

Adaptive marine spatial planning in the Netherlands sector of the North Sea

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ABSTRACT

The territorial waters and the EEZ of the Netherlands form a part of the southern North Sea. The area is intensely used and for several of these uses considerable growth is forecast. For years, industrial freedom and market forces prevailed during discussions on marine spatial planning in the Netherlands. But in 2005 it became clear that this might lead to increasing conflicts with the environment and between users. The introduction of a new spatial planning framework was in response to an increasing interest in new developments and a growing demand for governmental coordination of these developments. During the years after, societal demands changed rapidly, especially with regard to renewable energy and demand for sand to strengthen the coast. At a regular interval of 6 years, revised Marine Spatial Plans have been developed which are adapted to the new knowledge and experience acquired and the new societal demands. Each cycle has a strong stakeholder involvement, both informal and formal.

1. The need for MSP in the Netherlands

The territorial waters and exclusive economic zone (EEZ) of the Netherlands in the North Sea cover an area of more than 57,000 km², approximately 1.5 times the surface area of its total land mass. As in other parts of the North Sea, the waters under Dutch jurisdiction are intensely used. Table 1 gives an overview of these uses as they were in 2016, together with some new demands on ocean space.

While some uses will remain more or less at a constant level, considerable growth is forecast for surface mineral extraction, water sport recreation, wind farms, nature and possibly mariculture. Already around 2005, this expected growth and the concern that it might lead to greater conflict between users was the main reason for the development of a spatial planning vision for the North Sea. Until around 2000, a cooperative arrangement between the oil and gas industry and shipping industry was used to agree on the location of the shipping lanes and that offshore installations would not be placed in or near these shipping lanes. But with growing interest of other uses these arrangements were no longer sufficient. This became obvious in 2001 when a study was launched to look into the feasibility of building an artificial island at sea as a main airport to replace Schiphol airport. Due to political reasons, this study never materialized, but it became obvious that planning different uses and looking ahead was necessary.

At that time the Dutch government chose a spatial policy that provided the market (economic sectors & industries) considerable flexibility in developing offshore initiatives and projects. To limit the

risks involved in complete market freedom, the spatial policy provided a guiding framework in which location-based uses (usage zones) and a number of exclusion policies were defined. The usage zones included shipping routes, military exercise zones, and areas with special ecological features. Furthermore, the policy was based on the 'first come, first served' principle. There was only an Integrated Management Plan 2015 in force [2] but not a spatial policy. When the Ministry of Economic Affairs announced in 2007 that there would be a subsidy for building wind farms, a total of 76 initiatives were proposed. But the subsidy was only enough for three wind farms (500 MW in total). Also, a condition for applying for this subsidy was to have a license to build and exploit a wind farm from the Rijkswaterstaat, part of the Ministry of Infrastructure and Water Management. This situation created an enormous stress among the initiators as they entered a competition for developing and getting approval for their environmental impact assessment report. Within the authorities this also created stress as initiatives overlapped, were in conflict with other uses and questions arose for which there were no rules such as: what would be a safe distance between a wind farm and a shipping lane where tankers of 400 m would pass by? There was a call from the initiators for more and stronger coordination by the competent authorities. The responsible ministers tasked the competent authorities to develop a roadmap, clearly expressing the time lines for final application and decision-making up to the application and decision for the subsidy. This clear roadmap led to the withdrawal of most unviable initiatives. Only 17 initiatives were pursued from which 10 were approved and 7 denied.

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Table 1
Uses and demands (especially wind energy) for access and use of space in the Dutch part of the North Sea.

Activity		Area
Mining and mineral exploitation	Subsurface oil and gas Commercial sand mining Sand mining for beach nourishment	Approx. 160 platforms (126 km ²) 13 million m ³ /yr 12 million m ³ /yr (together 60–90 km ² /5 yr)
Replacement sites for dredged material	Designated sites for reallocating unpolluted sand	6 sites (37 km ²)
Cables and pipelines	Oil and gas pipelines Telecommunications and electricity cables	4500 km length, with a safety zone of 1 km width: 4500 km ² 3300 km length, with a maintenance zone of 1 km width: 3300 km ²
Shipping and transportation	Shipping routes, traffic separation schemes, anchor sites	3600 km ² shipping lanes for 260.000 ship movements per year
Military exercise area	Firing and practice ranges Ammunition depots	4200 km ²
Land reclamation	Land reclamation extension of Rotterdam Harbour II	20 km ² (volume of sand is 380 million m ³ , dug for sea area of 40 km ² in period 2008–2012)
Fishing and aquaculture	Beam trawlers for Herring, mackerel, and demersal fish	All EEZ and territorial waters minus areas closed for nature and energy
Wind energy	Completed in 2016: Planned 2018–2022: Planned 2023–2030:	958 MW in 5 wind farms realized (168 km ²) 3500 MW in 5 wind farms (600 km ²) 7000 MW (1100 km ²)
Recreation areas	Beach and shoreline recreation and water-based recreation, e.g., yachting, wind surfing.	Along the 250 km shoreline of the Dutch coast
Nature conservation	Protected Natura 2000 areas	11,374 km ² in five areas (Voordelta, NZ Kustzone, Doggersbank, Klaverbank, Friese Front)

Those ten went into competition for the subsidy. At the same time, a broad range of different stakeholders called for a spatial plan to give more certainty to developers and to other sectors. The wind sector called for integrated decision-making on permits and subsidy decisions.

2. Development of MSP in legislation

2.1. Integration of land and sea in national planning

The Dutch Ministry of Housing, Spatial Planning and Environment was responsible for the development of national policy on spatial planning. In 2005 the Ministry published the National Spatial Planning Policy Document [1]. In this document, the land and sea were considered no longer separate entities in spatial planning terms. It thus offered a framework for the Dutch Part of the North Sea, in which relevant international agreements and obligations and national policies are taken into account. The primary objective was to enhance the economic importance of the North Sea, to maintain and develop the international ecological features such as shallow sand banks, special benthic habitats and certain species (birds, sea mammals), as required by OSPAR (the regional seas convention of the North East Atlantic that includes the North Sea) and the European Commission, by harmonizing sustainable economic activities that require ocean space.

2.2. Implementation of spatial policy

The implementation of the spatial policy was further elaborated in the Integrated Management Plan for the North Sea 2015 [2], published in 2005. The overall objectives were related mainly to the management of those activities that were active at sea, rather than new policies:

- Management to foster a *healthy sea*: A natural, healthy ecosystem was the central aim of this theme. The objective of a healthy sea concentrated on the sustainable use of the North Sea and on protecting the natural ecosystem features. The policy was concerned with regulating discharges to improve water quality and regulating uses in order to maintain biodiversity including site-specific

ecological features in accordance with European Union and international nature conservation agreements such as agreed by OSPAR;

- Management to foster a *safe sea*: A safe sea referred to a safe use of the sea and protection of human beings for the dangers of the sea. It addressed policies such as coastal defence, safe shipping traffic, military use and quality of bathing water;
- Management to foster a *profitable sea*: A profitable sea referred to the economic function and potential of the sea. Activities that were addressed included shipping, sand extraction, oil and gas exploitation, wind energy, recreation and fisheries. Economic growth would be primarily regulated through sectoral policies.

During the process of developing the management plan, extensive consultations took place with representatives from the different sectors that were active or beginning to become active in order to learn what their objectives, visions and planned developments were and what they considered could be improved in the management of the North Sea. For instance, there was a strong call for a centralized contact for permits, but with the notion that this contact should also have the knowledge base for decision making. The result was that for most permits, the Rijkswaterstaat would be the central contact, but not for oil and gas industry (Ministry of Economic Affairs). The management units of the national government had regular contact to make sure to exchange the relevant information.

The Integrated Management Plan for the North Sea [2] had the legal status of a regulation and obliged all relevant national government ministries to act in accordance with the plan, but it did not contain a spatial policy. The management plan covered the period 2005–2015.

3. Management instruments for implementing MSP

A central aspect of Dutch marine spatial management is a system of permits to regulate offshore activities. Additionally, there are a set of other tools that provide an insight into potential problems associated with spatial development and if necessary ways of managing the use of space:

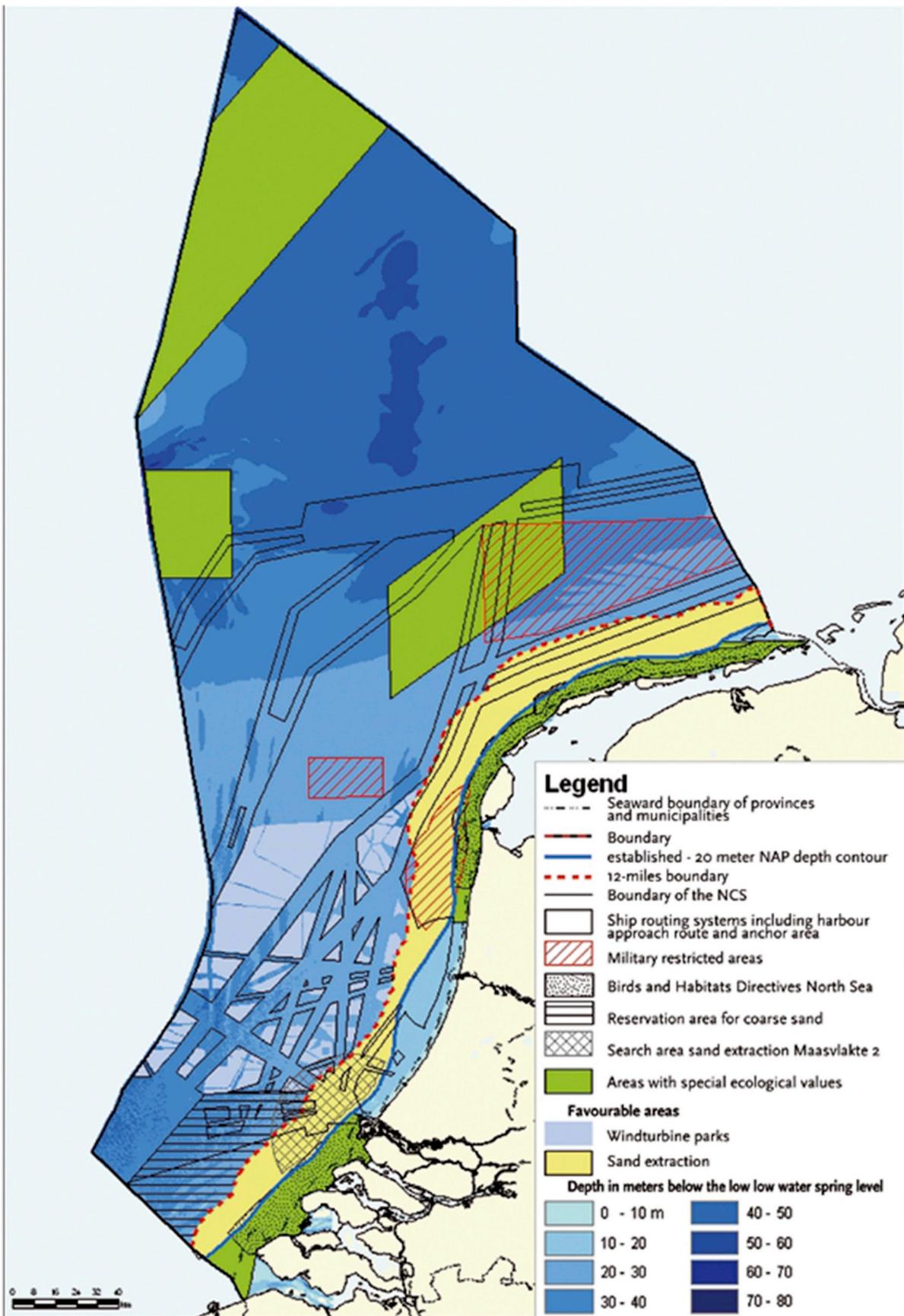


Fig. 1. Opportunity map North sea 2005 from integrated management plan 2015.

- Opportunity maps

These maps, without legal status, showed a potential future use in areas where growth could take place. There were “opportunity maps” for sand mining and wind farms and a map identifying areas of potential special ecological value. These areas (the Friese Front, the Klaverbank and the Doggersbank) in principle met the criteria for marine protected areas (MPAs) under the OSPAR convention and the EU Bird and Habitat Directives [3]. However, it took until 2016 before these areas had a legal status as MPAs due to the required change in legislation (extension form territorial water to the EEZ) in a period of time when there was a frequent change of governments that prevented the completion of the legislation change. See Fig. 1 for the map with the opportunities.

- A spatial monitoring and permit tracking system

This system facilitated the development of up-to-date pictures of current and anticipated uses of space and the validation and applications of the various permits. It showed who had issued permits, for how long and for what area.

- An Integrated (spatial) assessment framework for issuing permits.

Each location-based activity that had a permit would need this assessment. The integrated assessment framework contains five elements, including [1]: a definition of the spatial allocation [2]; the possibility of developing precautionary measures to prevent negative impacts on the ecosystem [3]; the usefulness and necessity of the activity (excluding activities explicitly permitted or encouraged by national policy) [4], choice of location and evaluation of use of space, and [5] mitigation and compensation for ecological impact.

- A disadvantage compensation

If a user believes that he or she is being harmed by another legal use, a disadvantage compensation can be claimed from the competent authority;

- Joint initiatives

The government promoted and invited initiatives that combined

functions and facilitated the multipurpose use of space.

In 2008, a revised Land Use Planning Act [4] included an extension into the North Sea. It contained a basis for applying the specific instruments and powers to the exclusive economic zone (EEZ), if necessary. A new North Sea Interdepartmental Directors’ Consultation (IDON) was established to improve the coordination among the various authorities responsible for the implementation of the spatial planning for the North Sea.

In the sections below, successive plans are presented. An overview of the different legal acts, plans and aims is given in Table 2.

4. Real MSP in the Netherlands

4.1. Marine strategy

In 2009, with the new Land Use Planning Act in place, the expectations concerning the use of the North Sea had to be refined because of new societal demands through national government policies with regard to coastal protection, wind farms and the protection of the marine environment. This led to the first real marine spatial plan 2009–2015 [5] and adaptation of the management plan [6].

In 2008 the European Commission adopted the Strategy on the Protection and Conservation of the Marine Environment [7], that aims to achieve good environmental status of the EU’s marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Marine Strategy constitutes the environmental pillar of the maritime policy the European Commission, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment.

4.2. National Water Plan 2009–2016

In 2009, the Dutch government published the ‘National Water Plan’ [8], that contained a replacement of the North Sea part of the Spatial Planning Policy Document of 2005. In this plan, the Cabinet of Ministers opted for uses that are sustainable and safe and make efficient use of space. At the same time, the uses should be in balance with the coastal and marine ecosystem (as set out in the Water Framework Directive, the Marine Strategy Framework Directive, the OSPAR convention and the Bird and Habitat Directive).

Within international frameworks, the Cabinet gave priority to the following activities that are of national importance for the Netherlands:

Table 2
Overview of the different legal acts, plans and aims related to MSP in the period 2005–2016.

Year	Legal Act/Plan	Aim	Section
2005	National Spatial Planning Policy Document	The primary objective was to enhance the economic importance of the North Sea and to maintain and develop the international agreed and obliged ecological features.	2
2005	Integrated Management Plan for the North Sea 2015	To foster a healthy, safe and profitable sea.	2 & 3
2008	Revised Land Use Planning Act	Extended legislation into the North Sea and EEZ	3
2009	National Water Plan that contains North Sea policy including Marine Spatial Plan 2009–2015	The plan opted for uses that are sustainable and safe and make efficient use of space. At the same time, the uses should be in balance with the coastal and marine ecosystem (as set out in the Water Framework Directive, the Marine Strategy Framework Directive, the OSPAR convention and the Bird and Habitat Directive). The main allocation of space is for the six main sectors with national importance: shipping routes; oil and gas installations; carbon capture and storage; renewable energy; defense areas; and sand mining areas.	4
2009	The integrated management plan 2015 (revised)	Revision of the plan of 2005 accordingly to the changed policy	4
2014	North Sea Vision 2050	A long term vision for the North Sea in 2050	5
2015	Second National Water Plan that contains the North Sea Policy 2016–2021	Main changes due to renewable energy plans, sand mining strategy and MSFD measures. The six priority functions were the same as in 2009.	5

- Sand extraction and replenishment provide a way of enabling the coastal profile (the foundation zone) to keep pace with the rise in sea levels. Where possible, this is to take place by distributing and transferring sand along the coast. In addition, the government explored the feasibility of extending the coastline, to provide more space for development and use. This requires appropriate planning to find areas where sand can be mined at low costs and with minor environmental impacts. Also the so-called Sand Engine near the Hook of Holland is one of the outcomes of this exploration. An enormous amount of sand was put on the beach and in the fore shore. Through waves, current and wind this sand volume will be spread in the next 20 years along a coastal stretch of 25 km and protect the land behind it against flooding;
- Sustainable (wind) energy: providing space for 6000 Megawatt of wind turbines by 2020 (requiring at least 1000 km²) and creating conditions for further (international) growth after 2020. Once the 1170 MW is built or in the pipeline, the remaining 4800 MW will be allocated in so-called ‘wind development areas’. Extensive stakeholder consultation and a Strategic Environmental Assessment will form the basis for designating these areas;
- Oil and gas field development: extracting natural gas and oil from

the Dutch fields in the North Sea, at a relative high rate, but also from small fields;

- Sea shipping: building a system of traffic separation schemes, clearways and anchoring areas allowing safe and prompt handling of shipping; and
- Defence (exercise) areas at sea.

These priorities lead to specific, delineated zones for certain developments where other functions can take place so long as they do not conflict with the priority function. An assessment framework is in place to guide decision making with regard to other initiatives outside these areas of national importance. See Fig. 2.

This first National Water Plan and its chapter on North Sea Policy and Marine Spatial Plan also aimed at stimulating and providing room for innovation, such as combining functions in space or time in experimental areas with fewer restrictions. In the process of drafting the plan, stakeholders were involved informally while drafting the policy. Both bilateral as well as group sessions were held to discuss our plans, their plans, views and possible consequences of the plans. Information was provided for existing and potential new users about the availability of space for new activities and the conditions attached. The new

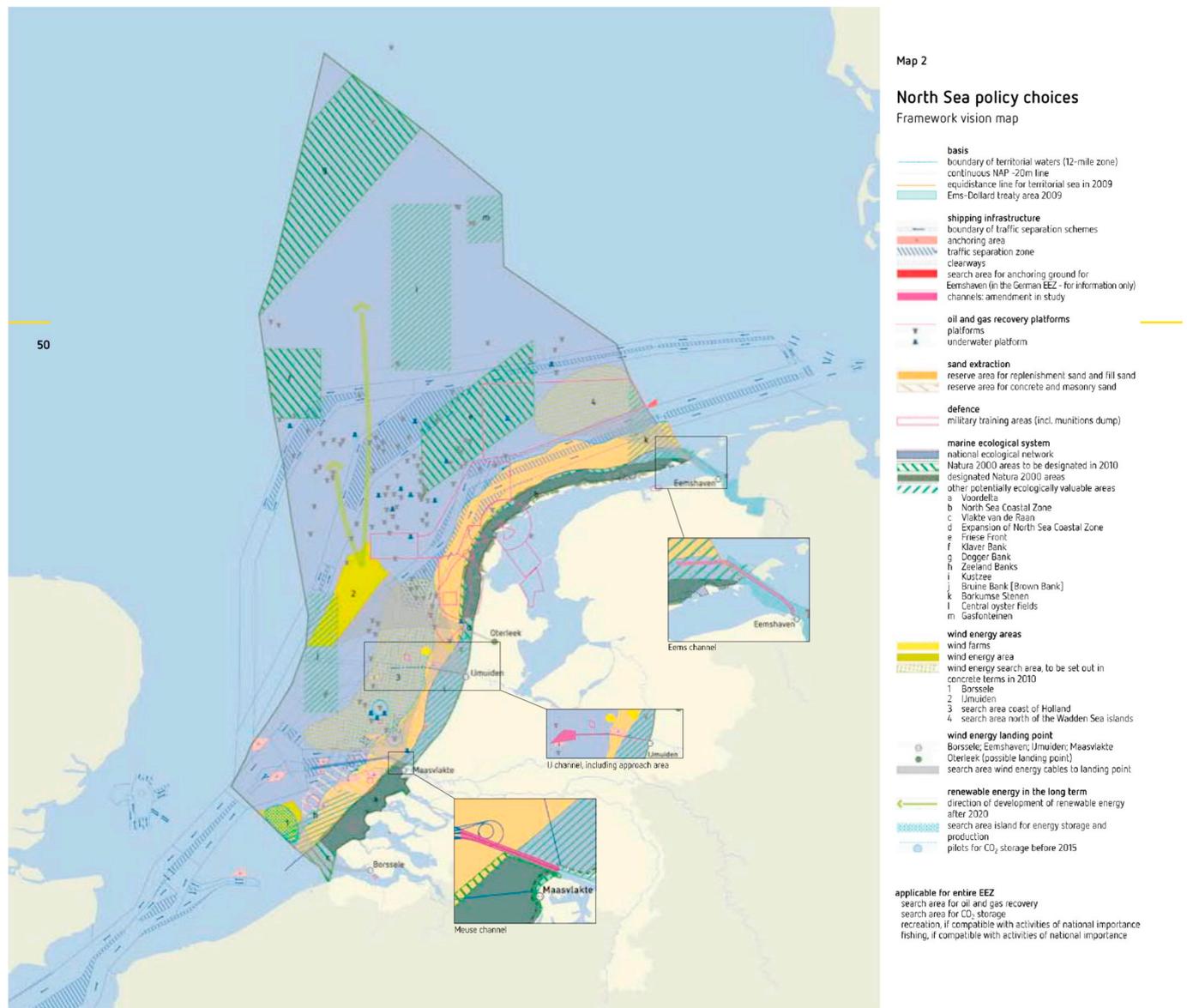


Fig. 2. Marine spatial plan 2009–2016.

National Water plan has a time horizon up to 2020.

A more formal consultation on the draft policy was organized by the formalised consultation process of the Ministry of Infrastructure and Water Management. Under the independent chair of a major of a city, representatives of organized stakeholder groups regular are consulted on plans of the Ministry and requested to send their advice to the Minister. The formal procedure for consultation starts when the draft policy is published by the Cabinet of Ministers.

Neighbouring countries were also consulted, as required by the Espoo Convention [9] when the draft is published. This did not lead to any comments. The Integrated Management Plan 2015 was updated in accordance to the changes in the National Water Plan of 2010.

5. North Sea vision 2050 and second National Water Plan 2016–2021

5.1. North Sea vision 2050

In 2013 the Ministry of Infrastructure and Water Management, together with the Ministry of Agriculture and Nature initiated a discussion and consultation with stakeholders on what would be the desirable future of the North Sea in 2050. This intensive informal consultation during several sessions involved a broad mix of stakeholder representatives although the representatives from the wind-sector did not participate. This may be due to the fact that their sector had already been allocated 1000 km² for wind farm use. From the beginning it was clear to all participants that this process would not lead to new policies but merely shows the way to a desired or possible future. Through being clear on the objectives and managing the expectations, more vivid and free thinking was stimulated. From all these inputs and the analysis made by the Ministries, the following five topics became evident (North Sea 2050 Spatial Agenda [1]: Building with nature—meaning that much more use could be made from using the natural capacities of the ecosystem, for instance in soft defence with sand of the Dutch coast against sea level rise, cultivating seaweed to clean the sea, and a sustainable food supply form a healthy ecosystem [2]; Energy transition at sea—the North Sea has an enormous potential of generating renewable energy, mainly wind and less by waves and currents and tides that can be developed beyond the 3,5 GW that is planned until 2023 [3]; Multiple use of space—the vision of 2050 is that users will already be obliged to take another use into consideration at an early stage. The exception to have only a single use is limited to those cases whereby the vulnerability of the marine environment in that locations requires this [4]; Connection between land and sea—connecting challenges and developments on land and at sea will bolster the identity and economy of coastal areas. In addition to the physical relationship between coast and sea (connecting cables, shipping routes) and the relationship between the coast and marine ecosystem, coastal areas are a breeding ground for new developments at sea; and [5] Accessibility and shipping—there will be large changes in maritime transport due to changes in society, but safe and environmentally friendly shipping, the accessibility of Dutch ports, and good passage are ambitions for shipping that will prevail for both the present and the future [10].

5.2. North Sea Policy 2016–2021 as part of the National Water Plan

This non-binding vision was endorsed by Cabinet and used as guidance for the development of a renewed policy for the North Sea 2016–2021 [11]. The Water Act itself requires a renewed policy every six years. But there were also another three reasons to adapt the policy

of 2010.

First, although in 2010 the wind areas at sea were allocated in space, in 2014, a policy for subsidizing the development of these areas came into force. The target was to develop 3,5 GW of wind energy in the period up to 2023 in these allocated areas. However, in 2013, shipping routes changed in front of Rotterdam Harbour due to the extension of the harbour into the sea with a size of 200 km². Because of this change, some of the allocated wind areas needed to be changed as well.

Secondly, the policy on sand mining changed. It was common to extract sand with a thickness of 2 m from a zone that has a depth of 20 m below sea level. While building the extension of Rotterdam harbour, an experiment to mine the sand not with a thickness of 2 m but of 20 m, reducing the size of the impact by 90%. By experimenting with the slope and monitoring the results, it was learned that re-colonisation with benthic species was possible under these circumstances within 3–5 years.

Thirdly, measures had to be taken to comply with the requirements of the Marine Strategy Framework Directive, the EU legislation [7] that requires Member States to work together with neighbouring countries to achieve “good environmental status” of the sea in 2020. For this, eleven descriptors were identified that are a combination of status descriptors like biodiversity, fish stocks, sea floor integrity and pressure descriptors like eutrophication, hazardous substances, underwater noise and marine litter. Through a consultative process with all stakeholders, the state of the marine environment was assessed, described and compared to the defined good environmental status standard. Measures that would lead to this good status were defined and incorporated in this new Policy Document for the North Sea.

During the drafting of the revised policy on the North Sea, use was made of the ongoing public consultations on the development of wind energy at sea, the development of the measures for the MSFD, and on the development of the long term vision, in order to be efficient and prevent consultation fatigue. In addition, the formalised consultation routine of the Ministry was used again (as it was in 2008/2009). The whole process ended with the formal public consultation on the published draft plan, as part of the National Water Plan. Each comment was registered, answered and used in the final version. The final policy document was published together with a document describing all the reactions and what was done with them in light of the final policy plan.

The policy document also contains a map (see Fig. 3) and rules that apply for different uses. Of course, an evaluation of the previous policy was made as well as a description of the development of all the uses of the North Sea. These findings were used in designing the new policy. As a boundary condition, the Natura 2000 areas were recognized as MPAs. This also applied for the three MPAs in the EEZ since the necessary legislation for the EEZ was at last in place in 2016. As in 2010, the main allocation of space is for the six main sectors with national importance: shipping routes; oil and gas installations; carbon capture and storage (although no real CCS project exists); renewable energy; defense areas; and sand mining areas. Also rules were made to resolve potential conflicts between these priority functions. For new activities a revised assessment framework will be applied.

The national plans and policy documents focused on the main sectors and the MPAs. More detailed plans for a region or area are nested in the overall spatial plan for the sea. As an example can be mentioned that for the allocated MPAs in the North Sea Policy management plans for each of these MPAs were developed with more detailed arrangements on what is allowed, with or without restrictions and what not. Of course, the development of these management plans have an intensive, probably even more intensive than at national level, stakeholder

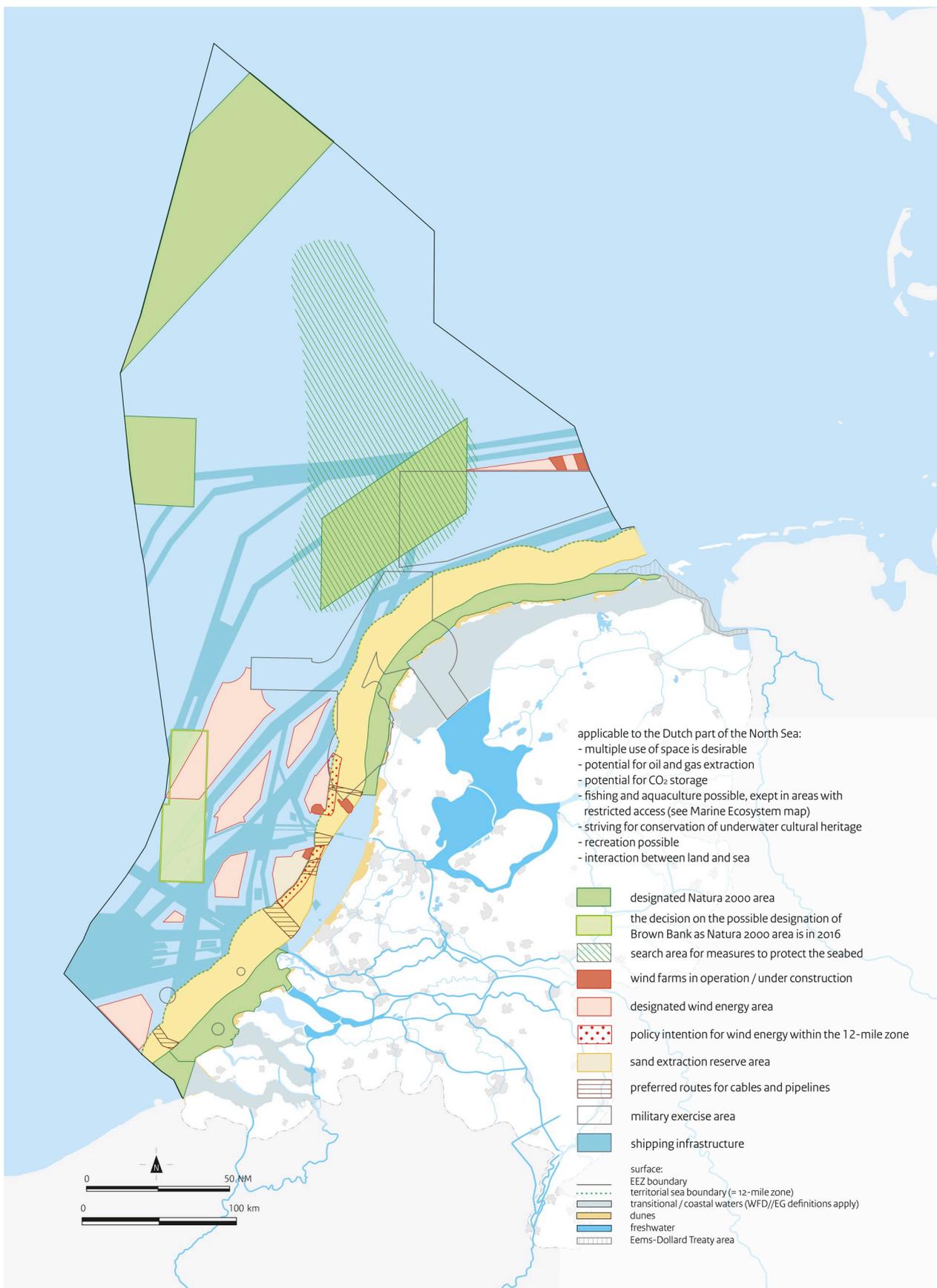


Fig. 3. Marine spatial plan 2016–2021.

process.

6. North Sea Strategy 2030

6.1. Enormous challenges

In 2015, the global climate agreement of Paris was signed by almost all countries of the world. The Netherlands faces the challenge of making the production and use of energy more sustainable.

From calculations how to achieve a reduction of CO₂ of 80–95%, it became clear that next to energy use reduction and renewable energy production on land, an enormous amount of production of renewable energy at sea would be needed. Estimates went into a direction of 250 GW in the Southern part of the North Sea in 2050 or 25,000 turbines of 10 MW each. It became clear to the politicians of the North Sea countries that the present speed and manner of developing renewable energy at sea would not bring us close to these possible targets. Ministers of 10 countries¹ and the EC signed in June 2016 a political declaration to explore the opportunities for a more efficient energy transition through cooperation. Four working groups were established: on MSP and environmental impacts; on interconnectors between countries; on financial instruments; and on techniques.

In the Netherlands, the already designated wind-farm zones appear to be adequate for the construction of wind farms up to 2023. An offshore wind energy roadmap was published in 2018, that provided certainty for the period after 2023. According to the new government (in charge since October 2017), another 7000 MW is required until 2030. Up to 2023, an average of 700 MW/yr is to be built during five consecutive years and onwards to 2030, a minimum of 1000 MW per year. Probably around 90% of this amount would fit in already designated areas but new areas have to be designated again, certainly for the period after 2029.

This increase in wind energy and with this its connections through

cables and the routing of ferries is one of the reasons to prepare a new policy that will give direction to the extensive developments in the North Sea, now and in the decades ahead. As there is already a long-term vision 2050, it also became obvious that a strategy was needed to bring us closer to this vision—the North Sea Strategy 2030.

Wind farms, along with other forms of sustainable energy generation, affect the marine ecosystem. These effects accumulate in space and time, and it is extremely important that an adequate assessment of the nature and magnitude of this accumulation is carried out. The extensive spatial claim for further development of offshore wind energy also has an effect. This claim can conflict with the need to keep space free to ensure that the ecosystem functions naturally in accordance with the frameworks of Natura 2000 and the European Marine Strategy Framework Directive (MSFD). Conflicts can also arise with other functions, such as shipping, coastal development, recreation, the fishing industry and the preservation of underwater heritage, e.g., shipwrecks. On the other hand, there are ample opportunities for the multiple use of space in wind farms. The formulation of new policy to harmonize all these factors properly requires tight coordination and intensive cooperation among ministries, economic and social sectors and the knowledge world.

6.2. Process under way

Steps towards a long-term strategy were taken in 2016 and 2017, but this development process did not start from scratch. The partners in the North Sea Interdepartmental Directors' Consultation, IDON, and stakeholder groups, had already drawn up the 2050 North Sea Agenda in preceding years. Various partners from economic sectors, knowledge institutions and government are currently building a long-term strategy on the basis of the 2050 North Sea Agenda. Important aspects are: energy from water, seaweed cultivation and making shipping sustainable. A great deal of attention is also being paid to the change of state

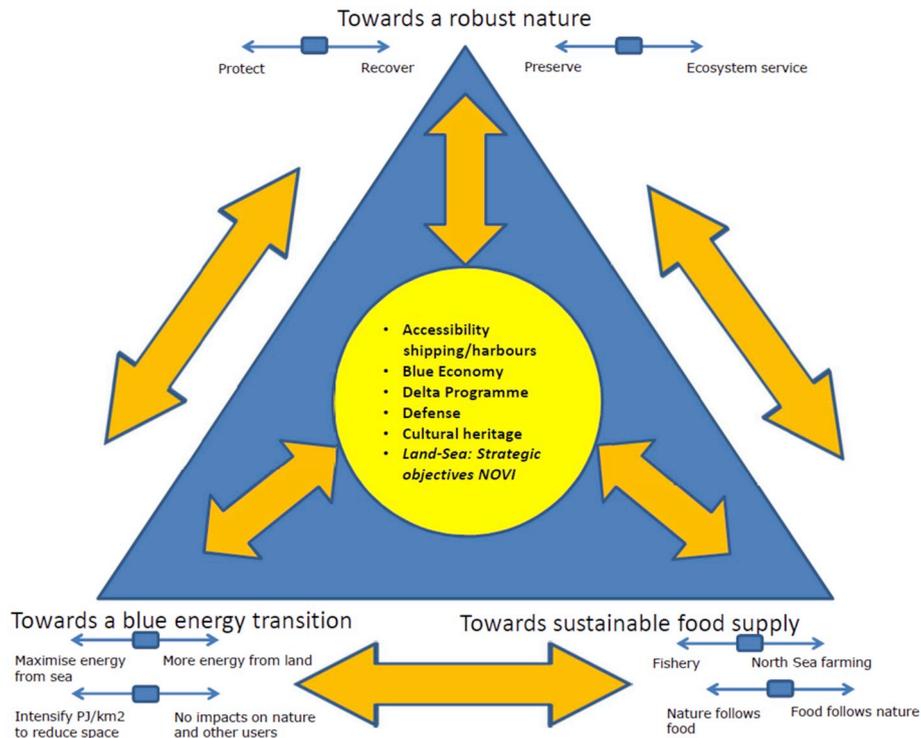


Fig. 4. Tension between energy, food and nature.

¹ Norway, Sweden, Denmark, Germany, Netherlands, Belgium, Luxembourg, France, UK and Ireland.

that is taking place, or must take place, in the fishing industry. However, contributions from the participating parties strongly suggest that three particular strategic challenges are the driving factors behind the long-term strategy. They are [1]: development toward the recovery of a healthy and vigorous natural environment [2]; sustainable energy provision; and [3] a future-proof and sustainable food supply (see Fig. 4). This is because it is mainly these three ‘agents of change’ that determine how the situation at the sea will change, and because conflicts between those can only be solved in conjunction with each other and together the other designated uses of the North Sea.

6.3. Acceleration

In line with the intentions of the new *Omgevingswet* (Environment and Planning Act of 2017 [12]), the development of the 2030 North Sea Strategy has evolved into a broadly-supported participation process. The 2024–2030 offshore wind energy road map was ready by the beginning of 2018. This means that harmonization with other users is urgent, both from a spatial-economic perspective and within the boundaries of a healthy North Sea ecosystem. All users have an interest in sufficient investment certainty. The opportunities offered by the North Sea and its space cannot be afforded to be missed. Moreover, the EC requires that the frameworks for support, recovery and sustainable use of the marine ecosystem be revised when the MSFD is implemented (second round) in mid-2018. As a result, the 2030 North Sea Strategy will not only interact directly with the 2024–2030 offshore wind energy road map, but also with the creation of frameworks based on the MSFD and the MSP Directive [13].

A 2030 North Sea Agenda must be ready in the summer of 2019. This agenda will contain the strategic challenges – including timing, areas of tension and opportunities – with the related key options for national and (international) investment, knowledge and cooperation agendas. The strategic agenda will also outline the challenges, that are already casting their shadows, and the national scope for policymaking within the European and global regulatory frameworks.

7. Monitoring and evaluation

An important and integral part of MSP is monitoring and evaluation. There are different types of monitoring, e.g., monitoring the state of the marine environment. This is a continuous task and feeds the assessment of the objective to have healthy ecosystems, as required by the MSFD. But also when there is uncertainty or knowledge gaps in the assessment of potential impact of an activity for which a license is applied, through monitoring the knowledge gaps can be filled or the uncertainty reduced. This is adaptive management. In the assessment of the state of the marine environment as required by the MSFD, it became clear in 2014 that for instance more sea floor areas needed protection against bottom trawling in addition to some of the Natura 2000 areas. As part of the North Sea Strategy 2030, these new areas will be allocated after lengthy discussions with the stakeholders involved (fishermen and green NGO's).

The second type is to monitor the developments within sectors and policy requirements of the government. Are outcomes consistent with what was expected when the plan was drafted? As shown, policies with regard to renewable energy changed rapidly. Each new plan had to incorporate these new and higher objectives by allocating areas for renewable energy development.

The third type is to monitor the implementation of agreed actions. Are they successful and are the results as expected? This can also include the performance of the management of policy implementation.

The frequency and intensity of the monitoring depends on the dynamic of the elements one wants to evaluate. For instance, some features show annual changes, some summer/winter changes. The latter requires more frequent monitoring. The data and information gathered through the monitoring forms input to the evaluation and adaptation

process. The Rijkswaterstaat uses a simple but logical model: “Plan, Do, Check, Act” After the “Plan” phase, the implementation phase starts (“Do”). Regular there is the “Check” through monitoring and evaluation if the plan evolves as expected. If not, in the “Act” phase the plan is adapted. If urgencies require, this adaptation can already take place in between two full planning cycles. Monitoring data can also be acquired through the granting of a permit for a new activity with the obligation to monitor the impacts so that for later licenses of this kind of activity, lessons can be learned and directly applied. A requirement is that these monitoring results are available to the competent authority. As the first wind farms were built and monitoring started, it was learned that for certain aspects (especially underwater noise and its impact on fish larvae and the diameter of the disturbance area for marine mammals) the restrictions given because of the precautionary principle, could be lifted to a less strict regime. It also was the start of the development of a Framework for Ecology and Accumulation that could be applied in the planning phase as part of the Strategic Environmental Assessment of the marine plan.

8. Discussion

The reasons for regular adaptation of MSP are many [1]: because the legislation requires this at a regular interval [2]; because of evaluation of performance of the system or the implementation of the actions and policy; or [3] because of new government direction with new policies objectives or changes in developments from outside. The question is to what extent one wants to change the plan since the plan also needs to have continuity to stimulate investors from the private sector for certain developments. Therefore, it is essential to have an agreed longer-term vision that is robust and can guide the direction of the desired developments at sea. In addition, continuous monitoring and regular evaluation are necessary to inform adaption: from adaptation of license conditions to adaptation of the whole marine spatial plan. In the Netherlands, the change in policy direction coincided with the requirement by legislation to review the marine plan every six years. There was only a partial revision of the marine plan 2016–2021 on the aspect of wind energy after its adoption by the end of 2016, the Structural Vision Amendment [14]. This amendment was needed because there was a need for extending two already allocated wind farm areas with a zone between the 10 and 12 nautical miles to comply with the required objectives in a more economic manner. This change came too late for the North Sea Policy 2016–2021 process. Legislation required a new adopted plan by the end of 2015. The seemingly smooth process of developing spatial plans at relatively high speed and at a regular interval is probably the result of a number of conditions and characteristics. Also in the Netherlands problems and issues have to be overcome, as in any other country. For instance, in the beginning, the oil and gas industry looked at the new wind development plans as a threat to their business opportunities. Could they still explore new oil and gas fields when wind farms are built? Also they saw wind mills as a threat to their operations as the platform with a helicopter deck for bringing in people and goods requires a 5-nautical mile free obstacle zone. The shipping and harbour sector was afraid that the normal safety distance of 500 m around an obstacle at sea would not be enough when there are multiple objects such as wind mills. Especially in the process of developing the Marine Plan 2016–2021 good discussions were held with the representatives of these sectors. This resulted in, for instance, design criteria to apply between shipping lanes and wind farms, depending on the length of the main ships. The distance now varies between 1,24 nm (port side 300 m vessel) and 1,87 nm (starboard, 400 m vessel) as a safety zone. Scientists, captains of commercial vessels and modeling for ship-simulators were involved to come to this agreement and rules that were afterward forwarded as guidance to the International Maritime Organization.

But first of all, there is good legislation in place (under the Water Act) and the governance is well arranged. One Ministry, the Ministry of

Infrastructure and Water Management, has the responsibility to coordinate North Sea matters. This Ministry also chairs the board of directors of all relevant departments who together prepare decisions by the Ministers. In the Netherlands, there is a long history in finding compromises (known as ‘polderen’), through lengthy debates. There is a frequent dialogue with the different stakeholders, at different levels (policy advisors, directors, Director General and Ministers) and at all stages of the process. This results often in a final draft document in which most of the issues already have been solved. The spatial policy is development oriented, leaving room for changes and adaption but with an agenda made by the national government to fulfill the agreed objectives (such as the urgency to find space for renewable energy at sea).

Not all sectors are always satisfied with the result, despite the intensive consultation process. Especially the fishing sector is one that experiences developments that threaten its existence. In addition to restrictions from EC policies and the Brexit discussion it area a reduction in areas where it can fish due to spatial developments at sea, e.g., restrictions in nature and wind farm areas). The biggest challenge for the near future is to find solutions for the societal demands that also can be supported by this sector.

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