
STRATEGIC ENVIRONMENTAL ASSESSMENT IN CONNECTION WITH LICENSING ROUNDS WEST OF 6° 15' E IN THE DANISH PART OF THE NORTH SEA FOR EXPLORATION AND PRODUCTION OF HYDROCARBONS, AND LICENSING OF PERMITS FOR INJECTION OF CO₂ IN EXISTING OIL FIELDS FOR THE PURPOSE OF EOR.

SUMMARY REPORT

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1. INTRODUCTION

The Danish Energy Agency (DEA) has prepared an environmental report entitled "Strategic environmental assessment in connection with licensing rounds west of 6 degrees 15 minutes east in the Danish part of the North Sea for exploration for and production of hydrocarbons, and licensing of permits for injection of CO₂ in existing oil fields for the purpose of EOR", July 2012. In July 2012, the report was submitted for public consultation among public authorities etc. in Norway, Germany, the Netherlands and Great Britain. The consultation responses were subsequently submitted to the DEA, which processed them and prepared this summary report on the basis of the responses.

The background to the report is that the Ministry of Climate, Energy and Building is in the process of planning future licensing rounds for new licences for the exploration and production of hydrocarbons in the western part of the North Sea 125-300 km west of the west coast of Jutland. Hydrocarbon production is already underway in the area. As a result of a few oil companies' deliberations concerning the injection of CO₂ into existing oil fields with the aim of increasing oil recovery from the fields (EOR), the report also covers the possible use of such measures.

In connection with a government plan to invite applications, an environmental assessment is to be carried out in accordance with the applicable provisions of Consolidated Act No. 939 on Environmental Assessment of Plans and Programmes of 3 July 2013; see Directive 2001/42/EC. The purpose of the environmental assessment is to identify, describe and assess probable important impacts of the plan on the environment and other activities such as fisheries, which could be affected by the activities comprised by the plan. This summary report has been prepared on the basis of the consultation responses that have been received and made available to the consulted authorities and published. This report explains how the plan for the licensing rounds will make allowance for the outcome of the consultation before the plan is finalized; see section 3.1.

The environmental report presented is solely an environmental assessment of a plan in order to enable companies to apply for licences for the exploration and production of oil and gas and for permits to inject CO₂ into existing oil fields for the purpose of EOR. The execution of specific projects is covered by the provisions concerning environmental impact assessments (EIA)¹. Such projects will therefore be subject to a thorough environmental assessment based on specific information concerning the projects concerned, as is also the case for projects aimed at the production of oil and gas.

Before invitations can be issued for both applications for licences for the exploration and production of oil and gas and, if it should prove appropriate in the future, applications for permits to inject CO₂ in oil fields for the purpose of EOR, the Minister for Climate, Energy and Building will prepare a statement on areas and general conditions for the Climate, Energy and Building Committee of the Danish Parliament in accordance with the provisions of the Subsoil Act.

Based on the consultation responses etc. that have been received, there seems to be a general perception that the environmental report concerns specific projects for the injection of CO₂ in the oil fields for the purpose of EOR. This is not the case. The sole purpose of the environmental assessment is to identify, describe and assess probable significant impacts of future possible activities in accordance with the applicable statutory provisions, with the aim of using them in the licensing round.

¹ The provisions concerning EIA are primarily set out in the Act on the Use of the Danish Subsoil (the Subsoil Act), see Consolidated Act No. 960 of 13 September 2011, the Act on the Continental Shelf, see Consolidated Act No. 1101 of 18 November 2005, and Executive Order No. No. 632 of 11 June 2012 on Environmental Impact Assessment (EIA) concerning international nature protection areas and the protection of certain species in connection with offshore hydrocarbon exploration and production, storage in the subsoil, pipelines etc. (the Executive Order on EIAs).

Any future specific CO₂ EOR projects will only be approved if they can be carried out entirely appropriately from a health, safety and environmental perspective and following completion of an assessment of the effects on the environment in accordance with the EIA rules. If the conclusion is that a project could have significant cross-border effects, the neighbouring country or countries concerned must be consulted in accordance with the provisions of the ESPOO Convention².

In addition, there are no relevant considerations concerning the injection and storage of CO₂ in onshore areas in Denmark. In connection with the Danish Parliament's consideration of the Bill in spring 2011 concerning the implementation of the CCS Directive (Directive 2009/31/EC) into the Danish Subsoil Act, there was political agreement that before CO₂ can be stored on land in Denmark, a decision-in-principle concerning the issue must be taken through a debate in the Danish Parliament once experience of the technology has been acquired internationally. Such experience is not expected to be available until around 2020 at the earliest.

² Convention of 25 February 1991 on Environmental Impact Assessment in a Transboundary Context.

2. BACKGROUND AND PROCESS

The DEA has submitted a proposal for new licensing rounds in the area west of 6° 15' E with a view to exploration and production of oil and gas, as well as separate licensing rounds for permits for the injection of CO₂ in order to increase oil recovery in existing oil fields west of 6° 15' E, and the associated environmental report was subjected to public consultation; see section 8 of the Environmental Assessment Act. The environmental report was subjected to public consultation from 10 July to 25 September 2012. The consultation responses received have been considered and the results of this process are reflected in this report. The proposal for new licensing rounds west of 6° 15' E with a view to exploration and production of oil and gas, as well as a separate licensing round for permits for the injection of CO₂ in order to increase oil recovery from existing oil fields west of 6° 15' E, is collectively referred to as the "plan" and the environmental assessment thus contains general assessments of impacts of future activities in the area west of 6° 15' E.

The plan forms the basis for future licensing rounds concerning areas for the exploration and production of oil and gas, as well as a separate licensing round for permits to inject CO₂ (to increase oil recovery) in existing oil fields west of 6° 15' E. Specifically, the licensing rounds will be conducted through public invitations for applications. The application deadline will be published in the Danish Official Gazette and the Official Journal of the European Union when a draft invitation for applications has been presented to a committee appointed by the Danish Parliament.

2.1. The legal framework for the environmental assessment

According to the Act on Environmental Assessment of Plans and Programmes (see Directive 2001/42/EC), the plans and programmes of public authorities that set out a framework for future installations or area uses must be subject to an environmental assessment when the authority believes that the plan or programme could have a significant impact on the environment. Accordingly, the DEA has prepared an environmental assessment of the plan.

2.1.1. Scoping phase

In connection with the initial scoping of the environmental assessment, which was carried out during the period January to March 2012, the most significant and overarching environmental impacts have been identified for further consideration. All relevant authorities in Denmark have been consulted and given the opportunity to comment on both the plan and the scoping. In addition, the German, Dutch, British and Norwegian authorities were also informed of the plan during the initial scoping phase, see the ESPOO Convention, in relation to any cross-border effects. An English summary was subsequently submitted to the affected neighbouring countries for consultation. The German and Dutch authorities concluded that the plan and its associated environmental assessment should be subjected to public consultation in their respective countries. No comments were received from the British authorities, while the Norwegian authorities noted the information.

2.1.2. Environmental assessment

The environmental assessment has been prepared on the basis of the results of the scoping phase. The environmental report encompasses an introductory description of the anticipated project activities in connection with the exploration and production of oil and gas, as well as the injection of CO₂ in order to increase oil recovery from existing oil fields west of 6° 15' E. A description of the environmental status in the plan area is then presented.

The environmental assessment does not replace an EIA report for specific projects, see section 4(1) of the Executive Order on EIAs, an EIA screening of exploration wells for example, see section 4(2) of the Executive Order on EIAs, or impact assessments of activities which could have significant impacts on a habitat, see section 9 of the Executive order on EIAs. Any subsequent EIA report must deal with all relevant environmental factors; see section 4.2.2 regarding planning, environmental assessments and monitoring programmes.

During the scoping phase, it was concluded that the environmental report should place emphasis on the extent to which marine mammals and fish eggs and larvae were affected by noise from seismic surveys and pile-driving in connection with the drilling of wells. In addition, the impacts on birds as a result of increased noise, light, disruption caused by shipping traffic and collisions with fixed structures are considered in more detail. It was also concluded that the effect of fisheries and other socio-economic activities could have an impact. The potential effects are probably cross-border in nature and this aspect was also considered to be significant. Potential impacts on water, air quality and other fauna were not considered significant.

2.1.3. Publication and consultation

The environmental report was subjected to public consultation during the period 10 July to 25 September 2012. The report was also submitted for consultation to the British, Dutch, German and Norwegian authorities. The report was translated into English and German for this purpose. The German authorities requested an extension of the consultation deadline to 15 October 2012.

2.1.4. The requirements for the summary report

In connection with the final issuing of the plan, a summary report must be prepared pursuant to section 9(2) of the Environmental Assessment Act. The report must cover the following:

- The way in which environmental considerations have been integrated into the plan.
- The way in which the environmental report and responses received during the public consultation period have been taken into consideration.
- Why the plan has been chosen on the basis of the listed alternatives.
- How the authority will monitor the key environmental impacts from the implementation of the plan.

2.2. Adoption of the plan

Following the public consultation process, Minister for Climate, Energy and Building Martin Lidegaard decided to implement the plan for licensing rounds for areas for the exploration and production of oil and gas, as well as a separate licensing round for permits for the injection of CO₂ to increase oil recovery from existing oil fields west of 6° 15' E. The area is shown on figure 2.1.

Section 3.1 and chapter 4 of this report describe the conditions that will and may be imposed in order to minimize the effects of noise on marine mammals in connection with licences and permits for seismic surveys and drilling. The conditions applicable to these activities are partly a result of the public consultation process concerning the environmental assessment.

The final version of the plan, complete with the associated environmental report and summary report, was published in accordance with the provisions of the Environmental Assessment Act on the DEA's website on www.ens.dk. Specific invitations for applications for the area west of 6° 15' E in the Danish part of the North Sea with a view to exploration and production of oil and gas will be published in the Danish Official Gazette and the Official Journal of the European Union when a statement concerning areas and general conditions has been submitted to the Climate, Energy and Building Committee of the Danish Parliament.

The licensing round for permits for the injection of CO₂ in existing oil fields for the purpose of EOR is not expected to be initiated until companies have specifically expressed an interest in CO₂ injection.

3. INTEGRATION OF ENVIRONMENTAL CONSIDERATIONS AND THE SIGNIFICANCE OF THE ENVIRONMENTAL REPORT

3.1. Integration of environmental considerations

This section gives an account of the way in which environmental considerations have been integrated into the "Strategic environmental assessment in connection with licensing rounds west of 6° 15' E in the Danish part of the North Sea for exploration and production of hydrocarbons, and licensing of permits for injection of CO₂ in existing oil fields for the purpose of EOR", see the Environmental Assessment Act, section 9(2)(i).

An environmental assessment has been carried out alongside the preparation of the planning proposal. The DEA believes that the preparation of the environmental assessment parallel to the planning proposals has helped identify and clarify relevant problem areas at an early stage. In this way, a number of environmental considerations have already been integrated in order to avoid, reduce and/or compensate for any adverse environmental impacts on the surroundings. These environmental considerations are described in more detail in chapter 4, section 3.1 and the associated environmental report.

Based on the consultation process that has been carried out, a number of clarifications have been made in relation to activities that could have a significant impact on marine mammals (seismic surveys, pile-driving in connection with drilling operations and noise-generating activities in connection with development activities); see section 4.2.4. Table 3.1 shows the measures that the DEA is planning to implement as a result of the environmental report and the consultation responses received.

It has also been made clear that an exploration and production licence will be subject to the laws applying in Denmark from time to time. A licence will therefore not exempt the licensee from the obligation to obtain all other necessary permits that follow from the Act on the Use of the Danish Subsoil and other legislation, including environmental legislation (e.g. EIA and impact assessment).

A preliminary assessment has also been carried out to determine whether a nature impact assessment should be carried out; see the Habitats Directive. The assessment is presented in Appendix 2 and the conclusion is that no nature impact assessment need be carried out. In connection with specific projects, a requirement may however be imposed for a nature impact assessment to be carried out.

3.2. Significance of the environmental report

The environmental report and the subsequent consultation process have helped identify relevant problems in connection with the preparation of the plan for licensing rounds west of 6° 15' E in the Danish part of the North Sea for the exploration and production of oil and gas, which is expected to be published at the end of 2013, and a separate licensing round for permits to inject CO₂ in existing oil fields for the purpose of EOR. The report has also helped ensure that a number of considerations relating to nature and environmental protection have been integrated into the plan.

3.3. Measures resulting from the environmental report and consultation responses

Table 3.1

1.	Noise - marine mammals	Based on the work that is underway in connection with the Marine Strategy Directive, including the preparation of monitoring programmes and action plans (see section 4.2.2.3), items 1a., 1b., 4. and 5. are being coordinated with this work where relevant. The DEA will re-evaluate its practice procedures by no later than 15 July 2014 when the above-mentioned monitoring programmes and action plans will be available.
1a	Requirements concerning sound radiation models in applications for seismic surveys and drilling, and a description of alternative technologies	It will be a requirement in future that applicants for licences and permits for seismic surveys and drilling must document sound radiation associated with the planned survey using a model. The applicant must also give an account of alternative technologies that could be used to carry out the activity. Information on sound propagation in the application and the use of alternative technologies will be taken into consideration in the DEA's assessment of the activity's impact on marine mammals in the survey area.
1b	Guidelines in connection with seismic surveys	Based on the work that is underway in connection with the Marine Strategy Directive (see item 1. in this table and the work that is being initiated under item 1c.), the DEA is preparing guidelines concerning procedures and conditions for seismic surveys and drilling. The guidelines will also describe preventive measures and restrictive conditions which could be imposed on applicants. The DEA believes that the conditions and procedures for seismic surveys and drilling relating to noise that are imposed will vary depending on the location, time of year and duration of the survey etc. For example, one requirement for the approval of the drilling of a well could be that noise generated in connection with the driving of casing must be measured if the well is to be drilled close to an international nature protection area. The guidelines will also state that applicants must give a description of the use of alternative technologies in connection with the activity. These circumstances will be considered conclusively in connection with the determination of new procedures; see item 1. above.
1c	Alternative technologies and new types of preventive measures	At the end of 2013, the DEA will initiate a study concerning alternative technologies which could be used as a supplement to or substitute for seismic surveys and new types of preventive measures in order that the applicants should give an account of possible uses of alternative technologies in applications for licences for preliminary investigations. The study will be updated every other year to ensure that new types of technology and preventive measures are regularly assessed and, if deemed relevant, included in the DEA's guidelines (item 1b.) concerning seismic surveys and drilling.
2.	Monitoring of seismicity in the planning area	In collaboration with the Geological Survey of Denmark and Greenland (GEUS), the DEA will initiate a study of seismicity in the planning area. The purpose of the study is to assess the number of earthquakes that can be detected, and the lower limit of detection (on the Richter scale), with the current network of seismographs both in Denmark and other countries, as well as the potential to improve the level of detection. The study is expected to be initiated during the fourth quarter of 2013.

3.	Development – baseline study	If the DEA believes that the database in connection with applications for development (section 10 of the Subsoil Act) is too sparse, the DEA will impose a requirement for applicants to carry out a baseline study.
4.	Cumulative effects	In connection with the work that is underway under the Marine Strategy Directive, the DEA will review practice procedures; see item 1. of this table.
5.	Improve knowledge of the planning area.	EIA reports and monitoring programmes can be coordinated with the monitoring that is initiated in connection with the Marine Strategy Directive, thereby contributing further knowledge of the planning area in the North Sea. This will be clarified conclusively in connection with the work to prepare monitoring programmes and action plans; see item 1. of this table.
6.	CO ₂ projects (EOR)	The DEA will focus on the project-specific details in connection with any specific CO ₂ project (EOR), including any environmental impacts which could arise from such a project.

4. THE PUBLIC CONSULTATION PHASE

This section describes how the consultation responses received in connection with the public consultation phase have been considered by the DEA; see the Environmental Assessment Act, section 9(2)(i).

4.1. Consultation responses

During the public consultation phase, consultation responses were received concerning the plan and the associated environmental report. The consultation responses are reproduced in summary form in Appendix 1, "White Paper". The full consultation responses have not been enclosed with this report, as the material is too comprehensive. Information on the consultation responses can be obtained from the DEA, ens@ens.dk, or Amaliegade 44, 1256 Copenhagen K. The responses will also be made available on the DEA's website www.ens.dk.

During the consultation period, two consultation responses were received from Great Britain, eight from Denmark and 829 from Germany. Many of the consultation responses from Germany are identically worded letters or opinions submitted through a signed petition. A total of 19 of the responses from Germany occur twice, which reduces the number of responses from Germany to 810. No consultation responses were received from the Netherlands or Norway. The consultation responses received during the consultation period were received from citizens, public authorities, NGOs, stakeholder organizations, politicians and a university.

All consultation responses have been assessed and integrated into the plan insofar as is relevant.

The DEA's remarks can be seen next to each consultation response in the White Paper, Appendix 1, while reference is made to a collective consideration of many recurring themes, presented in section 4.2 of this chapter, where the DEA's reply, remarks, clarification and/or assessment of the issue can be found. Next to some of the consultation responses in Appendix 1, references are made to one or more sections in this chapter.

The far column in Appendix 1 contains one or more numbers which refer to the list that can be found at the back of Appendix 1. The list is an overview of the parties that have submitted consultation responses to the environmental report and the plan. By comparing the number in the column with the number in the list, it is possible to find the respondee that submitted a particular response. A number of the respondees have submitted the same response, hence the same number may be found next to several respondees in the list at the back of Appendix 1.

The DEA has asked NIRAS, the consultancy firm which prepared the environmental assessment for the DEA, to give its assessment of the recurring multidisciplinary problems and some of the consultation responses; see Appendix 1. In some cases, NIRAS has consulted Aarhus University (DCE – Danish Centre for Environment and Energy), who are Denmark's experts within the environmental field. In addition, the DEA has consulted the Geological Survey of Denmark and Greenland (GEUS), particularly in connection with the consultation responses which concerned earthquakes in the Danish part of the North Sea.

4.2. General remarks concerning consultation responses

4.2.1. Level of detail and data underlying the environmental assessment

References and underlying data have been acquired via searches in the databases of scientific periodicals (such as Scopus and Web of Science), as well as via searches on Google and Google Scholar. Information has also been obtained based on the EIA reports that have previously been prepared by DONG Energy and Mærsk Olie og Gas. In addition, Aarhus University (DCE) has also provided supplementary information concerning the database for birds and marine mammals. A list of the literature used in the report has been drawn up. References to scientific articles have been made by identifying them in the report itself. The references are not presented in the same way as in scientific works, as there is no requirement for references to be given in this way.

NIRAS and the DCE are aware of surveys and data which concern the area, but which are not yet publicly available. Much of this information originates from environmental impact assessments of specific projects (EIAs) and research projects for specific projects in the area. Wherever possible, information from adjacent areas has also been incorporated. German, Norwegian and British websites have not been systematically checked for relevant literature, as the results of the searches that have been made are considered to be sufficient. Sufficient literature has therefore been incorporated to enable an assessment at a general level which can form a basis for a decision on adoption of the plan.

According to the Guidelines on environmental assessment of plans and programmes (no. 9664 of 18 June 2006), the level of detail in the environmental report should be adapted to the level of detail in the plan. "It would therefore make no sense to conduct a detailed environmental assessment with precise calculations of the anticipated impacts if the plan sets out general framework conditions for future projects (or area usage). The very uncertainty in the environmental assessment could result in a higher level of precision in the plan with the aim of preventing any undesirable impacts on the environment".

It is difficult to carry out assessments based on this plan, as the scope and probability of the activities to be carried out are unknown. For example, it is not known where seismic surveys will be carried out or where any exploration wells will be drilled. This is also noted in the environmental report and in section 4.2.11 of this summary report.

Based on NIRAS' assessment, as set out above, and the reply under section 4.2.4, the DEA believes that sufficient existing information concerning the individual themes has been incorporated or referred to and that the conclusions concerning the environmental consequences are founded on an adequate basis.

4.2.2. Planning, environmental assessments and monitoring programmes

Activities relating to offshore hydrocarbon exploration, production and final decommissioning of obsolete installations have an impact on the environment. In order to permit these activities to take place, it is therefore an important prerequisite that these impacts are identified and controlled in such a way that the consequences are environmentally acceptable.

The various activities affect the environment with varying levels of intensity over different periods of time. Seismic surveys and the laying of pipelines are examples of activities of relatively short duration over a large area. Drilling and the establishment or removal of installations are typically of fairly short duration as well, but result in a more intensive impact on a limited area. However, hydrocarbon production involves a more constant local impact over a very long period of time, and is associated with impacts from air and ship transport via the infrastructure required for such production.

Impacts on the environment come from discharges and any marine spills, atmospheric emissions and changes in the subsoil, in addition to the physical presence of installations and infrastructure on the seabed and in the water column and air space.

As a public authority, the DEA is responsible for the following impacts on climate and the environment: atmospheric emissions of CO₂ from the combustion and flaring of natural gas and diesel oil, the effects of activities on established international nature protection areas and the impact of projects on the environment and the monitoring thereof.

Emissions, discharges and any marine spills are managed by the Ministry of the Environment, partly on the basis of rules and regulations issued under the auspices of the international collaboration under the OSPAR Convention³.

Licences that are issued for the exploration and production of hydrocarbons (exclusive licences) give the licensees an exclusive right to explore and produce oil and gas in the licence area. All activities in connection with such exploration and production must be specifically approved by the DEA and are subject to the laws that apply in Denmark from time to time. This means that the granting of an exclusive to a licensee does not give the licensee an

³ The Oslo-Paris Convention concerns the protection of the marine environment, and covers the North-East Atlantic. The contracting parties consist of 15 countries, including Denmark.

exclusive right to carry out exploration and production activities without the DEA's prior approval of the activities, e.g. for the drilling of a well. In connection with the approval of the activity, the DEA will carry out a specific assessment of the project's impact on the environment in collaboration with other authorities. This could result in conditions (e.g. health, safety and environmental conditions) being imposed in the approval that the licensee must observe when initiating the activity.

Health and safety offshore is regulated by the Offshore Safety Act and associated executive orders. These regulate safety, working environment and other issues of significance to health on offshore installations. The startup of specific activities in accordance with the forthcoming plan will require a permit under this legislation.

4.2.2.1. SEA

The environmental assessment of plans and programmes is sometimes called an "SEA". "SEA" stands for **S**trategic **E**nvironmental **A**ssessment. SEA is the term used for environmental assessments of plans, programmes and political objectives, i.e. an assessment of their impacts on the environment.

The strategic environmental assessment of plans and programmes must be considered a regulatory process superimposed on the provisions relating to EIAs. The strategic environmental assessment of plans and programmes is carried out at the level before the project level, with an assessment being made of whether an EIA report should be prepared, and therefore also at an earlier stage in the decision-making process.

The purpose of a strategic environmental assessment of plans and programmes is to ensure that an assessment of environmental consequences and possible alternatives is carried out while the plans are still under preparation and being considered politically, i.e. before they have been adopted with final effect. This will ensure a high level of environmental protection and that environmental considerations are integrated in connection with the preparation of plans.

With effect from 21 July 2004, rules were introduced to the effect that all plans and programmes that establish a framework for future licences or permits for the development of specific projects are to undergo a strategic environmental assessment. This is now done on the basis of the Environmental Assessment Act. This Act implements Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment.

The Act requires an environmental assessment to be carried out of plans and programmes which could have a significant impact on the environment if implemented. The Act is aimed at the plans and programmes of state, regional or municipal authorities which could have a significant impact on the environment. This particularly concerns plans within a number of sectors which establish a framework for future development, as well as plans which could have a significant impact on a designated international nature protection area. The Act introduces an obligation for the authorities to carry out an environmental assessment of these plans and programmes and to involve relevant environmental authorities in order to establish the scope and content of the environmental assessments. Public authorities and the public must subsequently be consulted concerning the draft plan or programme and concerning the environmental reports that are prepared.

The level of detail in the environmental assessment must be adapted to the level of detail in the plan or programme concerned. All other factors being equal, a more specific and detailed plan will enable a more detailed assessment to be carried out. The chosen level of detail will also depend on what is being planned and how significant the change and impact will be.

This plan has been assessed as being general in nature, as the scope and probability of the activities being carried out are unknown. It is difficult to assess the outcome of a licensing round in advance, i.e. the number of licences that will be granted as a result of the licensing round. In addition, it will not be known where seismic surveys will be performed or where any exploration wells will be drilled. This is reflected in the level of detail of information in the environmental report, as referred to in the environmental report and section 4.2.11 of this summary report.

4.2.2.2. *Plan*

The term “plans and programmes” encompasses various types of planning documents etc. which are drawn up on the basis of the applicable legislation. For example, this could be the Planning Act and the types of plan regulated by it, or other legislation which contains provisions concerning the preparation of plans, programmes, strategies, action plans, development plans and other similar concepts.

The decisive factor will be whether a planning document has a nature or content which means that it establishes a framework for future planning permits in general or for activities which could impact on international nature protection areas.

4.2.2.3. *Monitoring programme*

The plan describes a range of activities which could at some time become sufficiently concrete for a project to exist that will be subject to a requirement for the preparation of an EIA report. At that time, a series of investigations will have to be carried out for the specific project. This could be to provide a baseline on which to carry out assessments, see table 3.1 item 3, but also to provide a basis on which to assess cumulative effects on birds and marine mammals, for example. The assessment of cumulative effects on future projects must be carried out very thoroughly and, depending on the nature and scope of the project, the DEA may require monitoring programmes to be carried out. For example, the DEA's processing of “Assessment of the environmental impact of further oil and gas activities, July 2011”, made by Mærsk Olie og Gas A/S, led to the Danish Nature Agency and Mærsk Olie og Gas A/S entering into a framework agreement on a measuring and monitoring programme concerning the presence and behaviour of marine mammals in the area in light of noise effects. The programme is to be completed and a report presented no later than on 30 June 2014.

It should also be noted that, pursuant to the Marine Strategy Framework Directive, Denmark is required to draw up a monitoring programme and action plans with a view to achieving the goal of a good environmental status in the North Sea. Pursuant to the Marine Strategy Act (see Act No. 522 of 26 May 2010), the Minister for the Environment is required to prepare monitoring programmes that make it possible to observe changes in the condition of the marine areas. These monitoring programmes must have been drawn up and initiated by 15 July 2014. They must provide an overview of the environmental status of the marine areas and, together with the basic analyses, form the basis for the preparation of the action programmes that will ensure fulfilment of the environmental goals. The Minister for the Environment will prepare action programmes which describe the measures that are considered to be necessary in order to achieve the established goals. These action programmes must be prepared by the end of 2015 and initiated by the end of 2016.

The Marine Strategy Directive concerns a number of new issues in relation to the marine environment, including the importance of cumulative effects, the effects of noise and the impact of marine waste. The Directive also requires Member States to reciprocally coordinate their marine strategies at regional level to ensure coherence within the various territorial waters. Where relevant, impending EIA reports and monitoring programmes will be coordinated with the marine monitoring that is initiated pursuant to the Marine Strategy Directive, thereby contributing further knowledge about the planning area in the North Sea.

Chapter 9 of the environmental report also notes that, in respect of the southwestern corner of the planning area, there may be a need to establish a monitoring programme for birds and marine mammals if the German and British plans for wind turbines are realized. Therefore, particularly within this area, the DEA will focus on the need for monitoring in connection with projects where there is a requirement for an EIA report to be prepared.

4.2.2.4. *EIA*

An EIA report must be prepared for a specific project that is subject to an obligation for preparation of an EIA. This means that a number of detailed surveys must be carried out to assess the environmental consequences of the

project, both individually and cumulatively with existing installations and other planned activities. If the project can be expected to impact on an international nature protection area within or outside Danish territory, an assessment of the impacts on international nature protection areas must also be carried out. Before a licence or permit can be issued for the project, the impact assessment must demonstrate that the activity will not damage the international nature protection area. In addition, species that are protected pursuant to the Habitats Directive must not be intentionally disturbed in their natural habitats, particularly during periods when the animals are breeding, nurturing their young, overwintering or migrating, with harmful effects for the species or the population as a result. It is also prohibited to damage or destroy their breeding or rest areas. Only once a specific project has been prepared can a delimited survey area, emissions and sound radiation be defined etc., and only then can field surveys be carried out in order to supplement knowledge about the existing conditions and status in the area concerned.

Upon the submission of an application for a licence, permit or approval for the production of hydrocarbons and pipeline installation in Danish territorial waters and the continental shelf area, a report will normally have to be prepared to assess the effects on the environment (an EIA report). An EIA report must be submitted before the DEA can issue a licence, permit or approval for major projects pursuant to sections 10, 17, 23d, 23k, 23u and 28 of the Subsoil Act and section 4 of the Continental Shelf Act and section 2 of the Executive Order on certain pipeline installations for the transport of hydrocarbons in territorial waters and on the continental shelf. The detailed provisions can be found in Executive Order No. 632 of 11 June 2012 on Environmental Impact Assessment (EIA) concerning international nature protection areas and the protection of certain species in connection with offshore hydrocarbon exploration and production, storage in the subsoil, pipelines etc.

4.2.2.5. EIA screening etc.

Even if a project falls outside the provisions concerning an obligation to prepare a full EIA report, there may still be cases where a project is covered by the provisions concerning EIA screening, e.g. in connection with an exploration well. During an EIA screening, an assessment is carried out according to certain established criteria in order to determine whether a project can be expected to have a significant impact on the environment and should therefore be subject to a full EIA. The criteria according to which the assessment should be made are set out in Appendix 1 to the EIA Executive Order and concern the project's characteristics, the location of the project and the specifics of the potential environmental impact.

4.2.2.6. Impact assessment

Appendix 3 to the environmental report refers to several activities that are not necessarily covered by a requirement for an EIA report. For example, this applies to seismic surveys, but as is also noted in chapter 7 of the environmental report, the DEA must grant its approval before the activity can be initiated. As part of this process, conditions will be laid down with the aim of protecting the environment.

Whales and dolphins are among the species that require strict protection pursuant to Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). These species must not be disturbed in their natural habitats, particularly during the most sensitive periods when there is a risk of harmful effects on the species or population.

When submitting an application for approval of a project, e.g. an exploration well, a development project or a seismic survey, the applicant must include all necessary information about the project and its impact on international nature protection areas, including Natura 2000 sites. On this basis, the DEA will then decide whether an impact assessment is required. Applicants must also submit the necessary information concerning the project in relation to the impact of the project on protected species.

Projects assumed to have a potential significant impact on an international nature protection area will only be permitted or approved if the impact assessment shows that the project will have no adverse effects on the protected area in view of the conservation objectives for the site concerned. The DEA will decide whether the application for

approval of the project must include an impact assessment. The decision will be based on information concerning the project in relation to the impact on international nature protection areas. If the DEA concludes that an international nature protection area in a neighbouring country would be significantly affected, the authorities in the country concerned will be consulted in accordance with the ESPOO Convention.

4.2.2.7. Conditions

The DEA may attach special terms and conditions to a licence, permit or approval for the purpose of protecting the environment, nature or cultural heritage. Such terms and conditions may place restrictions on the project; for example, time restrictions may be imposed on noise-generating activities in some areas to ensure that whales, including porpoises, are not disturbed during periods when the species concerned is particularly sensitive to disturbance, e.g. during the mating or breeding season.

One of the standard conditions included in approvals or licences and permits is that companies must use what is known as a “soft start procedure” when carrying out noise-generating activity, e.g. seismic surveys or pile-driving in the seabed. The soft start procedure involves slowly increasing the sound level from the sound source up to the operational level. If marine mammals are observed at a distance of less than 200 m from the sound source, the soft start procedure must be postponed. The soft start procedure must be carried out in accordance with a set of best practice guidelines prepared by the DCE.

The conditions imposed in connection with a licence, permit or approval for offshore activities will partly be based on the latest data and information concerning the presence and behaviour of the marine mammals that live in the Danish offshore area. The DEA will re-evaluate the conditions as necessary and, if deemed relevant, the DEA will incorporate amendments into its guidelines (table 3.1, item 1b.) for seismic surveys and drilling to ensure compliance with the requirements set out in the Habitats Directive concerning the strict protection of whales, dolphins etc.

4.2.3. Use of EOR in existing oil fields, including CO₂ EOR

Enhanced Oil Recovery (EOR) is an established technique used in the oil and gas industry to increase oil recovery from a given field. It involves pumping a liquid or gas down into the oil reservoir, which increases the flow of oil towards the production wells. The increased flow can be the result of an increase in pressure or a reduction in the viscosity of the crude oil.

In the Danish part of the North Sea, water or natural gas has so far been used as the EOR fluid. In some cases, water injection is combined with fracturing of the reservoir formation using a process known as “fracking” in order to achieve sufficiently high injection rates. In the Tyra Field, the reinjection of dry natural gas has been used to maintain the high rate of gas production during the summer when exports ashore decrease. The aim has been to extract condensate (light crude oil) from the natural gas of a volume corresponding to the capacity of the processing plant.

With water injection, a series of injection wells and production wells are normally used, and attempts are made to locate the wells so as to create a “sweeper” effect in order to “sweep” the hydrocarbons to the production wells.

The use of these techniques (injection, recapture and separation of gas and liquid fractions, utilization of reservoirs for storage) is today considered standard operating practice in the oil and gas industry.

For example, CO₂ has been used in the USA in the same way as water and natural gas and for the same purpose. CO₂ can therefore be considered just one of a number of alternatives when considering EOR solutions.

From a technical perspective, there is very little difference between the handling of CO₂ and the handling of natural gas. The industry has built up a high level of safety in the handling of natural gas, and hydrocarbon releases are rare. It should also be noted that contingency plans must be established in connection with the drilling of wells and execution of development projects for dealing with accidental discharges etc. In addition to the risk of fire and explosion associated with natural gas, many oil provinces are polluted with hydrogen sulphide (sour gas), which

would make inhalation lethal. A special focus has therefore been placed on combating even the smallest releases. Similarly, the use of CO₂ is also strictly controlled, so that the risk of releases is minimized; see the provisions of the Subsoil Act concerning CCS. The natural gas currently being produced in Denmark contains insignificant quantities of hydrogen sulphide.

The use of CO₂ for EOR purposes has therefore been included in the environmental assessment, primarily because it has not previously been used for this purpose in Denmark, not because the EOR technique is new as such. One of the reasons why there has been no interest in CO₂ injection in Denmark in the past is the costs associated with the technique, partly because of a lack of sufficient quantities of low-cost CO₂.

The Danish Nature Agency notes that the oil companies' deliberations concerning the economic aspects of CO₂ quotas and payment for the storage of CO₂ could be a factor in relation to whether or not CO₂ EOR will be used. In addition, in existing fields where well casings and production facilities have not been designed to cope with the presence of CO₂, there are major economic barriers to the introduction of this technique, as new installations which could handle CO₂ would have to be established in these fields. Therefore, the number of fields in which CO₂ EOR will be a possibility is limited. The geology must also be such that CO₂ EOR is possible and able to boost oil recovery.

Given that no specific project exists at present, the environmental report does not describe the impact on the environment of this activity in any detail. The environmental report therefore considers CO₂ injection from a general perspective. Once specific projects have been established, the impacts will be evaluated in detail in connection with the preparation of an EIA report.

If an oil company decides to use CO₂ injection in order to increase recovery, it must have a permit issued by the DEA. CO₂ injection in the subsoil is regulated by the CCS provisions of the Subsoil Act (sections 23 - 23v). An EIA report must be prepared for the project. Pursuant to section 3(1) of the EIA Executive Order (No. 632 of 11 June 2012), a specific project for CO₂ EOR will be subject to the requirement for an EIA report to be prepared to assess the impact of the project on the environment. If the DEA concludes that the project could have significant cross-border impacts, the neighbouring country affected will be consulted in accordance with the ESPOO Convention.

A number of the consultation responses received pointed out that no risk assessment has been carried out in the SEA concerning the injection of CO₂. The risk of blowouts caused by CO₂ and the assessment of the impact on the environment following such an incident cannot be described on the basis of the information that is currently available. This can only be done in connection with an assessment of a specific application concerning the injection of CO₂ in existing oil fields for the purpose of EOR. The implementation of specific projects involving the injection and storage of CO₂ in existing oil fields in the North Sea is covered by the provisions concerning environmental impact assessment (EIA) in the Subsoil Act, as described above. Such projects will therefore undergo a very thorough environmental and safety-related assessment based on specific information concerning a particular project.

A number of consultation responses also point out that the SEA is not founded on a sufficient knowledge base relating to the use of EOR, including the use of CO₂. The preliminary work relating to the plan and the environmental report took into account knowledge and experience concerning the use of EOR, including the use of CO₂, as mentioned previously in this section.

4.2.4. Noise and preventive measures

4.2.4.1. Seismic surveys

Some of the consultation responses that were received questioned whether all relevant knowledge had been taken into account in connection with the preparation of the SEA. When preparing an SEA, it is not practically possible to refer to all studies and scientific articles that have been published over the years relating to the various subjects concerned. Instead, efforts have been made to ensure that the SEA incorporates and refers to sufficient material to

ensure that it reflects the existing knowledge within the individual subject areas and that the conclusions relating to environmental impacts are founded on an appropriate basis.

As an example of this, the consultation responses received noted that the article by Lucke et al. 2009 "Temporary shift in masked hearing thresholds in a harbour porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli" was not considered. With regard to this, the DCE concluded that this article is extremely relevant in relation to the effects of airgun noise on porpoises and should have been included.

Based on the DCE's conclusion above, the article has been reviewed. The article examines which acoustic pressure caused temporary hearing impairment in a porpoise in Fjord & Bælt in Kerteminde. The noise source was a seismic airgun, and consequently the article is sufficiently relevant to be included in the SEA. However, the article contains no information that alters the assumption in the SEA's conclusions: that noise from seismic surveys can cause temporary hearing impairment and permanent loss of hearing in porpoises. Nor does the article change the conclusion that preventive measures must be implemented in connection with seismic surveys.

The consultation responses also contain references to surveys which, for example, describe bottom fauna compositions which deviate from the general description given in the SEA. It is not believed that a more detailed description of the bottom fauna in the areas would alter the conclusions set out in the SEA. The conclusion from the scoping phase concerning the anticipated impact on bottom fauna and flora was that they would not be altered significantly as a result of the change in activity levels following from the plan. The impacts are therefore not considered to be so significant as to warrant further consideration in the environmental report.

The consultation responses received also contain a number of remarks concerning the level of preventive measures. The SEA states that preventive (mitigation) measures could include the following:

- The equipment used (airguns) should be no more powerful than necessary to conduct the survey.
- The survey should be postponed if marine mammals are observed within a safety zone of 500 m from the equipment.
- A soft start procedure should be adopted.

In some cases, a condition may be imposed which requires trained observers of marine mammals to be onboard the survey vessel. The surveys should only be permitted to commence once it has been ensured with reasonable certainty that there are no marine mammals in the area (minimum 200 m from the sound source).

These proposed preventive measures are based on the guidelines that have been established for Greenlandic and British territorial waters.

The safety zone depends on the activity concerned, i.e. noise level, duration, time of year etc. The safety zone will always be a minimum of 200 m from the sound source, which follows the best practice according to the DCE's recommendations.

In connection with the establishment of conditions in a licence or permit to carry out seismic surveys (or pile-driving), the following issues were raised in the consultation responses. The DEA agrees that it would be beneficial to consider these issues:

- An account should be given as to whether it is necessary to conduct seismic surveys or whether existing data could be used instead. However, it should be noted that existing data can be difficult to obtain.
- An account should be given to demonstrate that the equipment used is no more powerful than necessary to conduct the survey, that the duration of the noise-generating activity is no longer than necessary and whether alternative methods could be used.

- In connection with specific seismic surveys, it must be ensured that procedures are established which must be observed in connection with startup, line changes, intervals etc. This will ensure that there are no marine mammals present in the area where the surveys could cause damage.

Where relevant, particularly noise-intensive operations may be omitted in specific areas or during particularly sensitive periods. It should be noted, however, that no defined breeding areas have been identified for marine mammals or areas with a particularly high concentration of fish eggs or larvae, for example, which would immediately trigger a requirement for no seismic surveys to be conducted during certain periods, e.g. during the breeding and mating seasons of porpoises. The possibility that it may be relevant to take into consideration porpoises with young in certain parts of the planning area cannot be excluded when imposing conditions for seismic surveys. Conversely, the DEA does not believe it would be appropriate beforehand to prohibit seismic surveys in certain parts of the planning area or at certain times of the year.

If, in connection with seismic surveys, it is ensured that preventive measures are implemented at a satisfactory level, the DEA believes that surveys can be conducted with reduced environmental impacts.

The SEA does not give a “free ticket” to perform seismic surveys, for example, in the planning area, but it is not possible at the present time to prepare a detailed assessment of the cumulative effects of a particular seismic survey in relation to the other noise-generating activities in a given part of the planning area. The DEA will monitor the work in accordance with the Marine Strategy Directive; see table 3.1, item 1. of this report.

4.2.4.2. Preventive measures relating to noise and requirements for applications

On the basis of previously adopted procedures and the above, the DEA believes that the procedures mentioned below should be introduced (and indeed already have been introduced during the strategic environmental assessment process) in connection with seismic surveys and drilling in the planning area. It should be noted however that many of the requirements set out below, e.g. the soft start procedure, have been a condition for many years. The following conditions will be included in licences for specific projects:

- Use of a soft start procedure, ensuring that seismic surveys and pile-driving only take place at full power after a period at low power, ensuring that no noise loud enough to harm marine mammals is emitted. When the equipment operates at low power, the noise will cause marine mammals to leave the area.
- The survey/operation and associated soft start procedure must be postponed if marine mammals are observed within a safety zone of not less than 200 m from the equipment.
- The soft start procedure must take place over a period of at least 20 minutes.
- If the survey/operation is interrupted for a significant period of time, the soft start procedure must be repeated.
- In connection with seismic surveys, the equipment must be shut down when the transit time between the lines exceeds 20 minutes. Before the next line is commenced, the equipment must be started up again slowly, following the soft start procedure. If the transit time is less than 20 minutes, the equipment may be switched on, although only at reduced power.
- The equipment used (airguns/seismic surveys) should be no more powerful than necessary to conduct the survey.
- In some cases, there must be trained observers of marine mammals onboard the survey vessel and on the drilling rig. This may for example be the case if the survey/drilling operation could have a significant impact on an international nature protection area.
- A log of observations of marine mammals must be kept and a report submitted upon conclusion of the survey.

- The equipment must not be used outside the lines, except in the above-mentioned cases (soft start procedure immediately prior to arrival of the vessel in the survey area and in connection with short transit lines) and for the strictly necessary testing of equipment. The soft start procedure must be followed during the testing of equipment.

It must be stressed that, in connection with each individual project, a specific assessment will be made of the impact of the project on the environment, including on marine mammals. In addition to the above-mentioned conditions, the DEA may impose further conditions, such as a longer soft start procedure, postponement of the starting time for the activity, requirement for an EIA report etc.

The application should include an account as to whether it is necessary to conduct seismic surveys or whether existing data could be used instead. The application must demonstrate that the equipment used is no more powerful than necessary to conduct the survey and that the duration of the noise-generating activity is no longer than necessary.

The cumulative effects of noise are difficult to deal with in connection with an SEA. Some noise-generating activities will differ so much from other activities, both as concerns timing and geographical location, that there will be no risk of cumulative effects. However, with other noise-generating activities, the risk may be considerable. Cumulative effects can therefore best be minimized through the imposition of conditions on specific projects and in connection with EIAs. The DEA will monitor the work in accordance with the Marine Strategy Directive; see table 3.1, item 1.

Finally, it should be noted that when specific seismic surveys are to be approved by the DEA, the approval and associated conditions will be based on the latest information concerning, for example, preventive measures in order to minimize the environmental effects of seismic surveys. To ensure that approvals are based on the most recent information, the DEA will instigate a study; see table 3.1, item 1c.

4.2.4.3. Platforms and transport

As a basis for assessing whether increased noise from platforms, vessels etc. results in a minor impact on marine mammals, it is assumed that the increase in level of activity will be small compared with the current level. There is some uncertainty as regards the extent to which the current noise levels affect marine mammals and as regards which other specific activities could cause cumulative effects in connection with noise generated by platforms or vessels servicing the platforms.

It is therefore also important to stress that, in connection with the possible establishment of a new platform, specific assessments must be carried out as regards how much noise the platform and transport to and from the platform will generate, how much noise is already being generated in the area and which activities and projects could cause cumulative effects. These issues must be reviewed in the EIA report for the project. The conclusion made in the SEA that the anticipated increase in level of activity will only result in a minor impact is not synonymous with a specific project having only a minor impact, regardless of its scope, cumulative effects etc.

4.2.5. Natura 2000 and nature impact assessment

The plan makes it clear that no significant impacts on Natura 2000 sites must occur as a result of the plan. In addition, an appendix to the environmental report has been prepared, which describes the considerations relating to the potential impact of the plan on Natura 2000 sites in the form of a preliminary assessment as to whether a nature impact assessment should be carried out pursuant to the Habitats Directive. Restrictive conditions and preventive measures have been incorporated into the plan to ensure that the impending licensing rounds comply directly with the restrictive conditions. With regard to the material prepared in connection with the individual licensing rounds, restrictive conditions and preventive measures will be imposed insofar as is deemed relevant.

4.2.6. Annex IV species

In addition to designating habitat areas, the Habitats Directive also contains a more general description of many species that are listed in Annex IV to the Habitats Directive, which also applies outside the boundaries of the Natura 2000 sites. These include species in marine and freshwater areas on land. The provisions are basically very restrictive and state that licences may not be granted or plans etc. adopted that could damage or destroy breeding and rest areas for certain species. This restrictive condition has been incorporated into the plan.

4.2.7. Assessment of significant environmental impacts

Chapter 6 of the environmental report presents the results of the environmental assessments in diagrammatic form. This has been done to ensure clarity and to highlight the conclusions that have been drawn. This could mean that they appear more concrete and bombastic in relation to the quality of the information that forms the basis for the conclusions. However, the environmental report repeatedly notes that the knowledge base is limited, but based on the assessments carried out by NIRAS, the DEA believes that it is sufficient to enable the necessary evaluations to be made.

In the consultation responses received, it is noted that the SEA's assessments are based on a limited amount of knowledge within a couple of areas. These concern "Increase in disturbance of resting, feeding, moulting and wintering birds by increased level of noise and vessel activity" and "Increase in collisions of migrating and resting birds with structures or use of structures as 'stepping stones'".

The DEA agrees that the documentation available within both areas is limited. In connection with the assessment in relation to resting birds etc., the SEA places emphasis on ensuring that the relevant species are widely distributed and that the proportion of birds in the planning area is relatively low compared with other parts of the North Sea. With regard to the assessment of collisions etc. between birds and fixed structures in the planning area, a great deal of knowledge is available from environmental monitoring programmes in connection with offshore wind farms. At a general level, it can be said that collisions between birds and fixed structures have the greatest risk of having a significant impact in areas where concentrated bird migration takes place and where birds with a long life-cycle, such as most birds of prey, are at risk of colliding with wind turbines (see for example "E.ON Vind Sverige AB. Rødsand 2 Offshore Wind Farm Post Construction Studies on Migrating Red Kite/Landbirds", DHI 2012).

Even if more information about collisions involving birds and the attraction of fixed structures at sea could be used to improve the knowledge base within the area, it is believed that it would not be of particular relevance in connection with the SEA. This is primarily because no concentrated bird migration takes place through the planning area and because the fixed structures concerned do not include moving substructures (such as wind turbine blades), which often represent the biggest risk factor in relation to bird collisions.

With regard to the noise levels generated by pile-driving and seismic surveys, the conclusion is that the environmental impact will be minor as a result of disturbance and moderate as a result of harmful physical effects and will be of short duration. It is assumed that the density of whales is not great in the planning area (based on existing information) and that, for each individual project, it will be ensured that preventive measures are implemented at a satisfactory level.

The EIA report for the Hejre Field concluded that impacts on marine mammals as a result of "pile-driving before drilling" would not be significant provided that the soft start procedure is used. The seismic surveys will be regulated via the DEA's licences and permits, which include a series of conditions.

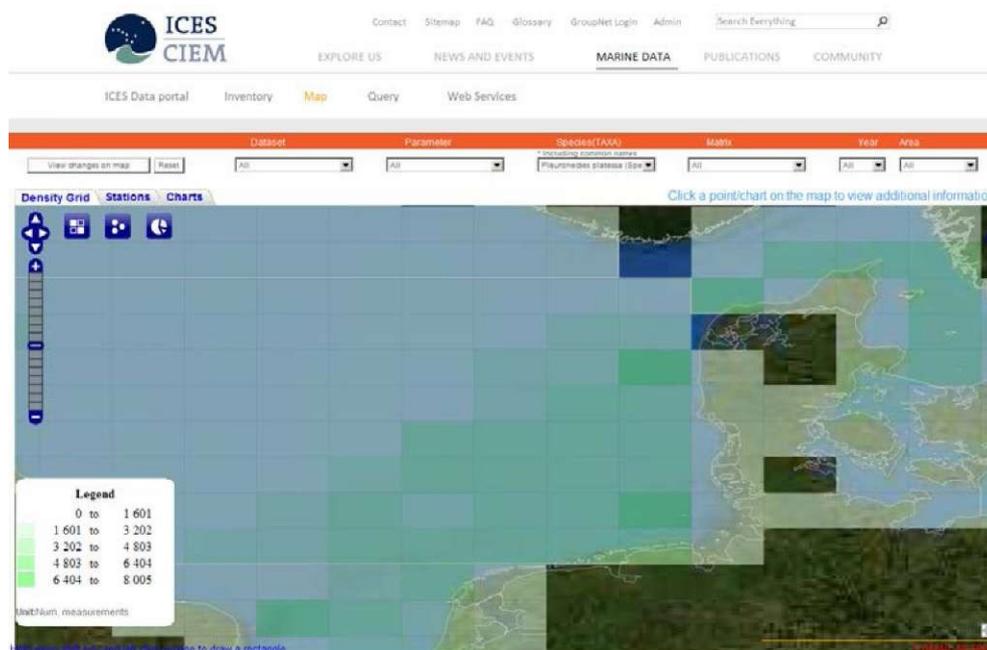
A worst case scenario, where the North Sea is subjected to noise pollution caused by the erection of one or more offshore wind farms and licences or permits have been granted for a number of simultaneous seismic surveys and drilling operations in different parts of the North Sea, could possibly lead to the conclusion that the environmental effects on marine mammals might be significant. Such an assessment is not considered relevant, as the probability of such a situation arising is not known.

There is a general lack of knowledge concerning cumulative effects, and the environmental report therefore also notes in chapter 9 that a monitoring programme concerning marine mammals could be initiated in the southwestern corner if a situation arises with a high level of oil and gas activity at the same time as offshore wind farms are being constructed at Dogger Bank.

4.2.8. Fisheries

The assessment of the importance of the planning area for fisheries is based on catches made by the Danish fishing fleet in the area. It has not been possible to find publicly available data concerning the quantities of fish landed by other fleets or how much the fishing fleets of other countries trawl in the planning area. The SEA noted that the planning area is no more important for the Danish fishing fleet than other corresponding areas in the North Sea. For this reason, it was concluded that it is unlikely that the area represents a particularly important area for the fishing fleets of other countries. However, it has not been possible to find publicly available data to either support or contradict this view. Despite this, an indication that this conclusion is likely to be correct can be found in publicly available data concerning the occurrence of the commercially important flatfish, European plaice. The International Council for the Exploration of the Sea (ICES) is in possession of data concerning trial fisheries which, among other things, forms the basis for the determination of quotas. Figure 4.1 shows the occurrence of European plaice in the North Sea during the past five years. The figure shows that the occurrence of European plaice in the planning area is no greater than in other neighbouring areas in the North Sea. This also applies to other commercially important species such as European sprat, sand lance, Norway lobster and cod; see figures 4.2, 4.3, 4.4 and 4.5. The percentage figure is the proportion of species caught in the activity area compared with the total Danish catch of the species.

Figure 4.1 (European plaice)



Fishery is carried out in the planning area by both the Danish fishing fleet and other countries' fleets. However, based on the available information, it is difficult to determine a quantifiable limit for the importance of the area for fisheries. The conclusion in the environmental report is that the plan does not include any activities that would have a significant negative impact on fish stocks in the area. Given that the area which could become included in the

prohibition zones will constitute less than 1% of the total planning area, it is believed that the plan will be of very little significance to the fisheries practised by the various countries in the area.

Figure 4.2 (European sprat 10%)

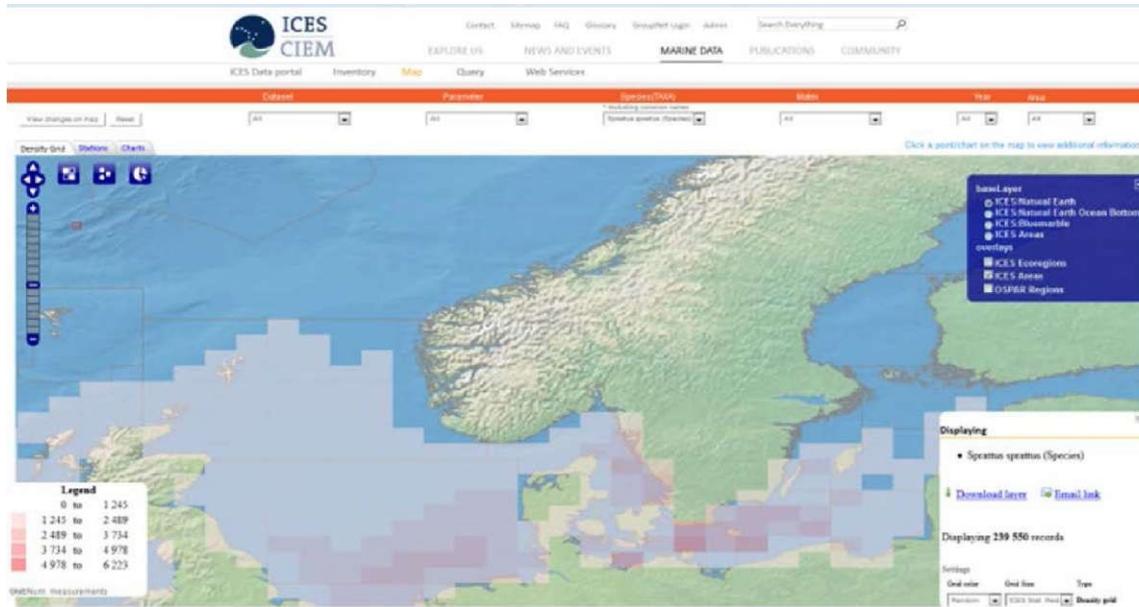


Figure 4.3 (Norway lobster 6%)

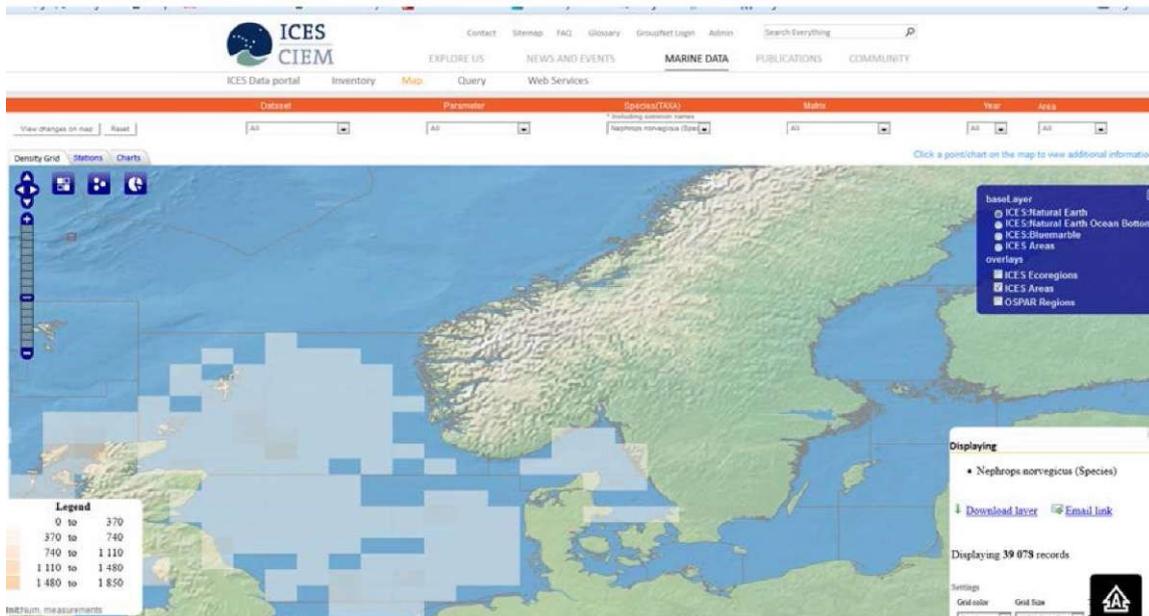


Figure 4.4 (Cod 1%)

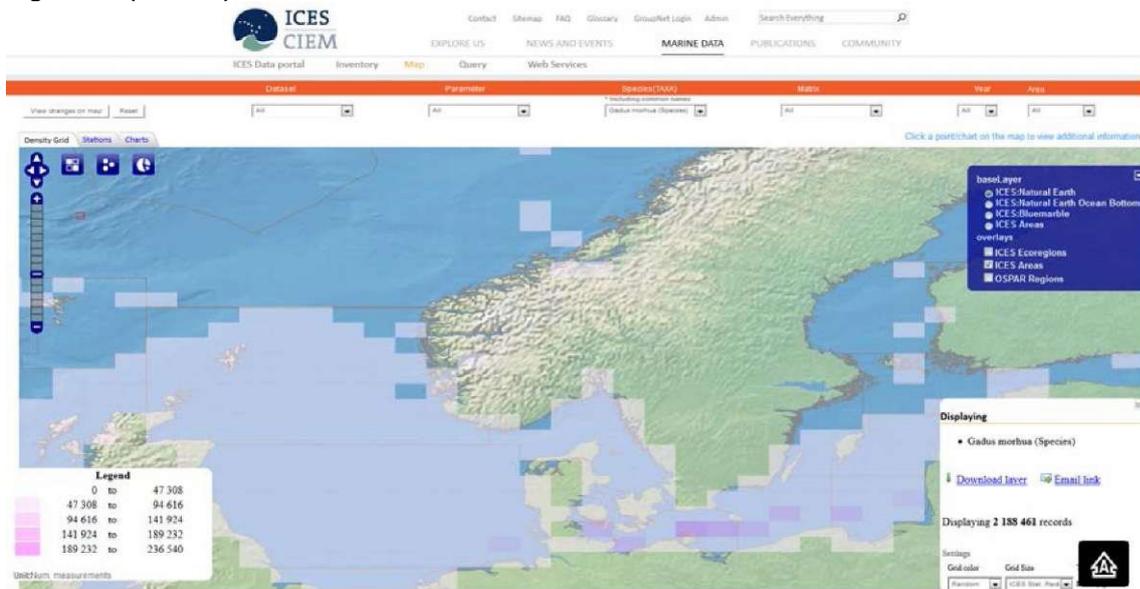
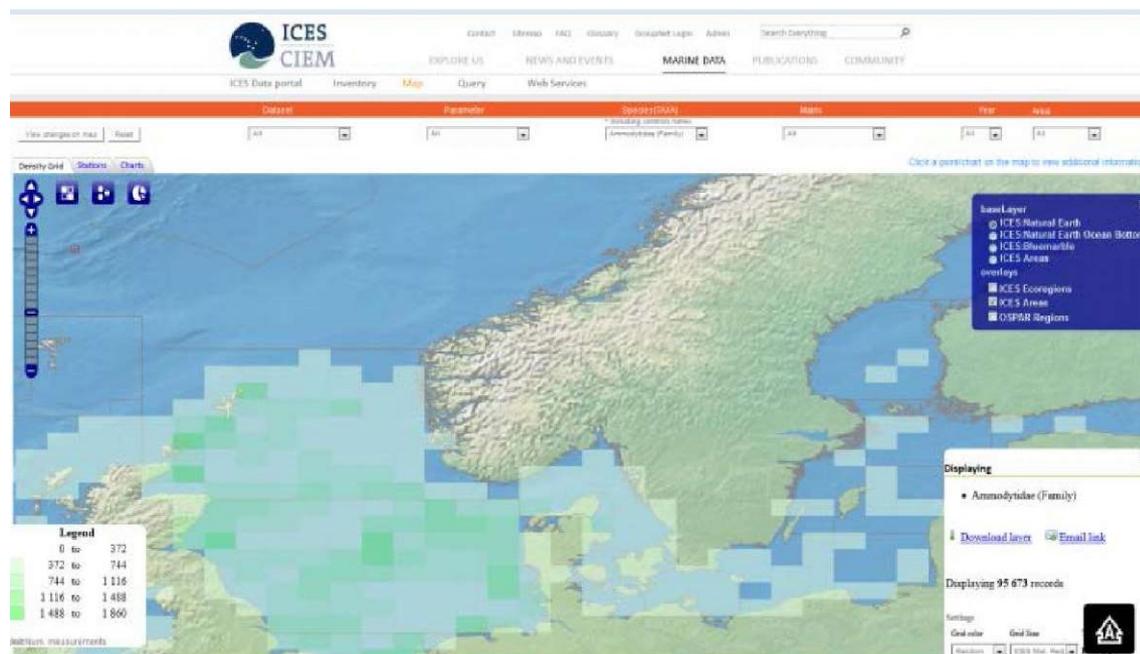


Figure 4.5 (Sand lance 4%)



4.2.9. Lack of knowledge

The plan establishes a general framework for future projects, and there are difficulties associated with assessing a plan in which the scope and probability of the projects being carried out are unknown. In the EIA reports that have been prepared for existing projects in the planning area, an assessment has been made based on estimates of the concentrations or magnitude of discharges and emissions to which activities give rise. In some cases, quantitative methods such as models have also been used as a basis for making assessments. It is not possible to do the same when performing an environmental assessment of an overarching plan.

The environmental impacts of the activities and projects that are covered by the plan have been studied in the EIA reports that have been prepared for projects already existing in the planning area. Together with the knowledge obtained through research projects and the data that is available concerning the existing conditions for biological parameters, this knowledge has been used to carry out an overall assessment of the plan. The information that is available concerning chemical, physical and biological conditions in the planning area is generally sparse and not all data is publicly available. It has however constituted the best available basis.

4.2.10. Socio-economic consequences of the plan

Oil Gas Denmark noted that the positive socio-economic consequences of the plan are not considered in the environmental report. The DEA expects new licences for exploration and production granted as a result of the plan to have a positive economic effect both for future licensees operating within the oil/gas sector and for the state in the form of revenue from taxes and duties. Since 1997, the production of hydrocarbons – combined with energy savings and the utilization of renewable energy, among other factors – has made an essential contribution to Denmark being a net exporter of energy, as the only country in the EU. To this should be added derived effects on employment, not only offshore, but also on the onshore service sector etc. The subsection below is based on the DEA's own figures and the report entitled "Den danske olie- og gasssektors udvikling og samfundsmæssige betydning (1992-2022)", prepared by Quartz+Co (2012) [only available in Danish].

4.2.10.1. Commercial impacts

In 2012 there were 19 fields, of which three did not carry on production during 2012. The direct value created in the sector is the value for the companies that have been granted a licence by the Danish state with an exclusive right to produce oil and gas from the fields. As the Danish state owns the oil and gas deposits in the Danish subsoil, various taxes and duties are paid to the state in connection with this production. Thus, the state received DKK 30.3 billion in 2011 in the form of direct taxes and duties in connection with the production that took place in the Danish part of the North Sea.

4.2.10.2. Employment impact

An average of 1,700 people were directly employed in the production of oil and gas in Denmark in 2008 to 2010. It is also estimated that 15,000 jobs are generated by the activities in the offshore oil and gas sector according to "1992-2022", prepared by Quartz+Co (2012).

4.2.11. Level of activity in the planning area

Since 1983, oil companies have been invited to apply for licences for the exploration and production of oil and gas in the Danish sector through licensing rounds. A total of six licensing rounds have been held for the western part of the North Sea. Figure 4.6 shows the number of licences that were granted during each round within the planning area and that some of the licences were relinquished after a period of many years. In addition to the licences shown, a few licences have also been granted outside the actual licensing rounds. Three of these are currently valid.

A licence to carry out exploration and production of oil and gas within a given area will not necessarily lead to a discovery and subsequent development of any discovery made. This depends on whether the exploration results are positive and whether the companies consider subsequent development to be financially viable. If the results indicate that there is no oil or gas in the targeted exploration area or that the quantities of oil and/or gas are insufficient to make development commercially viable, the licence will be relinquished.

Figure 4.6 Number of active licences from the various rounds

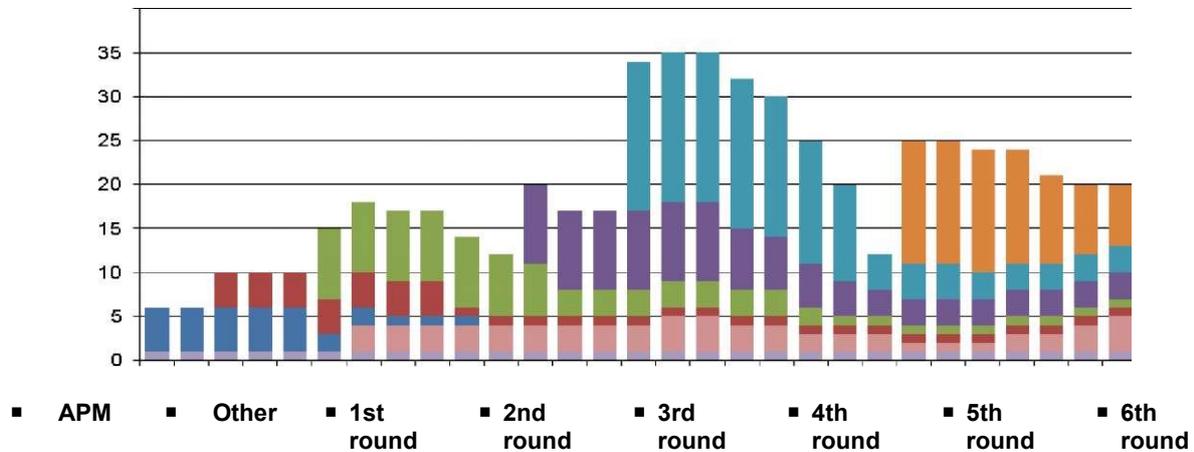


Table 4.2 shows the number of licences, exploration/appraisal wells and developments that the various licensing rounds have resulted in to date. The table only encompasses information concerning the planning area.

Table 4.2 Licences, exploration/appraisal wells and developments from each round

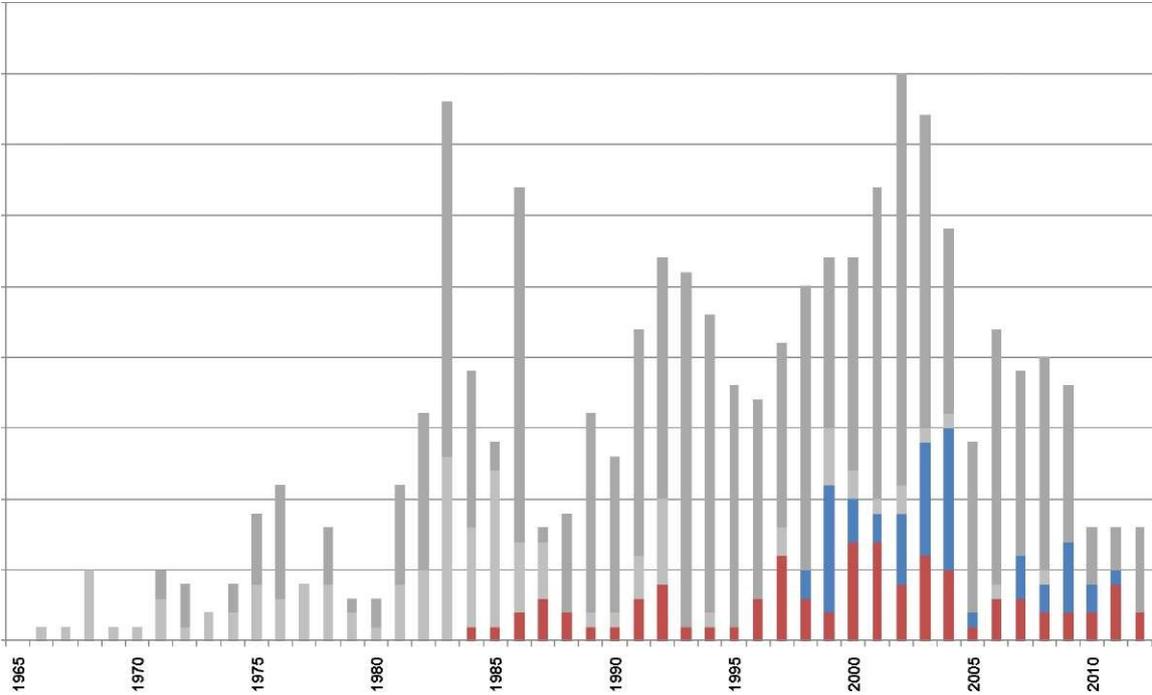
Round (year)	1 (1984)	2 (1986)	3 (1989)	4 (1995)	5 (1998)	6 (2006)
Licences granted	5	4	8	9	17	14
Exploration and appraisal wells	7	7	12	26	18	9
Developments (to date)	0	1	1	2	1	0

The table indicates that it is very difficult to accurately predict the number of licences that will be granted as a result of a licensing round. The number of licences granted may for example depend on the oil price, the companies' level of interest in the Danish sector, the time interval between the rounds and the available unlicensed area for which applications can be submitted. It is also difficult to predict how many specific projects/activities a round will ultimately result in. This will partly depend on the exploration results and the exploration methods that are deemed necessary in order to determine the potential volumes of oil and/or gas in a prospect.

Figure 4.7 shows the number of production, exploration and appraisal wells that were drilled in each individual year. The figure reflects the fact that the level of activity fluctuates over time and that drilling activity peaked in 2002-2003 and subsequently fell during the following years.

The work programmes for the licences vary depending on whether existing data is available for the licence area and the activities that are necessary to clarify the prospectivity of the exploration target under the licence. Experience gained from recent rounds has shown that the activities to be carried out under the individual licences will not necessarily be conducted at the same time, even though the licences are granted together in a round. Further rounds will not necessarily increase the level of activity, but will maintain the level, and as is apparent from figure 4.7, the number of exploration wells resulting from licensing rounds has declined since 2000.

Figure 4.7 Production, exploration and appraisal wells per year



- Exploration/appraisal wells, licensing rounds
- Production wells, licensing rounds
- ◻ Exploration/appraisal wells, DUC
- ◻ Production wells, DUC

In the years ahead, it is expected that production from some of the existing fields will cease and that the platforms in these fields will have to be dismantled. New discoveries from a future round, which potentially result in a development, will not necessary lead to expansion of the infrastructure in the Danish part of the North Sea, but rather result in the level of activity being maintained and new installations replacing old ones in other locations.

The next planned licensing round, the 7th round, which is encompassed by the environmental assessment, is aimed at ensuring that the level of exploration in the Danish part of the North Sea is maintained. This will ensure efficient utilization of Danish natural resources through potential new discoveries for the benefit of the Danish economy and Denmark’s security of supply.

It is difficult to assess the outcome of a licensing round in advance. Based on experience gained from previous rounds and expressions of interest from oil companies up to the forthcoming 7th round, the expectation is that the next licensing round will result in a respectable number of new licences and a level of activity that is likely to equal the level following the 6th round.

5. ALTERNATIVES

5.1. Zero alternative

The zero alternative can be defined as the current situation, where – as a result of licences already granted – significant exploration and production activities are ongoing, but where no new licences will be granted according to the proposed plan. In this situation, the environmental status of the area will be unchanged.

The zero alternative can also be described as a future situation where the plan is not implemented and existing activities decrease because oil and gas resources are declining. In this case, the zero alternative would in all probability result in a more positive environmental status, but would also have a negative impact on the socio-economic situation (hydrocarbon tax and jobs on- and offshore) compared with the situation where the plan is implemented.

5.2. Alternatives studied

No other alternatives have been studied because no other alternatives exist or are considered to be relevant at the present time.

6. MONITORING

Pursuant to section 9(2)(iii) of the Environmental Assessment Act, the authority responsible for the plan is required to monitor the principal environmental impacts of the plan. The environmental assessment indicates that there are no significant environmental impacts associated with implementation of the plan.

The general nature of the plan means that the primary monitoring of project activities must be linked to specific future projects that are realized on the basis of the plan and the necessary licences or permits. In connection with licensing rounds as well as specific activities relating to exploration and production, the work planned, including the drilling of wells, must be approved by the DEA pursuant to the Subsoil Act.

As is apparent from section 4.2.2.3 of this report, the cumulative effects of future projects must be evaluated very thoroughly and, depending on the nature and scope of the project, the DEA may require monitoring programmes to be implemented.

In addition, pursuant to the Marine Strategy Framework Directive, Denmark is required to draw up a monitoring programme and action plans with a view to achieving the goal of a good environmental status in the North Sea, as appears from section 4.2.2.3 of this report. The Directive concerns a number of subject areas, including the importance of cumulative effects, the effects of noise and the impact of marine waste. The Directive also requires Member States to reciprocally coordinate their marine strategies at regional level to ensure coherence within the various territorial waters. Where relevant, future EIA reports and monitoring programmes can be coordinated with the monitoring that is initiated pursuant to the Marine Strategy Directive, thereby contributing further knowledge of the planning area in the North Sea; see table 3.1.

In respect of the southwestern corner of the planning area, there may be a need to establish a monitoring programme for birds and marine mammals if the German and British plans for wind turbines are realized. Therefore, particularly in this area, the DEA will focus on the need for monitoring in connection with projects for which an EIA must be prepared.