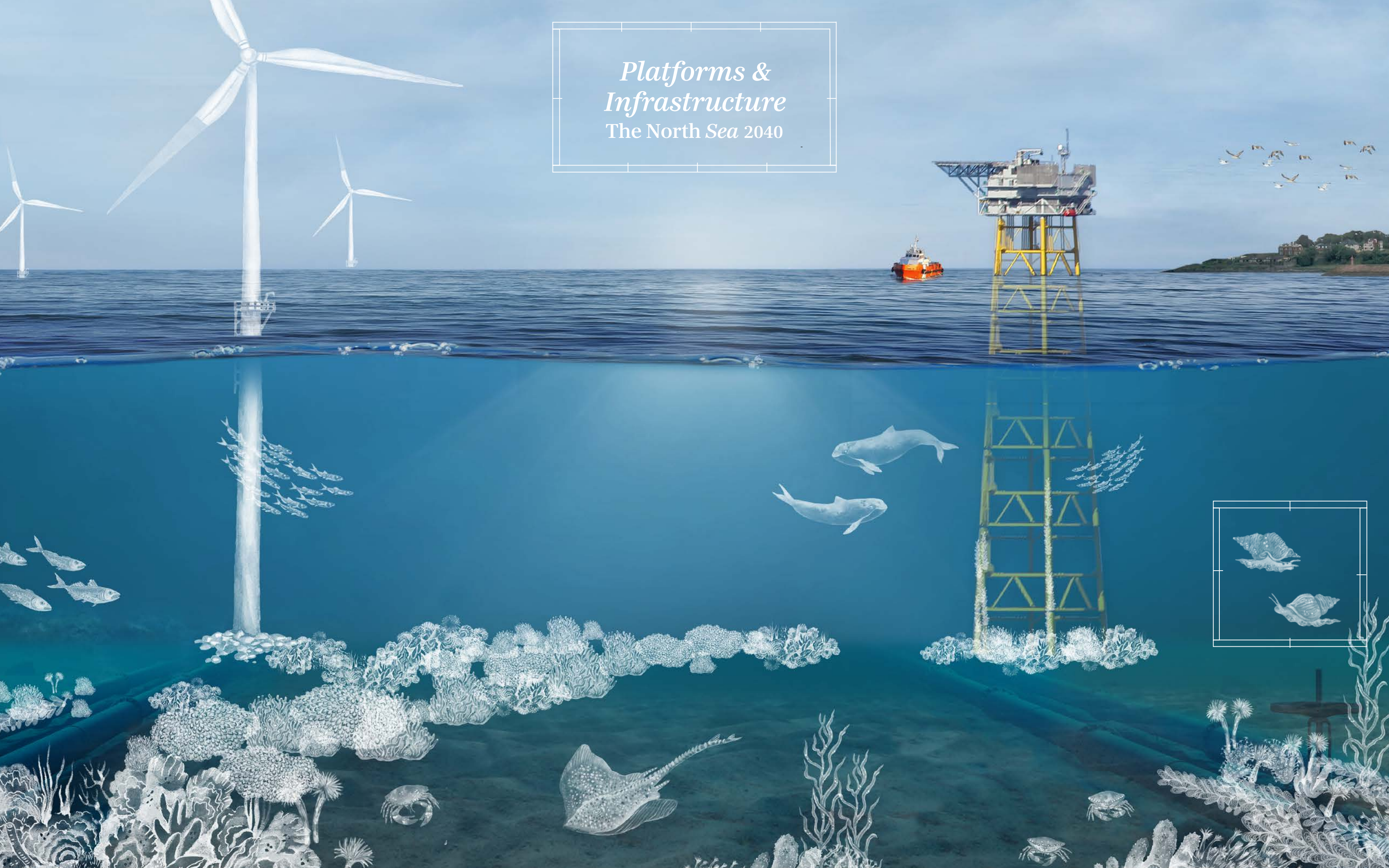
The government supports the transition to sustainable fishing and nature enhancing mariculture. Sustainable fishing needs to become profitable, and legislation must not be a hindrance. Achieving sustainability is only possible when the supply chain pays a realistic price for sustainable fish. This is why the supply chain needs to be transparent. Thanks to innovation processes, fishing techniques and fishing materials that result in less by-catch are developed. The best options will become mandatory. We stimulate fishermen to become more flexible and fish more seasonally.

Nature investment fund

After a successful transition, the food sector will also (proportionally) contribute to the fund for offsetting and nature enhancement.



*Platforms &
Infrastructure*
The North Sea 2040





Platforms

There have been platforms on the North Sea for decades. Currently, there are approximately one thousand. Until now their main function was the extraction of oil and gas. In the future they will mainly be responsible for the transportation of energy from wind farms, hydrogen production and CO₂ storage. In some cases, the new platforms can be built on the foundations of the old installations. These new platforms are not only functional for the energy system, but they also contribute to the ecosystem. Underwater, all kinds of endemic species can find a home on, around and between the legs of the structures. Nature's development around the platforms will be monitored well and collected and bundled internationally. This way, platform users will also contribute to the development and monitoring of North Sea's nature. Around the platforms, food production can profit from the good quality of local nature (keeping in mind the safety perimeter). Because of this, food production does not have to take place at another location (which would cause extra disturbance). To make optimal and positive use of the platforms, the following measures are important:

Spatial measures

- **Location choice**
New platforms will not be located in protected areas or in the sphere of influence of the protected areas.
- **Multi-use of space**
There may be room for sustainable food production around the platforms in some areas. Multiple activities can also take place on the platform. For example, energy hubs and CCS injection platforms can combine their functions.

Quality measures

- **Non-statutory Best Available Techniques (BAT)**
Smart platform design ensures maximum nature enhancement under water. For this we use the non-statutory application of BAT. BAT is used to restrict the negative impact of, for example, noise pollution and hydrogen production. If BAT are, not yet available, they are drawn up according to the North Sea Agreement definition.
- **Choosing smartly between electrons and molecules**
We must avoid needing extra wind farms on the North Sea as a result of not choosing wisely between hydrogen and electrons. If hydrogen needs to be converted back to electricity on land (with the exception of peak supply) then transport and use of electricity are strongly preferred. Only in case of lasting sustainable demand for hydrogen, is hydrogen production and transport by pipes preferable to electricity. There is also more research required into the impact of offshore hydrogen production (for example into heat production and brine¹⁷) before this can be applied on a large scale.

¹⁷ A concentrated saline solution which is a residual product from the production of desalinated water. This water is needed for electrolysis.

- **Re-use of pipes**

We re-use existing pipes (where possible) for the transport of hydrogen from the North Sea.

- **Decomissioning**

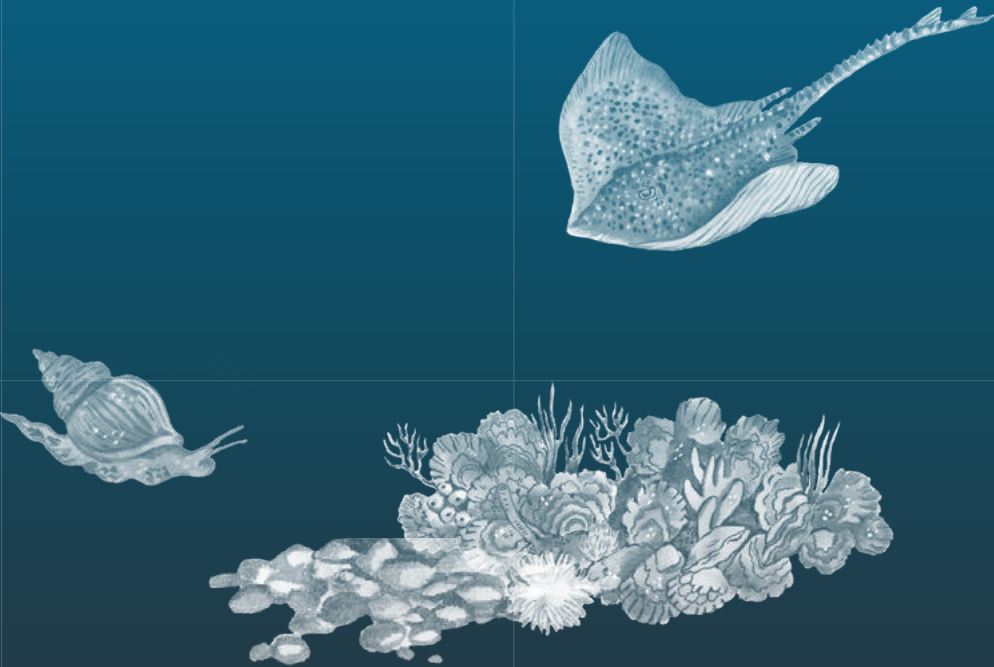
When we decommission, we choose (case-by-case) the best method for local nature. We adjust policy accordingly.

- **No permanent energy-islands as long as positive impact is not proven**

More research is required to determine the impact of developing energy-islands on the North Sea. We must especially look at how disturbing the seabed outweighs the possible added value for nature. Islands are only a possible alternative to platforms if it is guaranteed they have a more positive impact on nature (above and under water) than platforms. Until such a time, only steel support structures (jackets) and floating are possible alternatives.

Monitoring and research

All platforms are subject to abiotic and ecological monitoring. The results are public and are shared with governments and research programmes of other North Sea countries. Together they look at how they can fill the knowledge gaps regarding the effects of offshore hydrogen production.



Infrastructure (cables and pipelines)

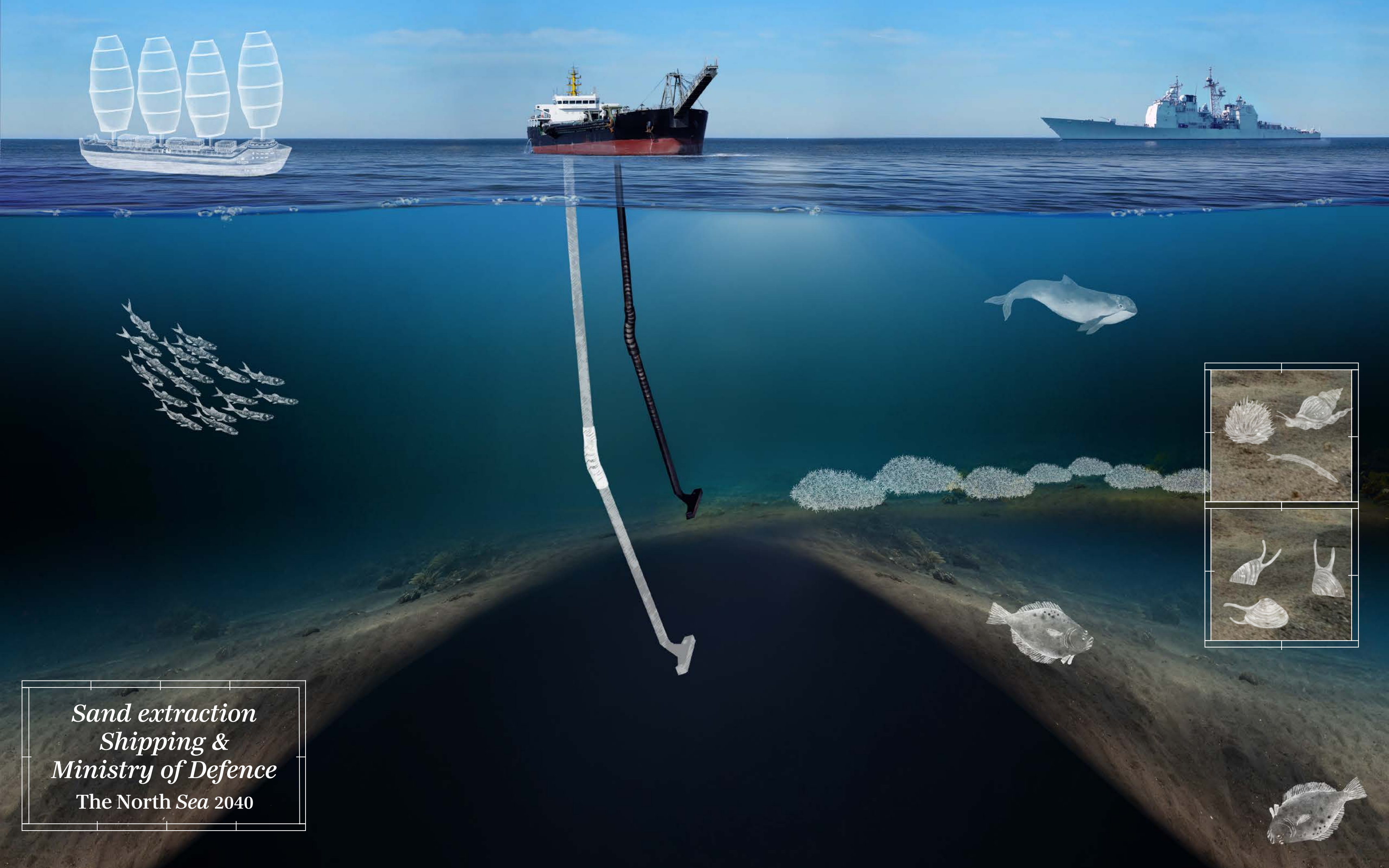
All different installations on the North Sea are connected to the mainland by power lines and gas pipes. Through the North Sea, power lines and gas pipes also run between countries, as well as many internet cables. In future we would like all this infrastructure not to run through protected areas anymore but instead as much as possible along or through shipping lanes. Through smart bundling and dimensioning we avoid work having to take place multiple times on the same route. By shielding powerlines well and laying them deep enough we limit the negative effects from electromagnetic fields (EMF). We continue to monitor and research the infrastructure's impact on the sea and take measures when necessary. A nature friendly scour protection ensures that cables and pipes can become breeding chambers and connecting routes for marine life. To achieve this, we propose the following measures:

Spatial measures

- **Avoiding protected areas and utilise shipping lanes**
New cables and pipelines will be laid through or along shipping lanes and through the corridors between wind farms, and not (or as little as possible) in protected areas.
- **Avoiding vulnerable coastal zone.**
During landing we spare the coastal zone as much as possible. For example, by using tunnelling and construction through gullies.

Quality measures

- **Re-use**
Where possible existing pipes and cables are used.
- **Shielding EMF**
By shielding cables as much as possible, the electromagnetic field (EMF) has minimal influence on the ecosystem. As a precaution cables are bundled as much as possible until the consequences are clearly mapped.
- **Future proof development**
Cables are installed in a way that is future proof. Higher wattages are taken into account when repowering.
- **Non-statutory Best Available Techniques**
Non-statutory BAT are used for maximum nature enhancement and minimal impact during the user phase. During the building phase BAT are used to limit negative effects from (among others) noise pollution and sediment plumes. If BAT are not yet available, they will be drawn up according to the North Sea Agreement definition.



Sand extraction
Shipping &
Ministry of Defence
The North Sea 2040



Sand extraction

We use high-quality North Sea sand for coastal protection and commercial purposes. We would like to continue doing this with the help of sand extraction, naturally without causing irreparable damage to nature. Excavating a deeper layer of sand means less areas to extract sand from in the North Sea, even if we need more sand due to rising sea levels. The added benefit is that deep sand extraction can also provide an underwater landscape with more relief. These landscapes often contain more life and biodiversity than flat landscapes¹⁸. A sand extraction area remains recognisable in the landscape and ecosystem of the seabed¹⁹, for a long time. Therefore, it is all the more important to design the underwater landscape in a nature friendly way, thereby enhancing nature. In the future, sand extraction areas will also overlap with the areas where seabed-disturbing fishing can take place. Thereby ensuring those activities take place on the same spot and do not disturb (and damage) the North Sea seabed in multiple areas. These measures help achieve this vision for the future:

¹⁸ <https://www.ecoshape.org/en/pilots/sea-bed-landscaping/>

¹⁹ <https://edepot.wur.nl/590094>

Spatial measures

- **Multi-functional use of space**

Fishing and defence activities can also take place in sand extraction areas.

Quality measures

- **Adjusting extraction depth**

The sand extraction depth will move from two to six meters. This requires less seabed surface, and it allows us to develop more biodiverse landscapes in various areas.

- **Underwater landscaping**

Relief landscapes can be created as long as they contribute to local nature.

- **Minimise disturbance**

We focus on seasonal work. On board observers monitor the presence of birds and sea mammals and halt work when necessary.

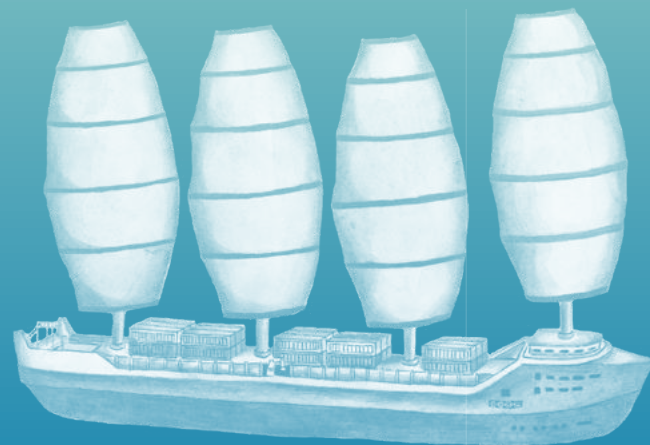
Monitoring and research

Research into the effects of deeper sand extraction and relief creation will be increased. For this we also use the insights for the OR-ELSE research programme. We adjust policy and legislation based on this: The application of Best Available Techniques for nature friendly sand extraction will become obligatory. These techniques can differ from location to location.

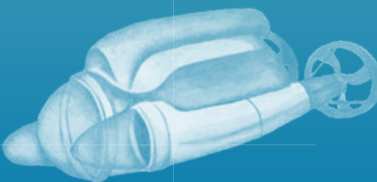
Nature investment fund

The sector contributes to the fund for offsetting and nature enhancement.





Shipping



Thanks to international agreements, ships will move through the North Sea more quietly and cleanly in the future. Smart main routes, without obstructions, will help curb the impact on nature and improve shipping safety. These routes will avoid vulnerable areas like the Waddenzee and will be sufficiently distant from wind farms and platforms. This way ports will remain accessible; the North Sea will be cleaner, and ships can safely continue to use the North Sea for the transportation of goods and people. To achieve this, these concrete measures are required:

Spatial measures

- **Relocation and keeping routes clear**
To minimise disturbing vulnerable areas, we will relocate the shipping lanes (traffic separation systems) where necessary. The ports remain accessible. The southern route along the Wadden Islands will be no more. The other North Sea countries should also lobby the IMO for this. A wide strip is kept free of platforms, wind farms and other offshore infrastructure, to avoid hindering maritime traffic. Seabed cables and pipelines can be placed on the edge of this strip.

Quality measures

- **Underwater noise standard**
There will be a ship type specific standard for underwater noise in the North Sea. This will mean that shipping avoids protected areas where necessary.
- **Clean fuels**
The North Sea countries stimulate wind powered sailing and sustainable clean fuels. They unite within the IMO to accelerate this transition.
- **Reduce pollution**
The discharge of scrubber water and cargo residues (from washing tanks) will be gradually prohibited towards 2040.

Monitoring and research.

The shipping industry will contribute to monitoring its own underwater noise. This allows the sector to contribute to the establishment and enforcement of noise standards.

Nature investment fund.

The shipping industry will contribute to the fund for offsetting and nature enhancement. To this end we explore if ports can ensure that ships will contribute to the use of the North Sea. For example, by purchasing a vignette.

Ministry of Defence

In future, the ministry of Defence should be allowed to continue international military exercises, albeit with the least amount of nuisance for vulnerable areas. This is possible by smartly adjusting areas. By releasing areas for fishing and sand extraction (as long as they are not used for military purposes) we minimise the impact on nature and do we not jeopardise Europe’s security. This requires the following measures:

Spatial measures

• Relocate areas

We relocate military areas where possible. The areas make room for wind, nature and seafaring. By moving the fighter jet’s practice area, the flight path impacts vulnerable nature like the Wadden Sea as little as possible. Military areas that currently overlap with protected areas and where explosives and sonar are used, will be relocated.

• Combine areas

Some military areas will create space for fishing and sand extraction. This is possible during the part of the year in which they are not used and where they do not overlap with munitions dump locations. The Ministry of Defence cannot use live munitions in multi-functional areas. On the edges military areas can overlap with offshore wind energy areas.

• Flight paths

Flight paths for drones and aircraft are (as much as possible) located outside protected areas.

Quality measures

• NATO collaboration

The total required surface for defence areas can be limited if NATO countries will make more joint use of the areas.

• Munitions debris

The Ministry of Defence uses as little munitions as possible, while munitions debris that does end up in the sea will be cleaned up as best as possible.

• Noise

Protected areas should be impacted by noise as little as possible during military exercises. As a result, heavily noise polluting activities take place as far from these areas as possible.

Monitoring and research

The impact of defence activities is researched further and monitored. Monitoring munitions dump locations is also part of that. Exercise protocols are drawn up based on the research results to minimise their impact on nature.

Norwegian Trench

Norway

Fladen Ground

Skagerrak

Kattegat

CONCLUSION

A future for people and nature on the North *Sea*

Dogger Bank

Denmark

German Bight

Conclusion

A future for people and nature on the North Sea

We see that not all is well with North Sea’s nature. The combined pressure of human activity and climate change literally and figuratively speaking encroach on nature’s space. We outlined this in part 1 of this vision document.

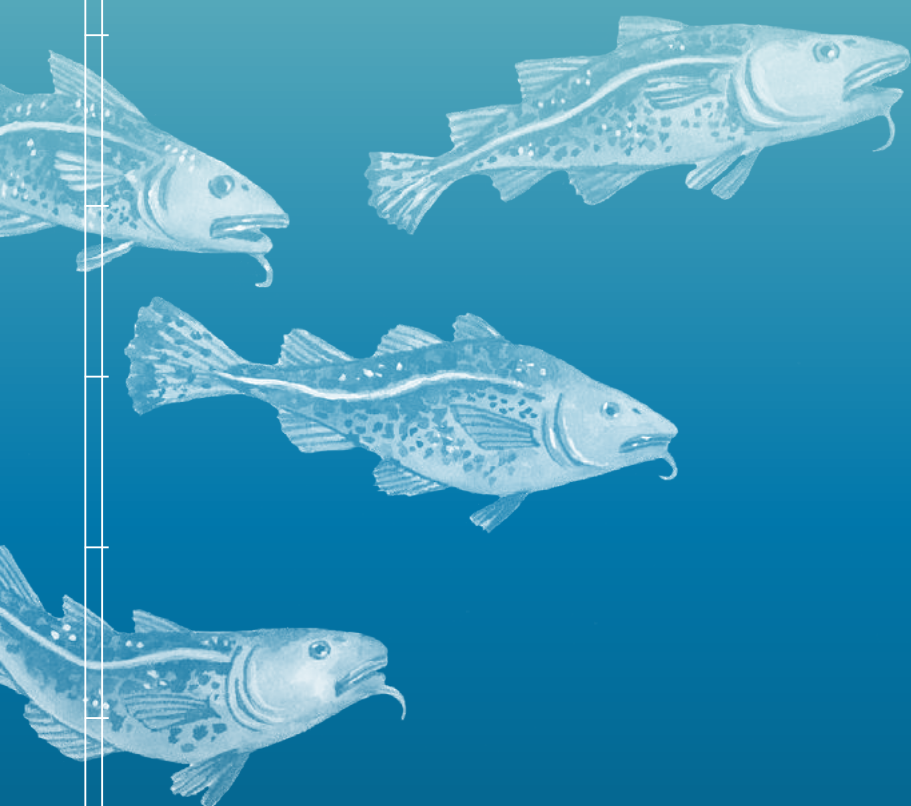
In part 2 we detail the main solution avenues to achieve structural recovery. In part 3 we explain what this means for the different sectors. The six main avenues we elaborate on there are:

- 1. An international master plan
- 2. Spatial measures
- 3. Quality measures
- 4. Monitoring and adjustment
- 5. Nature investment fund
- 6. Policy harmonisation

The space of the vast North Sea will be reorganized in the coming decades. This is necessary if we want to undergo the energy and food transition while simultaneously restoring nature. Significant changes will occur, but this does not mean that sectors will disappear. Nature has ceded space for hundreds of years and must now be given back space. This will come at the expense of space for other activities, but by smartly combining activities and transitioning to different ways of practicing professions, there is a future for both nature and humans on the North Sea.



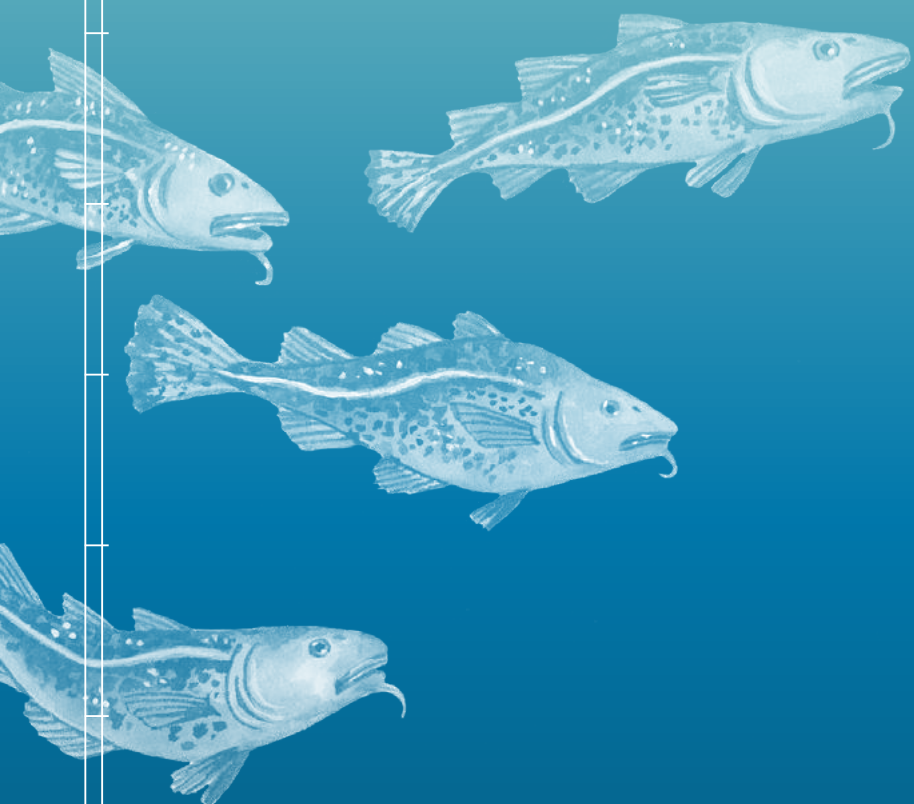
The vision shows that it is possible to turn the tide and regain a robust and resilient North Sea that is rich in species. If the North Sea countries join forces and redesign the space as well as the activities on the North Sea together, nature can recover. Only then can the North Sea give us the intrinsic and real value it has given us for the past hundreds of years. However, this does require an international masterplan with nature as its foundation.



We call on the governments of the North Sea countries and the sectors that are active on the North Sea to come together with nature and environmental organisations to work on concrete plans for the North Sea that will lead to a healthy and resilient ecosystem. If that does not happen, this vision will only be a beautiful perspective on what could have been. Then the reality will be that we will lose more than the various sectors could ever extract in value from the North Sea.

NATUUR
& MILIEU





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