STRATEGIC ENVIRONMENTAL ASSESSMENT IN THE UK

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CONTEXT

This report aims to provide regulators and statutory bodies related to strategic environmental assessment (SEA) in Brazil with a summary of ongoing SEA activity in the UK, as well as to evaluate its possible contribution to the improvement of the model adopted in Brazil, specifically for the oil and gas sector. Despite the differences between the two approaches, a detailed understanding of SEA's application to UK offshore licensing will certainly identify lessons that can be applied to Brazilian setting.

Building on a provisional understanding established through initial contacts and awareness raising facilitated by the FCO Prosperity Fund[2], further work has been undertaken to understand in detail the application of SEA to one context in the UK – offshore oil and has licensing. This has been done, in order to provide an evidence base from which to inform the development and application of a parallel strategic assessment process in Brazil, which aims to balance competing tensions between environment and energy sectors in a way commensurate with Brazil's need for energy security, environmental protection and progress towards a low carbon transition.

In 2012, after a discussion process involving representatives of the oil and gas industry; the regulatory agency and the federal environment agency, it was decided to carry out evaluations with "strategic" characteristics - the "Environmental Assessment of Sedimentary Areas" – AAAS abbreviation in Portuguese). The new assessment was established through the Interministerial Ordinance 198/2012 aiming to "*contribute to the prior definition of the area's suitability for oil and natural gas exploration and production; promote efficiency and increase regulatory certainty along the environmental consent for projects in 'suitable areas'; as well as enabling greater rationality to the processes, through the fully use of data and information produced in the strategic assessment*".

However, with the development of the first assessments in Brazil, it became clear that the inherent complexity of the theme (mainly the difficulties in separating strategic and operational issues) and the often-conflicting views between the main stackeholders in Brazil have led to the elaboration of a heterogeneous and apparently not fully adequate conceptual basis for conducting the strategic assessment process in Brazil.

This document was based on a thorough search of the reports available on the gov.uk website and other reference sources, as well as contacts with local researchers familiar with the topic. It is intended initially to clarify in a didactic way how SEA was implemented in the United Kingdom. Other topics such as licensing rounds and projects consenting; the relationship between SEA and EIA; and how oil spills derived from oil and gas activities are dealt with at SEA level are commented. Specific issues related to European guidelines are also considered, such as Habitat Regulatory Assessment - HRA, cumulative effects and marine plans.

Finally, the approaches, methodologies and underlying concepts in the UK SEA and Brazil's ongoing AAAS are briefly compared. The idea is to contribute to a broader understanding of the possible pros and cons of each model and their applicability to each country needs.

The Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment [3] requires the identification, description and evaluation of the likely significant effects on the environment of implementing a plan or programme and the proposal of measures to avoid, manage or mitigate any significant adverse effects. The review of the application of SEA to offshore energy in the UK **focus on the latest comprehensive strategic assessment conducted in 2016 (Offshore Energy Strategic Environmental Assessment - OESEA3)**, addressing oil and gas, hydrocarbon gas

[1] This report presents the main findings regarding the UK Strategic Environmental Assessment process, based on a research conducted as a Visiting Research Academic in the Faculty of Technology, Design and Environment, Oxford Brookes University, from 01 August 2019 to 31 October 2019.

[2] The Prosperity Fund aims support the inclusive economic growth needed to reduce poverty in partner countries. Through its primary purpose, the Fund's activities will contribute to achieving the UN Sustainable Development Goals. https://www.gov.uk/government/publications/cross-government-prosperity-fund-programme

[3] European Union Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32001L0042&from=EN

storage, carbon dioxide storage and marine renewables including wind, wave, tidal stream and tidal range)[4]. However, when necessary, examples of previous assessments specific to the oil and gas sector are considered for comparison (e.g. SEA 1 is mentioned when the "Characterisation of the potential type and scale of activity" is discussed and SEA 2, when considering "Potential for cumulative impacts").

As indicated in Table 1, initially the SEAs had a "regional" geographic scope with focus solely in oil and gas. With the introduction of offshore Energy SEAs (OESEAs), this changed to cover all territorial waters and activities, beyond oil and gas, related initially to offshore wind and then to hydrocarbon gas storage, carbon dioxide storage and other marine renewables including wave, tidal stream and tidal range.

In order to provide a comparison between the two groups of SEAs, the report evaluates separately the topics corresponding to "consultation process", "scale of activities", "cumulative effects" and the "main conclusions" of SEA 4 (focus on oil and gas) and OESEA3 (oil and gas, renewables and gas and CO2 storage). SEA 4 was chosen for comparison, as it was the fourth evaluation, when the consultation and evaluation procedures were already relatively well established, although, in practical terms, any assessment of the first group (from SEA 1 to SEA 7) could have been adopted as a standard for comparison.

As the European Union Directive defines very precise requirements for the assessments, the structure of the Environmental Reports and consultation process are very similar for each sequence of SEAs (SEA 1 – 7 and then OESEA1 – 3). However, as there was an expansion of the scope to include a wider range of activities it could seem surprising that the assessment methodology has not evolved to reflect this change. Particularly, the assessment of cumulative effects should have been more consistent. However, as it will be seen later, consideration of these effects tends to be more theoretical (and "rhetorical") than operational in function of gaps in knowledge.

The main points considered in the Report are "the SEA process and legislative context", "the SEA approach", "SEA objectives and indicators", "SEA scope", "the consultation process", "the environmental report (organization and structure)", "assessment methodology", "alternatives to the draft plan/programme", "overview of environmental baseline", "likely evolution of the baseline and relevant existing environmental problems", "the assessment (potential sources of significant effects, consideration of effects of alternatives)", "recommendations", "monitoring", "the definition of blocks for offering in bidding rounds", "the evaluation of SEA process", "overall conclusions", "strategic assessment in Brazil (AAAS) – peculiarities and comparison with the methodology in the UK", and "next steps".

Some topics were assessed in more detail in four Annexes, respectively, Marine Spatial Planning, Habitats Regulations Assessment, Accidental events and a comparison of SEA Conclusions, from 2001 to 2016.

The structure chosen does not correspond exactly to the SEA "stages", as defined in the Practical Guide to the SEA Directive (Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope; Stage B: Developing and refining alternatives and assessing effects; Stage C: Preparing the Environmental Report. Stage D: Consulting on the draft plan or programme and the Environmental Report and Stage E: Monitoring the significant effects of implementing the plan or programme on the environment).

However, the order and emphasis chosen were considered more appropriate to highlight aspects that may contribute to the comparison between the methodologies adopted in Brazil and the UK.

It is important to emphasize that, the report largely retained original excerpts from the reports available on the Internet. This will allow readers in Brazil a quick access to the main elements of the original text, without necessarily resorting to the primary sources. However, the main links are included as footnotes for those who choose to read the original reports.

[4] OESEA3 Environmental Report Future Leasing/Licensing for Offshore Renewable Energy, Offshore Oil & Gas, Hydrocarbon Gas and Carbon Dioxide Storage and Associated Infrastructure. March 2016, available at:

https://www.gov.uk/government/consultations/uk-offshore-energy-strategic-environmental-assessment-3-oesea3

THE SEA PROCESS AND LEGISLATIVE CONTEXT

The Directive 2001/42/EC entered into force on July 21 2001. The United Kingdom, as a Member State, was required to comply with the Directive before 21 July 2004, and regulations were implemented to mirror the Directive requirements[5].

The SEA process aims to help inform ministerial decisions through consideration of the environmental implications of the outcome of a proposed plan/programme. The Department for Business, Energy & Industrial Strategy (BEIS)[6], as the principal environmental regulator of the offshore oil and gas industry, "has taken a proactive stance on the use of SEA as a means of striking a balance between promoting economic development of the UK's offshore energy resources and effective environmental protection". Although the Directive 2001/42/EC was not incorporated into UK law until 2004 (The Environmental Assessment of Plans and Programmes Regulations 2004, and equivalent Regulations of the devolved administrations), SEAs have been carried out since 1999 in accordance with its requirements[7].

Under the terms of Article 3(2a) of the SEA Directive, all plans/programmes prepared for energy must be subject to environmental assessment.

The Directive's stated objective is *"to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment."*

In applying it to oil and gas activities, the SEA process aims to help inform licensing decisions by considering **the environmental impacts** of the proposed plan/programme and the potential activities which could result from their implementation.

In 1999, the former DTI began a sequence of SEAs considering the implications of further licensing of the UK Continental Shelf (UKCS) for oil and gas exploration and production. The SEAs were in line with the UK's "Greening Government" initiative, which included implementing the intent of the then draft European Council Directive on Strategic Environmental Assessment Directive. Government Departments would conduct Environmental Appraisals of their major plans and programmes – for the DTI this included oil and gas licensing.

Since then, seven SEAs were conducted to evaluate the implications of further licensing of the UKCS for oil and gas exploration and production (SEAs 1 to 7) and other three, considering besides oil and gas, offshore wind, hydrocarbon gas storage, carbon dioxide storage and other marine renewables including wave, tidal stream and tidal range (OESEA, OESEA2 and OESEA3); and a SEA for a second round (R2) of wind leasing.

Table 1 – The sequence of SEAs in UK

SEA	Area	Sectors covered	Year	Licensing/leasing round
SEA 1	The deep water area along the UK and Faroese boundary	Oil & Gas	2001	19th Round
SEA 2	The central spine of the North Sea which contains the majority of existing	Oil & Gas	2002	20th Round

[5] The Environmental Assessment of Plans and Programmes Regulations 2004 (SI2004/1633), available at: http://www.legislation.gov.uk/uksi/2004/1633/contents/made

[6] There was a shifting of departmental responsibilities for oil and gas licensing in UK ; the former Department of Trade and Industry - DTI became Department for Business, Enterprise and Regulatory Reform – BERR, in 2007; then Department of Energy and Climate Change – DECC, in 2009; and BEIS, in 2016. The Oil and Gas Authority - OGA was created in 2015. The OGA regulates the exploration and development of the UK's offshore and England's onshore oil and gas; the UK's carbon storage; and gas storage and offloading activities.

[7] Guidance "Offshore Energy Strategic Environmental Assessment (SEA): An overview of the SEA process", available at: https://www.gov.uk/guidance/offshore-energy-strategic-environmental-assessment-sea-an-overview-of-the-sea-process

	UK oil and gas fields			
SEA 2 extension	Outer Moray Firth	Oil & Gas	2002	20th Round
SEA 3	The remaining parts of the southern North Sea	Oil & Gas	2003	21st Round
R2	Three strategic regions off the coasts of England and Wales in relation to a second round of offshore wind leasing	Offshore wind	2003	Round 2
SEA 4	The offshore areas to the north and west of Shetland and Orkney	Oil & Gas	2004	22nd Round
SEA 5	Parts of the northern and central North Sea to the east of the Scottish mainland, Orkney and Shetland	Oil & Gas	2005	23rd Round
SEA 6	Parts of the Irish Sea	Oil & Gas	2006	24th Round
SEA 7	The offshore areas to the west of Scotland	Oil & Gas	2008	25th Round
OESEA	UK offshore waters and territorial waters of England and Wales	Oil & Gas, Offshore wind	2009	26th Round/ Round 3
OESEA2	UK offshore waters and territorial waters of England and Wales	Oil & Gas, Offshore wind, wave and tidal stream, gas and carbon dioxide storage	2011	27th Round 28th Round
OESEA3	UK offshore waters and territorial waters of England and Wales	oil and gas, hydrocarbon gas storage, carbon dioxide storage and marine renewables including wind, wave, tidal stream and tidal range	2016	29th Round and Supplementary Round 30th Round 31th Round 32th Round

The SEA Directive includes the following requirements[8]:

Consultation process including authorities/consultation bodies[9] with environmental responsibility, "*when deciding on the scope and level of detail of the information to be included in the environmental*

[8] A Practical Guide to the Strategic Environmental Assessment Directive. Practical guidance on applying European Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment". 2005. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf

[9] The following are the current (2016) statutory consultation bodies/authorities: Historic England (previously English Heritage); Natural England (previously English Nature and the Countryside Agency); Environment Agency; Historic Environment Scotland (previously Historic Scotland); Scottish Natural Heritage Scottish Environment Protection Agency; Cadw (Welsh Assembly

report"; "*authorities with environmental responsibility and the public shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan or programme and the accompanying environmental report before the adoption of the plan or programme*"; other EU Member States, "*where the implementation of the plan or programme is likely to have significant effects on the environment of that country*".

Preparation of an environmental report in which "*the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and geographical scope of the plan or programme, are identified, described and evaluated*";

Monitoring of "*the significant environmental effects of the plan's or programme's implementation*".

The Directive (Art. 8) reinforces the importance of "*Taking the environmental report and the results of the consultations into account in decision-making*".

The "Practical Guide to the Strategic Environmental Assessment Directive" also warns about the level of detail in SEA**: "*SEA need not be done in any more detail, or using any more resources, than is useful for its purpose***"; "***It is not usually appropriate in SEA, and is often impracticable, to predict the effects of an individual project-level proposal in the degree of detail that would normally be required for an EIA of a project***"; and "*In theory, collection of baseline information could go on indefinitely. A practical approach is essential. Set a time limit for information collection. Do not expect to be able to obtain all relevant information in the first SEA of a plan or programme, but make arrangements to fill any major gaps for future replacements or reviews of plans or programmes*".

THE SEA APPROACH

SEA Process[10]

The indicative time horizon (i.e. period of currency) for OESEA3 is expected to be five years from publication. During this period, as with previous SEAs, the regulator is supposed to maintain an active SEA research programme: identifying information gaps, commissioning new research where appropriate, and promoting its wider dissemination through a series of research seminars. This also involves the continued engagement with the SEA Steering Group (includes membership from industry, Government, statutory advisors and environmental organisations including NGOs[11]) and

Government's historic environment division); Natural Resources Wales (previously Countryside Council for Wales and Environment Agency Wales); Northern Ireland Environment Agency function lead for Department of Environment (NI).

[10] It is important to note that some approaches of previous SEAs may be slightly different from the adopted in OESEA3. In order to have a more comprehensive view of the whole process it is recommended to refer to the original Directive and the Practical Guide to the SEA Directive (see footnotes 3 and 7).

[11] Offshore Energy SEA Steering Group Member organisations, May 2018

1. Department for Business, Energy & Industrial Strategy (BEIS) (Energy Development & Resilience Directorate)
2. Department for Business, Energy & Industrial Strategy (BEIS) (Clean Electricity Directorate)
3. Department for Transport (DfT)
4. Department for Environment, Food and Rural Affairs (Defra)
5. Ministry of Housing, Communities & Local Government (MHCLG)
6. Scottish Government (SG)
7. Welsh Government (WG)
8. The Crown Estate (TCE)
9. Centre for Environment, Fisheries and Aquaculture Science (Cefas)
10. Marine Scotland (MS)
11. Natural Resources Wales (NRW)
12. Natural England (NE)
13. Scottish Natural Heritage (SNH)
14. Joint Nature Conservation Committee (JNCC)
15. Environment Agency (EA)
16. Marine Management Organisation (MMO)
17. Oil & Gas UK (OGUK)
18. RenewableUK (RUK)
19. World Wildlife Fund (WWF)
20. Scottish Environment LINK (SEL)
21. Wildlife and Countryside Link (WCL)
22. Royal Society for the Protection of Birds (RSPB)

review of the information base for the SEA[12]. The currency of OESEA3 will be periodically reviewed by the competent authority in the context of new information on technologies, effects, or plan/programme status.

OESEA3 is intended to:

- Consider the environmental implications of the draft plan/programme to enable further licensing/leasing, in the case of OESEA3, for offshore energy (oil and gas, hydrocarbon gas storage, carbon dioxide storage and marine renewables including wind, wave, tidal stream and tidal range). This includes consideration of the implications of alternatives to the plan/programme and consideration of potential interactions with other users of the sea.
- Inform the UK Government's decisions on the draft plan/programme
- Provide routes for public and stakeholder participation in the process

The **key stages**[13] in the conduct of the SEA are:

1. Instigation of draft plan/programme and identification of alternatives and draft objectives
2. Scoping for field work / longer term studies
3. Consultation with the Consultation Bodies and Authorities and other Stakeholders on the scope and level of detail of the Environmental Report
4. Information gathering and collation on:
    - Environmental baseline;
    - Existing environmental problems
    - Potential effects of proposed plan
    - Other relevant initiatives, plans and programmes and their objectives
5. Assessment workshop
6. Assessment of effects including consideration of alternatives
7. Regional stakeholder workshops
8. Sector meetings and/or workshops
9. Production of Environmental Report
10. Public Consultation
11. Post consultation evaluation of feedback (post consultation report) input to decision on the plan (post adoption statement(s))
12. Monitoring plan implementation.

Figure 1 below summarises the process:

[12] The SEA programme has funded a significant number of marine surveys and research projects to improve the information base for undertaking strategic assessment and support activity specific consenting.

Recent Offshore Energy SEA funded projects:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/656623/Offshore_Energy_SEA_-_Recent_Research_Summary.pdf.

Recent Papers from BEIS Offshore Energy SEA funded projects:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/725820/BEIS_Offshore_Energy_SEA_-_Recent_Papers_July_18.pdf

[13] Note that these are specific to OESEA3 – the stages as defined in the Practical Guide to the SEA Directive are Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope; Stage B: Developing and refining alternatives and assessing effects; Stage C: Preparing the Environmental Report. Stage D: Consulting on the draft plan or programme and the Environmental Report and Stage E: Monitoring the significant effects of implementing the plan or programme on the environment.

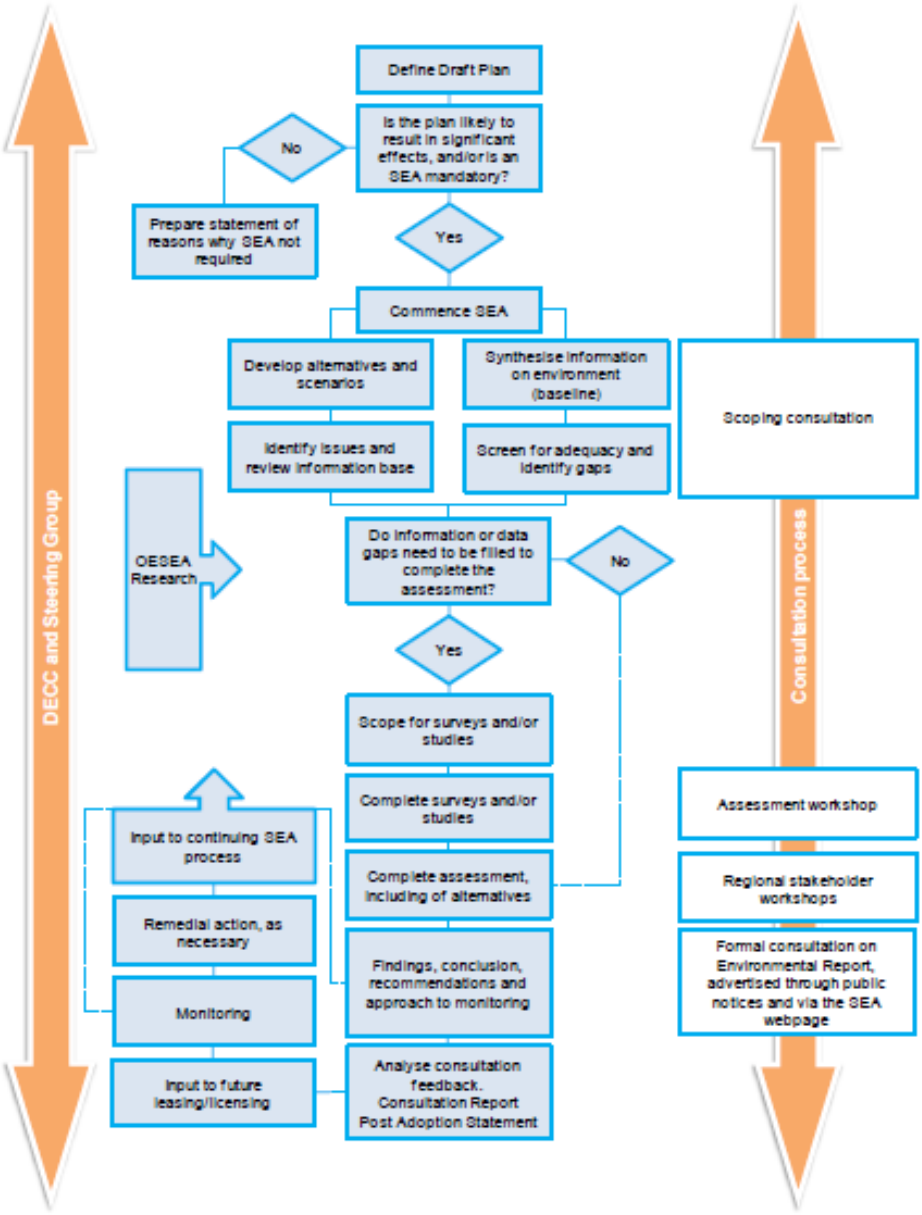

Figure 1 - Overview of the SEA process (From: OESEA3 Report)

SEA OBJECTIVES AND INDICATORS (OESEA3)

SEA's objectives are classified in relation to the main categories of receptors subjected to impacts (baseline[14]) as a result of plan implementation. These “high level” goals suggest efforts to avoid or minimize impacts and thus seek alignment with environmental protection measures, human health and wellbeing and avoidance of disruption, disturbance and nuisance to communities. These were based on those first developed in previous SEAs, amended following successive rounds of scoping and discussion including at the Assessment Workshop. It is important to note that SEA objectives are

[14] According to Directive 2001/42/EC. Article 5 - Environmental report, 1) Where an environmental assessment is required…, an environmental report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated. The information to be given for this purpose is referred to in Annex I. Annex I - Information referred to in Article 5(1):… (f) the likely significant effects on the environment, including on issues such as **biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors**. These effects **should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects**.

the key part of the assessment methodology and reflect scoping and consultation, as listed above (key stages in the conduct of the SEA).

It is also relevant to consider that the methodology seems to point to a **qualitative rather than a quantitative approach**[15].

Biodiversity, habitats, flora and fauna

Contributes to conservation of the biodiversity and ecosystems of the United Kingdom and its seas.

Avoids significant impact to conservation sites designated at an International, European and National level (e.g. Ramsar, Natura 2000, Marine Conservation Zone, Nature Conservation Marine Protected Area and SSSI).

Avoids significant impact to, or disturbance of, protected species and loss of habitat.

Geology and Soils

Protects the quality of the seabed and its sediments, and avoids significant effects on seabed morphology and sediment transport processes.

Protects the integrity of coastal and estuarine processes.

Avoids significant damage to geological conservation sites and protects important geological/geomorphological features

Landscape/Seascape

To accord with, and contribute to the delivery of the aims and articles of the European Landscape Convention and minimise significant adverse impact on seascape/landscape including designated and non-designated areas.

Water Environment

Protects estuarine and marine surface waters, and potable and other aquifer resources.

Avoid significant impact on flood and coastal risk management activities.

Air Quality

Avoids degradation of regional air quality from plan related activities.

Climatic Factors

Minimises greenhouse gas emissions.

Resilience to climate change

Population and Human Health

Has no adverse impact on human health and wellbeing

Avoids disruption, disturbance and nuisance to communities.

Other users of the sea, material assets (infrastructure, and natural resources)

Balances other United Kingdom resources and activities of economic, safety, security and amenity value including defence, shipping, fishing, aviation, aggregate extraction, dredging, tourism and recreation against the need to develop offshore energy resources.

Safety of Navigation.

Reduces waste

Cultural heritage

Protects the historic environment and cultural heritage of the United Kingdom, including its setting

[15] Whilst SEA requires the identification, description and evaluation of the likely significant effects, the SEA Objective Assessment framework enables a full range of effects to be identified, with commentary provided that describes these effects. It then usual that such effects are described as one (or more) of the following: Significant positive; Minor positive; Neutral; Minor negative; Significant negative; No relationship; Uncertain.

Given the strategic and non-spatially defined nature of many plans, it is then a question of professional judgement, as to which of the above is appropriate (taking into account the factors in Annex II of the SEA Directive). In our work, we provide definitions of what we mean by significance for each SEA objective, which tends to draw on legal thresholds or designations (so for example, **where a European site would be affected** would then lead to a **likely significant effect against a biodiversity objective being identified**). Where relevant and available, we use baseline evidence/research to inform the assessment. So for the vast majority of the SEAs completed in the UK, **there is no modelling undertaken to quantify the magnitude of effects** (for example changes in air quality arising from increases in vehicle movements along the strategic road network). P. Davis, Wood PLC, pers. comm. October 2019.

Contributes to archaeological knowledge.

Table 2 exemplifies the definition of objectives, “guided phrases” and SEA Indicators for the topic **Biodiversity, habitats, flora and fauna:**

Table 2 - SEA topics, objectives and indicators (Biodiversity, habitats, flora and fauna)

SEA Objectives	Guide Phrases	SEA Indicators
Biodiversity, habitats, flora and fauna		
Contributes to conservation of the biodiversity and ecosystems of the United Kingdom and its seas. Avoids significant impact to conservation sites designated at an International, European and National level (e.g. Ramsar, Natura 2000, Marine Conservation Zone, Nature Conservation Marine Protected Area and SSSI). Avoids significant impact to, or disturbance of, protected species and loss of habitat.	*Plan activities do not lead to the loss of biological diversity, the degradation in the quality and occurrence of habitats, and the distribution and abundance of species.* *Plan activities do not cause adverse effects on marine ecosystems/valued ecosystem components.* *Plan activities contribute to the ecological knowledge of the marine and coastal environment through survey and discovery.* *Plan activities do not lead to disruption in habitat and species connectivity.* *Plan activities do not lead to the introduction of noise at levels which adversely affect the marine environment, including by leading to significant effects on conservation sites and sensitive species.* *Plan activities do not lead to the introduction of non-native species at levels which adversely alter marine ecosystems.* *The plan recognises the ecosystem importance of land-sea coupling, for instance its role in species migration.* *The plan promotes the achievement of good ecological/environmental status for water bodies and marine sub-regions as outlined at a European Level.*	For selected ‘valued ecosystem components’ no loss of diversity or decline in population (measured as % of relevant biogeographic population) attributable to plan related marine activities and promotion of recovery wherever possible. Activities subsequent to licensing/leasing which are on, or potentially affecting designated sites (e.g. Natura 2000, Marine Conservation Zones, Marine Protected Areas), or with the potential to disturb a protected species1, are compliant with the requirements of relevant UK and devolved Regulations2, and consistent with national and regional policy. No adverse change in the environmental status of marine sub-regions, including in relation to the attainment of targets for MSFD descriptors; or in the ecological status of WFD transitional waters and the attainment of good status/potential.

SEA SCOPE

Offshore wind and other marine renewable energy development:

1. Site prospecting/selection including collection of site specific resource and constrain data, and seabed information by geophysical and geotechnical survey
2. Development, including construction of foundations/anchors/structures and any scour protection, device installation, cable laying including shoreline crossings and armouring, installation of gathering stations/substations and connection to the onshore national electricity transmission system
3. Generation operations
4. Maintenance
5. Decommissioning, including removal of facilities

Oil and gas activity:

1. Exploration/appraisal including seismic survey and exploration/appraisal drilling with well evaluation and testing
2. Development, including production facility installation, generally with construction of pipeline(s), and the drilling of producer and injector wells
3. Production and export operations, with routine supply, return of wastes to shore, power generation, chemical use, flaring, produced water management/reinjection and reservoir monitoring

4. Maintenance

5. Decommissioning, including cleaning and removal of facilities

Natural gas offloading and storage:

1. Exploration/appraisal potentially including seismic survey exploration/appraisal drilling and reservoir/geological formation evaluation

2. Development (depleted hydrocarbon reservoir), including drilling of new or workover of existing wells, installation of storage facility or modification of existing infrastructure, with new or existing import/export pipelines, and potentially offloading facilities

3. Development (salt caverns), including the drilling of wells, construction of storage caverns by dissolution, installation of storage facilities, with new import/export pipelines, and potentially offloading facilities

4. Import, storage and export operations, with routine supply, return of wastes to shore, power generation, chemical use, flaring, produced water management and reservoir/structure monitoring

5. Maintenance

6. Decommissioning, including cleaning and removal of facilities

Carbon dioxide and storage activity in depleted oil and gas reservoirs and saline aquifers:

1. Exploration/appraisal including seismic survey and exploration/appraisal drilling and testing

2. Development, including installation of injection facilities, generally with construction of import pipelines, and the drilling of injection wells and potentially aquifer water production wells

3. Import and injection operations, with routine supply, return of wastes to shore, power generation, chemical use, venting, potentially aquifer water production/management and storage reservoir monitoring

4. Maintenance

5. Decommissioning, including cleaning and removal of facilities

Once the activities are defined, the assessment seeks to identify the possible environmental effects, i.e., how **these activities can interact with the natural and broader environment in a number of ways**.

The main potential sources of environmental effects from activities which could follow adoption of the draft plan/programme are:

- Noise (impulsive, semi-continuous or continuous)
- Physical damage or change to the seabed and subsurface
- Other indirect physical effects on seabed and water column
- Ecological effects of presence of structures
- Interactions with other users of the sea
- Visual intrusion
- Chemical and other inputs
- Atmospheric emissions
- Electromagnetic fields
- Waste disposal onshore
- Other effects
- Decommissioning and legacy issues
- Accidental events

The SEA assessment should consider the likely significant effects of the implementation of the plan including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects on each of the topics listed below:

- Biodiversity, habitats, flora and fauna

- Geology, substrates and coastal geomorphology
- Landscape/seascape
- Water environment
- Air quality
- Climate and meteorology
- Population and human health
- Other users, material assets (infrastructure, other natural resources)
- Cultural heritage
- Conservation of sites and species

and the interrelationship between the above.

Characterisation of the potential type and scale of activity - SEA 4 and OESEA3

For a more appropriate assessment of the possible environmental impact resulting from the planned activities, an estimate of the order of magnitude of the **scale of activity** is required.

The methodology for estimating the likely scale of activities varied over time, from more precise quantitative indications to more “qualitative” considerations. This seems to indicate that more or less detail of the expected scale does not significantly interfere with the assessment impact estimates. This reinforces the qualitative feature of subsequent analyses, in which the predicted scale for future activities will be considered without the use of “weights” or other quantitative criteria.

Just to illustrate the evolution of the concept throughout SEAs, the criteria used in SEA4 are shown below.

SEA 4

According SEA4 Environmental Report, “both exploration and development activity levels and timing would depend on a range of factors including the number of blocks licensed, work programme commitments made by licensees, exploration success, economic and commercial factors and Government approval of project development plans".

“The forecasts of potential activity were developed by the former DTI Licensing and Consents Unit. They were not based on detailed mapping, but on a broad understanding of the geology of the area involved, anticipated applications for the blocks, currently known but undeveloped reserves which are in unlicensed blocks, and the likely exploration success rates. Predicted numbers are therefore indicative only”.

Area 1 – area of existing and previously licensed acreage where oil and gas have been encountered at almost all levels of the geological column from the Devonian to Eocene.

Estimated activity:

Seismic - two 2D seismic surveys (500-1000km length of 2D seismic lines) and two to five 3D; seismic surveys (500-2500 km^2 of 3D coverage)

Exploration wells – three to five firm/contingent wells

Developments - one to two subsea developments tied back to existing infrastructure, one to two Floating Production Storage and Offtake vessels (FPSO) involving some eight to twelve development wells.

Area 2 – Area North of Shetland has never been licensed. Potential for hydrocarbons relatively unknown.

Estimated activity:

Seismic – two to five 2D seismic surveys (1000-4000 km length of 2D seismic lines), two to five 3D; seismic surveys (500-2500 km^2 of 3D coverage)

Exploration wells – one to three firm/contingent wells

For area 2 there is only sparse 2D seismic coverage, and there is a strong likelihood that a number of blocks will be applied for on a drill or drop/contingent well basis. An estimate of up to 10 drill or drop/contingent wells could be expected.

Area 3 - Shallow water coastal areas viewed as having limited hydrocarbon potential.

No activity expected.

The Report compares the estimates made at the time of SEA 1 with the actual activities, suggesting, "*the predictions provided an indication of the relative accuracy of previous DTI activity predictions and it is planned to continue this process of reality checking and adjustment of activity estimates as necessary for future SEAs*"

Table 3 – Comparison of activity predicted in SEA 1 against that resulting from 19th Round Licensing

Blocks[1]	Seismic surveys[2,]		Exploration wells			Developments	
	Predicted	Actual	Predicted	Actual	Drilled[3]	Predicted	Actual
204/18		2 Firm 1 Contingent		3 Firm 1 Contingent	1 (abandoned)		
204/17		1 Contingent 1 Reprocess		1 Firm 1 Contingent	1		
213/5 214/1		1 Firm 1 Reprocess		D/D	0		
213/26 213/27		1 Reprocess		D/D	0		
204/21		1 Firm 1 Contingent		1 Firm 2 Contingent	0		
204/9 204/10		1 Reprocess		1 Firm 1 Contingent	1		
176/20 204/16		1 Firm		D/D	1		
176/25		1 Contingent 1 Reprocess		1 Firm 1 Contingent	0		
Total	**10**	**5 Firm 4 Contingent 5 Reprocess**	**15**	**7 Firm 6 Contingent 3 D/D**	**4**	**5**	**See notes[4]**

1. Work programmes for licensed blocks are arranged according to Licence number with some licences covering more than one block.

2. Where work programmes have indicated, "acquire seismic data" this has been interpreted for comparison purposes as a seismic survey although it may in fact, merely be the purchase of for reprocessing of existing seismic data. Where reprocessing of seismic data has been indicated in the work programmes, these have been highlighted.

3. Actual wells drilled since 19th licensing round closed on the 27th February 2001.

4. Development plans for discoveries are dependent on the finding of economically viable reserves as a result of exploration activity and therefore it is not yet possible to fully review this aspect.

Based on the acceptable level of accuracy of previous estimates, **the SEA team chose not to consider "scenarios" for the scale of activity, having adopted only the most likely one.** As noted in the consultation process, the suggestion to consider two lower and upper activity scenarios for oil and gas activity was dismissed by the technical team as it considered the use of the predicted most likely level of activity to be more reasonable.

OESEA3

For OESEA3, exploration and production estimates are more diffuse. The Report assesses the trend observed in the 27th and 28th Rounds and concludes that "The number of exploration and development wells drilled on the UKCS shows a general decline over time, aligned with a decline in domestic gas and oil production. Recent UKCS oil and gas licensing Rounds (27th and 28th Rounds) have maintained interest in exploration, including of mature hydrocarbon areas. There is a consensus view that the great majority of large fields in shelf depth waters (<200m) have been found, and deeper water areas are either not prospective or are increasingly well explored and understood, however, the possibility of future major commercial finds cannot be discounted entirely. It is considered likely that the scale of future licensing Rounds will be analogous to that of the recent 27th and 28th Rounds", noting also the number of applications received may vary according oil price.

For context, the scale of former licensing rounds and the number of exploration wells drilled on the offshore UKCS over the last 15 years are shown in Figures 2 and 3 below.

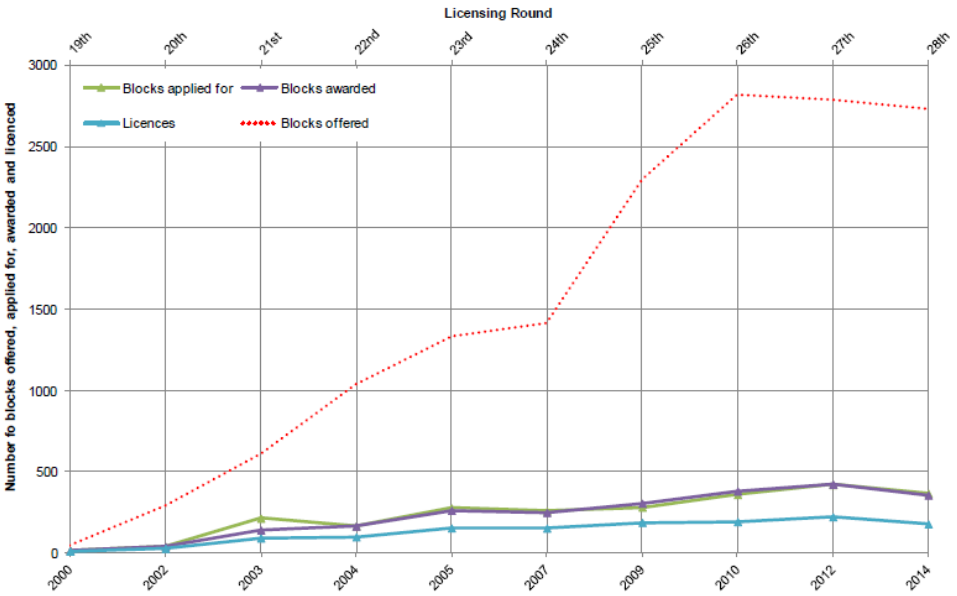

Figure 2 - Trends in number of blocks offered during each round and those applied for/licensed, 2000-2015

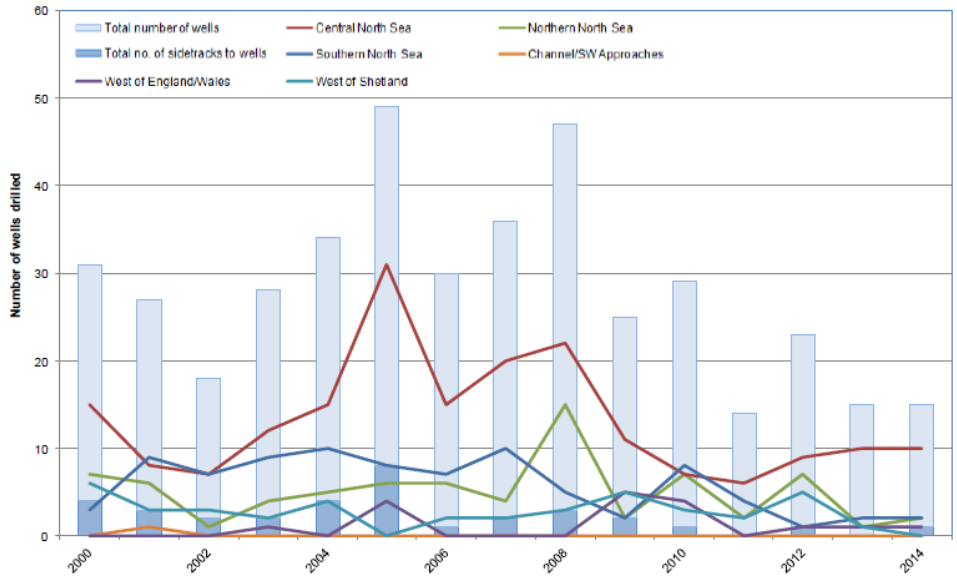

Figure 3 - Trends in exploration drilling in different areas of the UKCS, 2000-2015

The Report considers that based on previous experience, typically less than half the wells drilled reveal hydrocarbons, and of that half less than half again will yield an amount significant enough to warrant development. Also, for seismic survey, purchase and reprocessing of existing seismic data is often used; and development includes production facility installation which may be fixed or floating, and generally the installation of pipeline(s), which for major developments could come ashore but are more often “tied back” to existing export infrastructure, and the drilling of producer and injector wells.

The Report outlines the expected type and scale of activities which could take place in each Regional Sea derived from the trends in number of blocks applied and exploration drilling, between 2000 and 2015.

RS	Oil and Gas
1*	Prospectivity is largely for oil in the northern North Sea, Moray Firth and central North Sea Basins. The east Shetland Platform and mid North Sea High areas are comparatively underexploited. The latter has been the subject of an OGA survey to inform a 29th seaward licensing Round. It is likely that further Blocks will be applied for in Regional Sea 1 during the currency of this SEA.
2	Prospectivity in the southern North Sea Basin is primarily for gas. A portion of the mid North Sea High area is located in the north east of Regional Sea 2. It is likely that further Blocks will be applied for in Regional Sea 2 during the currency of this SEA.
3	Prospectivity in the Channel (Anglo-Paris Basin) has historically been for oil, produced by extended reach drilling from shore, however a single gas discover has also been made. It is possible that further Blocks will be applied for during the currency of this SEA.
4	No economically exploitable hydrocarbon stores have been discovered to date in the South West Approaches Basin, and the majority of blocks in this area have never been licensed. It is possible that some Blocks may be applied for in Regional Seas 4 and 5 during the currency of this SEA.
5	
6*	Prospectivity is largely for gas and has to date been restricted to the East Irish Sea Basin. Oil has been commercially produced in only small quantities. It is likely that further Blocks will be applied for in the East Irish Sea Basin during the currency of this SEA The northern section of the Cardigan Basin has been subject to previous exploration, but without commercial success. It is possible that further Blocks will be applied for in the Cardigan Basin during the currency of this SEA.
7*	The majority of Regional Sea 7 falls within the bay closing lines subject to landward Regulations. The remaining area has not been commercially exploited to date, however a number of blocks in Northern Irish waters around Rathlin Island were licensed in the 26th seaward round. It is possible that further Blocks will be applied for during the currency of this SEA.
8*	The western extent of Regional Sea 8 which is covered by the Rockall Basin is generally under explored, and a single gas discovery has been made in the area. It is possible that further Blocks will be applied for during the currency of this SEA.
9*	Exploration in this area has been comparatively small compared to the rest of the UK, however a number of significant oil and gas developments have taken place in the West of Shetland Basin. Geological barriers to seismic survey and drilling north of 62°N has resulted in historically limited exploration.
10*	The Rockall Basin is generally under explored. The basin within Regional Sea 10 has been the subject of an OGA survey to inform a 29th seaward licensing Round. It is likely that Blocks will be applied for during the currency of this SEA.

Table 4 - Activity by Regional Sea (oil and gas)

11 - Areas outside of the EEZ are not considered.

Regional Seas 1, 2, 6 (East Irish Sea Basin), 10 - **It is likely** that further Blocks will be applied for in during the currency of this SEA.

Regional Seas 3, 4, 5, 6 (northern section of the Cardigan Basin), 7, 8 - **It is possible** that further Blocks will be applied for during the currency of this SEA.

Regional Sea 9 - Exploration in this area has been comparatively small compared to the rest of the UK, however a number of significant oil and gas developments have taken place in the West of Shetland Basin. Geological barriers to seismic survey and drilling north of 62°N has resulted in historically limited exploration.

THE CONSULTATION PROCESS

Consultation is a fundamental step in SEA process, involving authorities and consultation bodies with environmental responsibility, NGOs and public, as well as other EU Member States, "*where the implementation of the plan or programme is likely to have significant effects on the environment of that country*". The process includes "**scoping**", "**assessment workshops**", "**regional stakeholder meetings"** and **Post Consultation Report** and occurs throughout all phases of assessment and review of the Environmental Report.

Given the importance of consultation to the SEA process, the various phases of consultation will also be considered for SEA 4 (North and West Area of Orkney and Shetland) and compared to those undertaken for OESEA3.

SEA 4 was implemented in 2003/2004, exclusively focused on oil and gas exploration and production projects. OESEA3, in 2015/2016, as seen above, had a broader geographical scope, considering the UK Exclusive Economic Zone and the territorial waters of England and Wales, for offshore renewable energy; the UK territorial waters and the UK EEZ, for gas storage and carbon dioxide storage[16]; and all UK waters for offshore oil and gas licensing.

[16] CCS in Scottish territorial waters is a devolved matter and so not covered in OESEA3 plan/programme.

The following presents a comparison of the two assessments, noting the differences in scope (the geographic area covered and the activities included) as well as the relative maturity of the assessment processes.

SEA 4 **OSEA3**

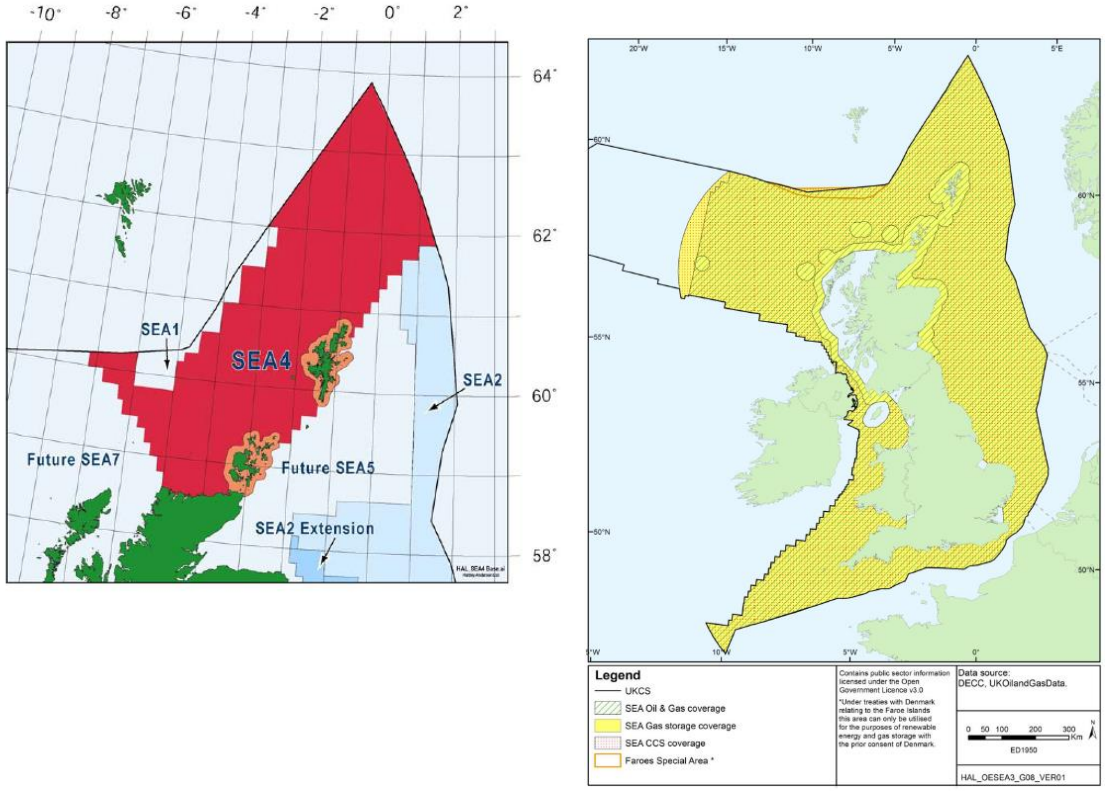

Figure 4 - the geographical coverage for SEA4 and OESEA3

Scoping – SEA 4 and OESEA3

A key purpose of scoping is to identify key issues of concern at an early stage so that they can be considered in appropriate detail in the SEA. Scoping also aids in the identification of information sources and data gaps that may require to be filled by studies or surveys to underpin the assessment.

SEA 4

The scoping process has been maintained throughout SEAs, with some variations, especially regarding the need to obtain primary data. For SEA 4 there were two stages in the scoping process; initial scoping consultation with a **range of academics and conservation organisations** was carried out in early 2002, focussed on ascertaining seabed survey needs. This part of scoping was conducted early because of the timescale needed to organise, collect and analyse offshore seabed information and samples.

A preliminary review, with input from the SEA Steering Group, of the availability of information to support preparation of the environment description for the assessment concluded that a number of studies were required. These studies were commissioned either to provide expert reviews or data syntheses in areas for which synoptic overviews were not published or readily available[17]. In addition,

[17] SEA 4 commissioned reports: The Scope of Strategic Environmental Assessment of Continental Shelf Area SEA 4 in Regard to Prehistoric Archaeological Remains; Synthesis of Information on the Shallow Benthos of the SEA 4 Area; An Overview of Benthic Ecology of the Faroe-Shetland Channel; An Overview of Cephalopods Relevant to the SEA 4; Coastal Conservation Sites in the SEA 4 Area; Existing Users and Management Initiatives Relevant to SEA 4; Fish and Fisheries in the SEA 4 Area; Sub-seabed Geology; Continental Shelf Seabed Geology and Processes; Geological Evolution Pilot Whale Diapirs and Stability of the Seabed Habitat; Background Information on Marine Mammals Relevant to Strategic Assessment 4; Plankton Report for Strategic Environmental Assessment Area 4; Seafloor Sediments and Sedimentary Processes on the Outer Continental Shelf, Continental Slope and Basin Floor; and The Potential Socio-Economic Implications of Licensing the SEA 4 Area (Strategic Environmental Assessment Area North and West of Orkney and Shetland, 2.6.1 Studies. p11, available at:

scoping concluded that although parts of the area had been surveyed between 1996 and 2000, additional information on seabed habitats and fauna would be needed for SEA 4 purposes and, as such, a survey of targeted areas of SEA 4 was conducted in the summer of 2002, comprising geophysical and biological sampling.

A **scoping pamphlet**[18] was prepared providing an overview of: proposed licensing; the Strategic Environmental Assessment process; draft **contents list** for the public consultation assessment document; key information sources on the environment; and further consultation to be conducted as part of the SEA process.

A broader scoping consultation exercise for SEA 4 was undertaken in Spring 2003 involving some 135 stakeholders. The scoping exercise **was carried out electronically**, through the circulation of the scoping pamphlet. In addition, hard copies were available for those without ready access to e-mail and internet facilities.

According SEA 4 assessment document, the issues raised during scoping for consideration or more detailed consideration were, among others: Marine archaeology; Adequacy of offshore seabird data; Potential new offshore reef locations; Tourism; Mitigation for nearshore operations; Exclusion of blocks in close proximity to Fair Isle; Establishment of bay closure lines around offshore islands; Linkage between the SEA and licensing processes; OSPAR list of threatened and/or declining species and habitats; Maximum activity scenarios; Orange roughy fish; and Offshore Natura 2000 sites and Visual intrusion.

The scoping process also identified some more precise items for which more detail would be needed, as invasive non-native species; water quality and bathing waters; eels and migratory fish. The issue of the widespread and significant decline in abundance of harbour seals in northern and eastern Scotland was considered (reasons are yet unclear, but they could be exacerbated by inappropriate development or activity in areas of importance to the species).

The scoping has also included some more general themes that will be discussed more extensively throughout this report: for example, the necessity of including greater clarity on **how cumulative** and **secondary effects will be assessed** and how the SEA will inform subsequent planning stages; and **the lack of conclusions in the form of spatial mapping** ("The SEA should identify potential development in a way that is as spatially well-defined as possible, with an emphasis on establishing the right technology in the right place" and "This approach repeats those of former SEAs, misses the opportunity to develop a plan that can deliver energy with low environmental impact, and has led to unnecessary conflict at the project stage due to poor siting of, for example, offshore wind zones with associated uncertainty and risk for developers").

OESEA3

OESEA3 scoping (similar to previous SEAs) specifically aimed to

- Promote stakeholder awareness of the SEA initiative
- Ensure access to relevant environmental information
- Identify opportunities for potential collaboration and the avoidance of duplication of effort
- Identify information gaps so these could be evaluated and filled if necessary
- Identify stakeholder issues and concerns which should be considered in the SEA

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197814/SEA4_assessment.pdf)

[18]Strategic Environmental Assessment of the area North and West of Shetland and Orkney SEA 4 Background Information and Scoping Request April 2003, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197815/SEA4_scoping_pamphlet.pdf (the pamphlet proposes a detailed structure for the future assessment document based on the experience of previous SEAs - 12p).

OESEA3 scoping document[19] was prepared and a formal scoping exercise with the statutory Consultation Bodies/Authorities for Wales, Scotland, England and Northern Ireland and other stakeholders was conducted from 31st July to 4th September 2015.

The scoping consultation **was undertaken by emailing** directly to the **statutorily defined Consultation Bodies (see footnote 9) and Authorities and by also making the scoping document available on the DECC Offshore Energy SEA pages of the gov.uk website**.

In addition, the Joint Nature Conservation Committee (JNCC), the Marine Management Organisation (MMO) and Marine Scotland (MS) were included as consultees for OESEA3 (statutory bodies not in existence at the time of SEA 4). **It was also proposed to include the wide range of interested stakeholders and the general public in the scoping consultation exercise**.

In order to provide an initial basis for the consultation, the scoping document consisted of a robust and structured report including a "Proposed Report Section Contents". The document already considered the range of energy related activities in the UK marine environment and their geographical limits; the SEA's objective and policy context; prospectivity and likely scale of OESEA3 related activity; a list of other relevant Plans and Programmes; a summary of the Environmental Baseline; and the likely evolution of the environmental baseline. The document also proposed an initial list of the main potential sources of environmental effects from activities which could follow adoption of the draft plan/programme, as well as possible SEA indicators and related monitoring.

Thus, the answers tended to be objective and complementary, reinforcing the "additional" character of the information requested in the consultation.

Questions:

1. Consultees are invited to highlight additional initiatives which they consider are relevant to the draft plan/programme.

2. Consultees are invited to draw attention to and provide (where relevant/possible) additional information and data sets which they consider of potential relevance to this SEA.

3. Do you agree with the choice of Regional Seas used to help describe the environmental baseline?

4. Are there any **additional** environmental problems you consider to be relevant to the SEA?

5. Are there any **additional** influences, and supporting data sources, on the likely evolution of the environmental baseline?

6. Are there any objectives that you feel should be included or removed?

7. Are the indicators for each objective suitable? If not please suggest alternatives.

8. Do you have any comments on the sources of potentially significant effect for each of the activities covered by the draft plan/programme, including whether they should be scoped in or out of assessment in the Environmental Report?

9. Are there any **additional** information sources or existing monitoring arrangements which could be used to inform monitoring of the offshore energy draft plan/programme?

10. Do you have any comments on the proposed approach to consultation?

Responses were received from 19 organisations[20] and compiled in a DECC Report[21].

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[19] Future Leasing/Licensing for Offshore Renewable Energy, Offshore Oil & Gas and Gas Storage and Associated Infrastructure. Scoping for Environmental Report. July 2015. 130p, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/534335/OESEA3_Scoping_Document.pdf

[20] Welsh Assembly Government's Historic Environment Division (Cadw); Department of the Environment Northern Ireland (DOENI); The Crown Estate (TCE); Natural Resources Wales (NRW); RenewableUK (RUK); Royal Society for the Protection of Birds (RSPB); Scottish Natural Heritage (SNH); Joint Nature Conservation Committee (JNCC); Historic England (HE); Natural England (NE); Scottish Environment Protection Agency (SEPA); Historic Scotland (HS); Response on behalf of: Humane Society International UK, Marine Conservation Society and Whale and Dolphin Conservation (WDC *et al*.); Marine Management Organisation (MMO); Environment Agency (EA); Tidal Lagoon Power (TLP); Carbon Capture and Storage Association (CCSA); EDF Energy (EDF); and The Wildlife Trusts (TWT).

[21] Synthesis of Responses to OESEA3 Scoping. November 2015, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/534333/OESEA3_scoping_compilation.pdf

It is important to note how the scoping document varied between SEA 4 and OESEA3, significantly increasing the scope and quality of information available for consultation and the twelve page pamphlet evolved into a more robust 130 page scoping document.

Assessment Workshop - SEA 4 and OESEA3

SEA4

The Assessment Workshop held during two days in May 2003 also brought the expertise of **the SEA Steering Group, the authors of the SEA 4 underpinning technical reports, as well as other users of the offshore area and the SEA team.** The Assessment Workshop aimed to review the potential interactions between the potential activities following licensing of the SEA 4 area and receptors within the environment (both the natural environment and human uses of the area) to identify those which might potentially have effects of a scale which should be considered further in the SEA. The workshop aimed also to review areas, sites and features of the SEA 4 region, to identify any requiring additional protection over and above that available through existing mechanisms, identify gaps in information and understanding, and assess their influence on the confidence with which the SEA 4 assessment of likely effects and necessary mitigation can be made.

This initial step drew on input from scoping, published descriptions of the effects of oil and gas activities, previous SEAs and the EU SEA Directive. The next stage was to review the potential interactions to identify those which might potentially have effects of a scale which should be considered further in the SEA. Prior to the workshop, a pack of background information was circulated including a provisional environmental interactions matrix and the scale of potential activity in the SEA 4 area.

Expert judgement was used to identify those interactions which should be considered further in the SEA. The criteria used in the consideration included the scale, severity and duration of effects on the environment, human health and socio-economics, together with issues of public concern. In this way the review attempted to ensure balanced consideration of scientific and perception issues.

The workshop initially considered matrices correlating sources of potential impacts and environmental receptors, in a score from 1 to 6; 1 to “no effects foreseen”; 2 for positive effects; 3 for “minor or negligible effects”; and 4 to 6 for issues to be considered further in SEA 4.

Table 5 below shows the potential consequences that explain the applied score.

Table 5 – Potential consequences derived from sources of potential impacts

Potential consequences	Key[4]	
No detectable effects	1	
Activity may contribute to recovery of habitats Incidental positive benefits to local, regional or national economy May generate information useful for understanding or management	2	
Change is within scope of existing natural variability but potentially detectable	3	
Disturbance of populations of species in areas of importance for their breeding, feeding or other parts of the life cycle with expectation of good recovery[1] Damage[3] to an offshore area 100 hectares or more, or 2 hectares or more of a benthic fish spawning ground or coastal habitat with expectation of good recovery Low potential to cause change[2] to internationally or nationally protected populations, habitats or sites Possible but unlikely effect on human health Possible transboundary effects Possible contribution to cumulative effects Issue of limited public concern May cause nuisance Damage to a building or site with historic, architectural or archaeological value, possibly reducing its importance Possible short term minor loss to business, communities or public finance	4	Issues to be considered further in SEA
Disturbance of populations of species in areas of importance for their breeding, feeding or other parts of the life cycle with expectation of moderate recovery[1] Damage[3] to an offshore area 100 hectares or more, or 2 hectares or more of a benthic fish spawning ground or coastal habitat with expectation of moderate recovery Moderate potential to cause change[2] to an internationally or nationally protected populations, habitats or sites Transboundary effects expected Moderate contribution to cumulative effects Issue of public concern Possible effect on human health Damage to a building or site with historic, architectural or archaeological value, reducing its importance Possible medium term loss to loss to business, communities or public finance	5	
Disturbance of populations of species in areas of importance for their breeding, feeding or other parts of the life cycle with expectation of poor recovery[1] Damage[3] to an offshore area 100 hectares or more, or 2 hectares or more of a benthic fish spawning ground or coastal habitat with expectation of poor recovery High potential to cause change[2] to an internationally or nationally protected populations, habitats or sites Major transboundary effects expected Major contribution to cumulative effects Issue of acute public concern Likely effect on human health Destruction of a building or site with historic, architectural or archaeological value Long term, substantial loss to business, communities or public finance	6	

Notes to matrix:

1. Assessed using expert judgement, consistent with the following general principles; Potentially affected area is > 10% biogeographic population (where quantification practicable); Recovery to pre-licensing status within: 1 year = good; 5 years (or 2 generations for long lived species) = moderate; 10 years (or 5 generations for long lived species) = poor;

2. Change - an effect contrary to the objectives of management plans for national or international sites or species;

3. Damage - an injury or harm impairing the function or condition of a person or thing;

4. Colour and numerical code used in interactions matrices.

For each source of potential impact (underwater noise, physical damage to biotopes, physical presence, marine and subsurface discharges, atmospheric emissions, wastes to shore and accidents) the vulnerable receptors were identified (Seismic - Marine mammals, Marine reptiles; Drilling / rig anchoring - Benthic fauna, Fish & Shellfish, Fisheries, Archaeology; Production / installations and pipelines – Seabed Fisheries, Other seabed users, Coastal & amenity, Archaeology & heritage).

Those impacts that could affect climatic changes, conservation sites, cumulative effects and transboundary effects were highlighted.

Despite the use of comparative matrices, **the method has no quantitative implications**, as the exercise aimed only at identifying those interactions, which should be considered further in the SEA.

OESEA3

An **Assessment Workshop** involving **the SEA Steering Group and SEA team** was held in December 2015. The output of the workshop included the final list of SEA objectives and indicators, the draft plan/programme alternatives and a list of topics to be considered in more detail in the Environmental Report.

There was no mention of the use of of comparative matrices or any other methodologies, even qualitative ones, to compare interactions which should be considered further in OESEA3. The participants in the Assessment Workshop were restricted to the SEA team and Steering Group.

Stakeholder dialogue meeting - SEA 4 and OESEA3

SEA 4

A stakeholder workshop meeting was held in Nairn on 1 July 2003, facilitated by independent facilitators People=Positive™ on behalf of the DTI. **A wide variety of potential stakeholders, drawn from UK and other regulators, government advisers, local authorities, other industry representatives, academics and NGOs were invited to the session**. The dialogue session aimed to fulfil a variety of functions including:

• Update stakeholders on SEA 4 progress and issues

• Gather stakeholder input to and comments on the information and analysis on which SEA 4 will be based

• Seek suggestions on ways to further improve future SEAs of other areas of the UK Continental Shelf (UKCS) prior to decisions on further large scale licensing.

The meeting was attended by thirty five stakeholders and included presentations on the UK & international regulatory context, SEA 4 process, oil and gas activities that could follow further licensing, and the natural environment and human uses of the SEA 4 area. Four stations were established (covering the SEA process and context, the SEA 4 physical, chemical and ecological environment, human interests in the SEA 4 area and a consideration of effects and controls) each with a number of posters, which formed the basis for facilitated discussion, the outcome of which was noted on flip charts. Stakeholder input was captured and a learning portfolio report of the meeting was produced by People=Positive™[22].

OESEA3

Three **regional stakeholder meetings** were held in in London, Aberdeen and Bristol on the 1st February, 2nd February and 5th February 2016 respectively. **An open invitation was made to a wide variety of potential stakeholders to the workshops, and participants included UK regulators, government advisors, local authorities, other industry representatives, academics and non-governmental organisations**. The stakeholder workshops aimed to gather industry perspectives and stakeholder input on the key issues to be addressed in the assessment for the Offshore Energy SEA, along with input to and comments on the information and analysis on which the SEA is being based[23].

Delegates were asked the following questions:

1. Are there emerging issues or additional sources of potentially significant environmental effects from the technologies covered in the current draft plan?

2. What do you view as key spatial constraints for the siting of major marine energy developments in the context of the multiple uses/designations of the seas around the UK, together with the need for security of energy supply and response to climate change?

3. Are there sources of potentially significant environmental effects from the technologies covered in the current draft plan which you feel are not fully covered by existing operational controls/permitting requirements?

[22] Learning Portfolio DTI Strategic Environmental Assessment SEA 4 Stakeholder Workshop Newton Hotel, Nairn 1st July 2003, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197816/SEA4_Stakeholder_Workshop.pdf

[23] The stakeholder input on the information base and other issues of relevance to the SEA is summarised in Appendix 4 of OESEA3 Environmental Report. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/504581/OESEA3_Appendix_4_Stakeholder_workshops.pdf

4. Are there additional practical mitigation techniques for sources of potentially significant environmental effects from the technologies covered in the current draft plan which you would like to draw to our attention?

5. Are there recent studies, reports, or other information which should be considered for OESEA 3 Environmental Report?

Questions 2 and 3 are particularly interesting as they propose, respectively, to obtain more information about spatial constraints for the proposed activities and to indicate situations not fully covered from existing operational controls or permitting requirements and possibly non-mitigated.

Regarding the discussion of possible **environmental constraints** for the installation of planned activities, DECC noted, "*we are trying to strike a balance between varying interests. For instance if conservation sites were regarded as no-go areas for siting offshore wind, given the distribution of conservation sites* ***little new offshore wind could be constructed in the southern North Sea****, but we can flag such issues in the Environmental Report as a basis for consultation and to inform Government decisions*" and "*It should be borne in mind that the presence of a (conservation) designation does not preclude development there*".

Regarding the establishment of a weight scale to identify areas best suited to a given project type the DECC considered that "*we tend to avoid setting numerical scores as the range of interactions is complex and single values do not inspire confidence in them. Several other studies have undertaken constraint exercises with an environmental or socio-economic focus; however, we are trying to reflect the range of sometimes competing interests*".

Concerning effects not mitigated from existing operational controls or permitting requirements, questions were raised on the need to take into account cumulative effects. According to DECC "*cumulatives are a common theme. Within the Environmental Report, we look at them at different scales. We try to reflect certainty in the near field and uncertainty in the far field. There are such huge gaps in knowledge that to assess cumulatives projecting too far forward into the future may be misleading*".

It was noted the need to identify the most significant effect, and from what activity. According to DECC, "I*n oil and gas terms, the vulnerability of beaked whales to noise is a specific example where current guidance would not help in mitigating effects due to the specific vulnerability of these animals. The majority of potential effects and siting have controls to prevent significant damage, including within conservation sites. Realise that information gaps exist and that some adaptive management may be required. There is a history of issues having been resolved and effectively regulated. Marine Spatial Planning is a new initiative, and if one thing is prioritised, there is the chance of disadvantaging others, so a balance has to be struck. Part of the role of the SEA is to lay the information and choices before Government and the public for them to make input to decisions*".

Post Consultation - SEA 4 and OESEA3

SEA4

The SEA 4 consultation document and supporting documents were available for review and public comment for a period of 90 days from the middle of September 2003. Responses were received via the SEA website and as e-mailed or hard copy correspondence. Feedback was received from Faroese Food, Veterinary and Environmental Agency (FVEA), Joint Nature Conservation Committee (JNCC), Royal Society for the Protection of Birds (RSPB), Marine Conservation Society (MCS) and Whale and Dolphin Conservation (WDC).

The Post consultation report was published in January 2004[24].

Some questions raised by the interlocutor institutions in the Post Consultation Report may shed light on some methodological options used at SEA.

[24] Department of Trade and Industry. Strategic Environmental Assessment of the Area North and West of Orkney and Shetland SEA 4. Post Public Consultation Report January 2004, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197810/sea4_post_consultation_report.pdf

For example, the RSPB expressed the need to consider two scenarios (lower and upper activity) for oil and gas activity planned in subsequent rounds. However, the SEA team considered more reasonable to use the predicted most likely level of activity and that the overall recommendation of the SEA was "*predicated on the projections of the likely scale and location of activities that could follow licensing*" and "*if these are likely to be substantially exceeded*" the conclusions of the SEA will be re-examined.

MSC noted the need of additional surveys to be certain than no pockmarks[25] and biogenic reefs occur in the SEA 4 area. According the SEA team, "*such surveys are unlikely to have detected any but the largest submarine structure made by leaking gases. However, such structures would be identified by pre-activity seabed surveys such as rig site and pipeline surveys*"

JNCC, WDC and MCS considered that "SEA 4 document did not demonstrate how the conclusion had been reached that there is an acceptably low risk of potential effects of underwater noise resulting from SEA 4 activities". The answer exemplifies how, if unable to demonstrate the full absence of impacts, SEA should adopt a precautionary way and suggests the regulator to consent and manage these activities and work towards reducing the environmental footprint of noise – "*given the existing and apparently effective mitigation and measures and apparent lack of significant detrimental effects from previous seismic activities the potential effects from underwater noise were judged on balance, to be acceptably low risk. It is recognised that gaps in understanding remain about potential far-field and additive/ cumulative disturbance effects that may arise…that although the risk is believed to be low this cannot be objectively demonstrated at this time. This problem is recognised internationally and work is ongoing to try and fill these data gaps*". **In the meantime, the regulator "*will consent and manage these activities in a precautionary way and work towards reducing the environmental footprint of noise*"**.

Consideration of cumulative effects was raised by WDCS, which claims the corresponding section of the document "does not adequately provide a full assessment of cumulative impacts". Also JNCC noted DTI (or the oil and gas industry as appropriate) should adopt the recommendations to minimise disturbance to marine mammals,

The SEA team pointed that "*all potential cumulative effects were considered significant and were taken forward for further discussion within the SEA 4 assessment document*", but "*the subject of cumulative and synergistic effects assessment is fraught with difficulty*…"

OESEA3

The Environmental Report and draft plan/programme were being issued for an **eight-week public consultation** period (between 3rd March and 29th April 2016). A **Post Consultation Report** was prepared and placed on the SEA pages of the gov.uk website collating the comments and DECC responses to them.

Post-Consultation for OESEA3 was especially important in raising conceptual and methodological issues for the discussion of SEA's expected boundaries in terms of its range of coverage.

The Post-Consultation also favored the debate on a possible regulatory uncertainty brought about by the refusal of consent of the Offshore Wind Farm - OWF "Navitus" project.

SEA team responses and considerations appear in *italics*. Our own highlighting are in **bold**.

EDF Energy and Energy UK – "The perception of developers is that sites identified as suitable for development following application of the Government's own principles and documents outlined in the development process have a high likelihood of receiving planning permission. **However, this is not necessarily the case and we believe the SEA process must learn from recent practical experiences in offshore energy consenting**".

EDF Energy - [There is] "particular experience with the Navitus Bay offshore wind project where a site was identified using the Offshore Wind Licensing Round 3 process and previous OESEA2 as a suitable development site. At significant cost, it was taken through the planning process for it to then be rejected on an issue that was considered as manageable in both the Offshore Wind Licensing

[25] Deep depressions in the sediments created by escaping gas from beneath the seafloor. https://www.sciencedirect.com/topics/earth-and-planetary-sciences/pockmark

Round 3 process and previous OESEA2. There are lessons to be learned from such rejections of apparently suitable development sites".

SEA team:*.. the previous OESEAs, and OESEA3, consider the potential technical resource areas for wind and other technologies within the remit of each aspect of the draft plan/programme**. The SEA makes no specific recommendation on particular sites or identifies particular areas or zones for preferred development, but instead indicates that certain locations may be less suitable or carry greater risk due to a number of constraints, whether these are environmental or in relation to other users of the sea.** Sections including those on the overall spatial consideration and seascape consider the implications of the conclusions relating to the decision on Navitus Bay. Due to the high level nature of the SEA, a balance has been sought to take account of this decision whilst also not making conclusions which would unduly restrict potential areas for future development. …. **Furthermore, regional scale considerations and policy relating to activity in UK seas is being augmented by the Marine Planning process, which may provide further locational guidance in the future.***

Therefore, it can be inferred from the SEA team's response that SEA does not intend to become more prescriptive in terms of spatial planning; however, the developer should also not assume that because an issue was not been identified at the strategic level means that it may not be significant at the project level.

WDC commented on SEA's inefficiency in defining the areas to be awarded in licensing rounds: "Despite many years of the SEA process, most of the UK's seas are still seen as open house for any developments with little sign of the SEA process changing anything in the licensing processes".

SEA team: *The SEA has placed spatial restriction on certain areas for oil and gas licensing in the past, and continues to do so for e.g. through its recommendation to withhold blocks from licensing to the west of 14˚W and those waters beyond the shelf break (>200m) in the Southwest Approaches. Additionally, the information contained in the SEA (including summaries of research undertaken through the SEA programme) are key inputs to information provided as part of each licensing round to enhance applicant awareness of environmental sensitivities.*

Other questions raised the discussion on the SEA scale:

Scottish Power Renewables - SPR, Energy UK, RenewableUK – "Support the recognition within OESEA3 that more detailed consideration of mitigation measures should be undertaken on a project-specific basis. This is welcome as mitigation is highly site specific and dependent on site conditions and other technical constraints **so it would be inappropriate to set out prescriptive mitigation requirements in a strategic document such as OESEA3**.

The UK offshore wind industry is at a critical point, balancing the need for rapid deployment and innovation with UK government cost reduction targets. Therefore it is imperative that the industry has a clear line of sight with regard to future leasing opportunities, and financial support, from government to ensure that the industry and supply chain can continue to plan for the future in terms of project development and investment.

For these reasons, we do not support the option not to offer any areas for leasing or licensing or to restrict areas offered for leasing or licensing, temporally or spatially, as this will not contribute to the UK targets and could place the expansion of the UK's offshore wind industry and associated supply chain in jeopardy".

SEA team: *the SEA has not definitively excluded any areas for renewables, however, it draws attention to a number of sensitivities (environmental and socio-economic) which indicate that development will not be suitable in all locations.*

Marine Scotland - Individual applications require clarity on effects on individual protected areas - species and habitats - not regional scale impacts. The Report could provide further detail on the applicability of this data in the consenting process and **what further information would be required when taking applications forward**.

SEA team: *The strategic nature of the Environmental Report is such that it may be used to inform developers, however site-specific information will always be required at the project level, which is acknowledged in the report, including in its recommendations.*

Discrepant conclusions regarding results:

WDC - The SEA states that with regard to impacts on porpoise the **"*degree of uncertainty remains uncomfortably high*" but then goes on to conclude overall, regarding noise generally, that "*current mitigation measures are deemed sufficient in reducing risk of injury to negligible levels*".** This simply cannot be justified from the evidence given**.** No real mitigation is proposed and once again no proper conclusion is given to disturbance, strict protection and potential cumulative impacts across sectors.

SEA team: *It should be noted that the first statement refers to extrapolations from individual changes in behaviour to population effects, while the second is specific to the risk of injury to individual animals. While uncertainty is very high in the first case, current evidence is sufficient to justify the statement with respect to injury.*

Previous SEAs have recommended consideration of the establishment of criteria in relation to underwater noise for determining limits of acceptable cumulative impact and for subsequent regulation of cumulative impact. The advances made in this respect through the establishment of the indicator on low- and mid- frequency impulsive sounds under the Marine Strategy Framework Directive are recognised. While criteria have not yet been defined, the establishment of the Marine Noise Registry database to collate occurrences of 'noisy activities' represents the necessary precursor. It is recommended that these efforts are prioritised ***to allow effective consideration of the cumulative impacts of underwater noise.***

UK Statutory Nature Conservation Bodies - SNCB – "The SEA report rightly considers it likely there will be cumulative effects on marine mammals resulting from potential licensing or leasing. It is reasonable to assume that most, if not all, individual projects will not have a significant effect on the large and wide-ranging populations of marine mammals**. It is the potential impact resulting from the combined effect of several pressures on a population that could cause declines**. Whilst we agree that planning and operational controls can reasonably cover the risk of auditory injury that could result from noise exposure**, the risk of disturbance, particularly of the cumulative effects of several disturbances is considerably more difficult to assess and mitigate.** The lack of adequate cumulative effects assessments (CEAs) is a major shortcoming of current processes and there is an urgent need to establish ways in which this can be undertaken and to develop the means to manage cumulative effects if needed".

SEA team: *As indicated in Section 5.16 of the SEA, DECC are aware of the Cross-Government Cumulative Effects Assessment Working Group, and will maintain awareness of relevant outputs from this and other groups working in the field of cumulative effects.*

SNCB – "We strongly suggest the SEA report should recommend that a cumulative effects framework is developed by UK Regulators so that pressures are recorded and effects modelled and new projects and plans assessed against a background of existing and past pressures. Such a framework would contribute to impact assessments that more appropriately reflect the relevant biological scales".

SEA team: *It should be noted that* ***a sound modelling exercise has been commissioned***[26] *under the current SEA research programme to model underwater sound propagation during geophysical seismic surveys, and predict received sound levels for marine mammals with respect to injury sound level thresholds.*

SEA vs. spatial restriction

SEA team: *A key role of the SEA is to assist those at the next development stage by raising their awareness of certain sensitivities and possible constraints, which are in part informed by previous development level assessment and consent outcomes… There is therefore the potential for greater stakeholder interaction and consenting risk for development in nearshore areas, but the SEA did not definitively exclude any area of potential resource for renewable technologies. It is understood that the presence of a Natura 2000 site does not preclude development, however there are additional assessment requirements associated with these sites, and despite mitigation, not every proposal*

[26] Modelling of received sound levels by marine mammals during geophysical surveys (OESEA-17-78). Project Ongoing. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/656623/Offshore_Energy_SEA_-_Recent_Research_Summary.pdf

(alone or in combination) may pass the HRA tests, or meet IROPI (Imperative Reasons of Overriding Public Interest) requirements[27]. These are highlighted here for awareness.

The Crown Estate - TCE – "Support the conclusion of OESEA3 that alternative 3 to the draft plan/programme is the preferred option, that the area offered for leasing/licensing is restricted spatially, **however it is unclear how such restrictions will be defined and applied**, and also the relationship with OESEA3, Marine Planning and other processes which guide development location".

SEA team: *Previous seaward oil and gas licensing rounds have restricted areas available for licensing on the basis of the outcome of the SEA. DECC are cognisant of the content of adopted marine plans, and is involved in providing input to remaining plans. The SEA has reflected the existing regulatory and policy framework of the UK and that these and related initiatives provide a level of activity control, or environmental protection. The SEA has sought to reflect this in the assessment and recommendations unless there are clear areas where issues remain.*

WDC – "Under alternative 3, a detailed assessment of spatial exclusions and key mitigation measures should be presented. We would recommend an approach based on the recommendations of the former Joint Links Oil and Gas Environmental Consortium (JLOGEC) where, instead of a presumption for development across all waters the SEA would designate certain categories of regions, namely that the SEA should identify Sacrosanct, Moratoria and Potential Areas".

SEA team: *It should be noted that the nature of resources is prospective and exploratory, and though it may be expected that future oil and gas development will likely take place in those basins exploited to date, frontier areas may present new opportunities for exploration and production. The SEA has not concluded that development should be precluded in any area for renewable technologies, but has highlighted the range of environmental sensitivities, other uses of the sea, potential sources of effect, and information gaps which remain, and that site-specific assessment will be required.* ***The area to the west of 14˚W west and those waters beyond the shelf break (>200m) in the Southwest Approaches have been withheld from oil and gas licensing.***

THE ENVIRONMENTAL REPORT

The SEA Directive also sets out the information to be included in the report of the Strategic Environmental Assessment. The Environmental Report is the central piece of the SEA process and includes a detailed survey of the environmental baseline, pre-existing problems, their expected evolution without the implementation of the plan, likely significant environmental effects, mitigation measures, recommendations and monitoring proposals.

[27] Item "Habitats Regulation Assessment (HRA)" on page 27 and Annex 2 provide further details on the HRA process.

Table 6 - Information to be included in Environmental Reports

1.	An outline of the contents and main objectives of the plan/programme, and of its relationship with other relevant plans/programmes.
2.	The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan/programme.
3.	The environmental characteristics of areas likely to be significantly affected.
4.	Any existing environmental problems which are relevant to the plan/programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the conservation of wild birds and the Habitats Directive.
5.	The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan/programme and the way those objectives and any environmental considerations have been taken into account during its preparation.
6.	The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as - (a) biodiversity; (b) population; (c) human health; (d) fauna; (e) flora; (f) soil; (g) water; (h) air; (i) climatic factors; (j) material assets; (k) cultural heritage, including architectural and archaeological heritage; (l) landscape; and (m) the interrelationship between the issues referred to in sub-paragraphs (a) to (l).
7.	The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan/programme.
8.	An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.
9.	A description of the measures envisaged concerning monitoring in accordance with regulation 17.
10.	A non-technical summary of the information provided under paragraphs 1 to 9.

Organization of the Environmental Report

Table 7 - Structure of the Environmental Report

Section	Summary
Non-technical summary	A stand alone summary in non technical language of the SEA, its findings and conclusions.
1. Introduction	Describes the background to the draft plan/programme and the regulatory context and purpose of the SEA and the ER.
2. Overview of the draft plan/programme	Provides details of the background to the proposed plan/programme, the plan/programme itself, its objectives and relationships to other initiatives. Alternatives to the plan/programme are also described.
3. SEA approach	Describes the scope and methodology of the SEA.
4. Environmental Information	Describes the environmental characteristics of the relevant areas, identifies relevant existing environmental problems, the likely evolution of the environmental baseline and SEA objectives.
5. Consideration of the potential effects of the draft plan/programme	Provides details of the assessment method, a consideration of the results of the assessment and identifies mitigation and enhancement measures to prevent, reduce or offset any significant adverse effects identified during the assessment process.
6. Recommendations and monitoring	Provides an overall conclusion on the likely implications of the proposed licensing/leasing and alternatives, together with recommendations for mitigation and monitoring, and identification of relevant gaps in understanding.
7. Next steps	Describes the consultation phase for the Environmental Report and proposed plan/programme, the process underpinning the adoption of the plan/programme and the final SEA statement.
	References
	Glossary and abbreviations
Appendix 1: Environmental Baseline	Underpins Section 4 and contains a series of sub-appendices (A1a to A1j) describing the key characteristics in relation to biodiversity, habitats, flora and fauna; geology, substrates and coastal geomorphology; landscape/seascape; water environment; air quality; climate and meteorology; population and human health; other users, material assets (infrastructure, other natural resources); cultural heritage and conservation of sites and species in relation to UK waters as a whole and for each of the draft Regional Seas (see Figure 1.1 for Regional Seas boundaries).
Appendix 2: Other Initiatives	Describes other initiatives, plans and programmes of relevance to the proposed plan/programme, the implications of these for the proposed plan/programme and vice versa.
Appendix 3: Regulatory and other controls	Summarises the key environmental legislation and controls applying to the activities encompassed by the draft plan/programme.
Appendix 4: SEA Stakeholder Workshops	Contains summaries of the range of workshops (assessment, regional stakeholder and sector) which contributed to the SEA process and information base.

ASSESSMENT METHODOLOGY

The assessment is based on the best evidences available citing peer reviewed and other literature as appropriate together with spatial GIS analysis shown as output maps and graphics. The assessment considers the implications of the draft plan/programme for relevant existing environmental problems including those relating to any areas of particular environmental importance, such as areas designated under the Habitats & Species and Birds Directives. The assessment draws on stakeholder perspectives on key issues relating to the plan/programme obtained through consultation with regulators, local authorities, operators/developers and others. As already noted before, the assessment tends to avoid the use of more quantitative methodology when determining likely significant effects.

Habitats Regulations Assessment (HRA)

Offshore activities are subject to a range of statutory permitting and consenting requirements, including, where relevant, activity specific **Appropriate Assessment (AA)** under Article 6(3) of the **Habitats Directive** (Directive 92/43/EC).

The UK is bound by the terms of the EU Habitats Directive, and the Wild Birds Directive. The aim of the Habitats Directive is to conserve particular natural habitats and wild species across the Europe Union by, amongst other measures, establishing a network of sites known as Natura 2000 sites. The Wild Birds Directive seeks to protect all wild birds and also sites important for the protection of wild birds. Under Article 6(3) of the Habitats Directive, an AA is required where a plan or project is likely to have a significant effect upon a European site, either individually or in combination with other plans or projects. Further to this, Article 6(4) provides that where an AA has been carried out and results in a negative assessment (in other words, where adverse effects to European site(s) cannot be ruled out, despite any proposed avoidance or mitigation measures), consent can only be granted if; there are no alternative solutions, there are "Imperative Reasons of Overriding Public Interest" (IROPI) for the development and compensatory measures have been secured[28].

The Offshore Petroleum Activities (Conservation of Habitats) Regulations implemented the requirements of Articles 6(3) and 6(4) of the Habitats Directive with respect to oil and gas activities in UK territorial waters and on the UK Continental Shelf[29].

As the petroleum licensing aspects of the plan/programme are not directly connected with or necessary for nature conservation management of European (Natura 2000) sites, to comply with its obligations under the relevant regulations, the BEIS has to undertake a Habitats Regulations Assessment (HRA).

The SEA Environmental Report considers the potential for effects on conservation sites, but the "test" is different i.e. HRA needs to show no adverse effects on a European site as a result of a plan or programme whereas SEA has to identify the likely significant effects of a plan or programme.

The SEA has a wide geographical coverage and the potential timing, nature and intensity of activities that could be associated with the adoption of the draft plan/programme is not fully defined. The strategic HRA will therefore be undertaken during each oil and gas licensing Round[30].

Annex 2 compares the results for the Appropriate Assessments, as part of the HRA made for the blocks offered in Rounds 24th to 31st.

The criteria adopted for screening are important for characterizing the footprint of oil and gas activities, **given that estimates of the range of predicted impacts for seismic activity and drilling are clearly indicated**.

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[28] The Planning Inspectorate. Habitats Regulations Assessment. 2017, available at:

https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/06/Advice-note-10v4.pdf

[29] For other relevant activities in offshore waters, this is covered by the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007. Within territorial waters, the Habitats Directive is transposed into UK law via the Conservation of Habitats and Species Regulations 2010 in England and Wales, the Conservation (Natural Habitats, &c.) Regulations 1994 in Scotland, and the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 in Northern Ireland.

[30] The Crown Estate is the competent authority for further renewables leasing at the strategic level. The Crown Estate undertook HRA for Round 3 leasing in 2009. The timetable and nature of any future HRA relating to the renewable leasing component of the plan rests with The Crown Estate.

ALTERNATIVES TO THE DRAFT PLAN/PROGRAMME

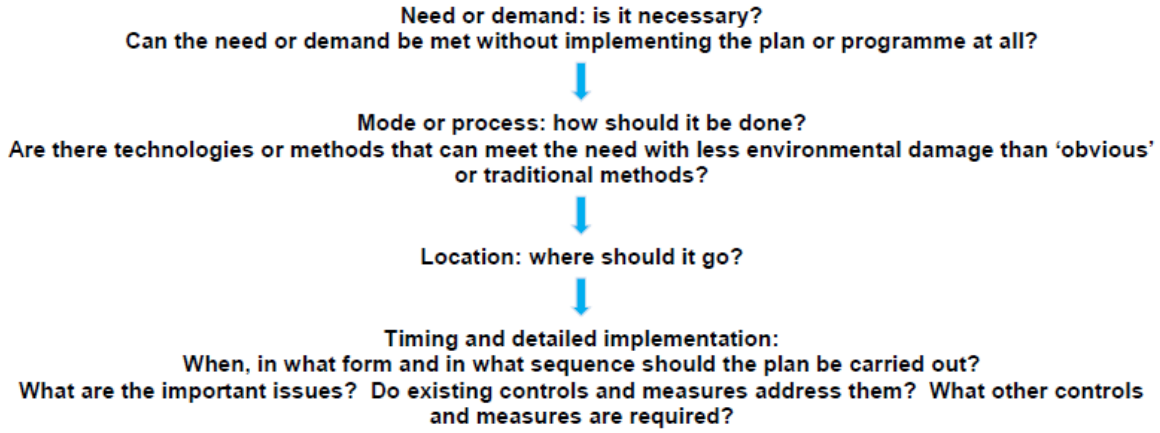
Ariticle 5 (1) of the SEA Directive (and regulation 12 (2) of the SEA Regulations) require that the Environmental Report should:

"...identify, describe and evaluate the likely significant effects on the environment of— (a) implementing the plan or programme; and (b) reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme"

Annex I (h) of the SEA Directive (mirrored in Schedule 2 (8) of trhe SEA Regulations) requires:

"...An outline of the reasons for selecting the alternatives dealt with..."

The alternatives were initially considered using a modified version of the hierarchy in ODPM (2005)[31]:



The justifications are considered as follows: (in OESEA3)

Is there a need or demand? Security of supply is a key objective of present energy policy in the UK. Production of domestic oil and gas has been in decline since 1999, with imports exceeding exports for gas and oil since 2004 and 2005 respectively. Whilst the major offshore hydrocarbon basins of the UK are at a mature stage of production, it is estimated that approximately 1,060 million tonnes of oil and 594 billion m^3 of reserves remain in fields in production or development. Central estimates for recoverable resources which are yet to be discovered are 752 million tonnes of oil and 578 million m3 of gas. Section 9A of the *Petroleum Act 1998* creates an obligation on the Secretary of State (for Energy and Climate Change) to produce a Strategy for achieving the principal objective of maximising the economic recovery of UK hydrocarbons.

UK gas storage capacity is presently 4.6 billion m^3, with demand for gas in 2014 being 70 billion m3. The overarching National Policy Statement for Energy recognises that gas storage infrastructure may increase as domestic gas production declines. A number of gas storage and unloading projects have been proposed in recent years and are at various stages of development.

In December 2008 the European Parliament and Council of Ministers reached political agreement on legislation to require that by 2020, 20% of the EU's energy consumption must come from renewable sources. The UK's contribution to this will require the share of renewables in the UK's energy consumption to increase from around 1.5% in 2006 to 15% by 2020 (presently ~7%).

Whilst renewable and other technologies (e.g. new nuclear) have the potential to deliver significant reductions in carbon dioxide emissions from energy production, fossil fuels will continue to constitute the majority of the UK energy mix for the foreseeable future during the decarbonisation of the UK energy supply (e.g. for use in gas fired power stations).

The current decline in domestic hydrocarbon production, the need to enhance security of supply whilst seeking to decarbonise the energy mix, and the statutory obligations placed on DECC and UK

[31] ODPM (2005). A practical guide to the Strategic Environmental Assessment Directive. Practical guidance on applying European Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment". Issued on behalf of the Scottish Executive, Welsh Assembly Government, Department of the Environment, Northern Ireland and Office of the Deputy Prime Minister, London, UK, 105pp.

Government to maximise the economic production of UK hydrocarbons and meet renewable generation and carbon reduction targets, clearly define a need for further leasing/licensing as defined by the draft plan/programme

Mode or process - Within the context of marine energy production, offshore oil and gas exploration and production and offshore wind are considered to be the most mature technologies to deliver the objectives of the plan. CCS, wave and tidal technologies and some wind farm technologies such as tethered turbines are emergent and are unlikely to see large scale commercial deployment during the currency of this SEA, with larger arrays and commercial viability probably achieved closer to 2020.

Location - The presence of exploitable wind, wave and tidal resources and commercial hydrocarbon resources/gas (including carbon dioxide) storage capacity is variously a function of location, geological history and existing sensitivities and uses which dictate the areas of potential interest.

A number of marine planning processes are separately taking place in UK waters, the first completed regional plans being the East Inshore and Offshore plans, covering a southern section of Regional Sea 2 used in this SEA. **Marine planning in the UK has to date not been spatially prescriptive but has defined the range of offshore uses and potential constraints on certain types of development by location, emphasising priorities and promoting activity co-location where appropriate**.

All plans are due to be in place by 2021 and, therefore, still in the currency time of OESEA3. Thus, it should be noted, as registered in post-consultation step, that ***"****regional scale considerations and policy relating to activity in UK seas is being augmented by the Marine Planning process, which may provide further locational guidance in the future".* This may imply the need of a revision of the recommendations, seeking to make them more spatially objective.

The draft plan/programme for future leasing/licensing **is not a spatial plan**, but has been drafted in the context of knowledge of the potential UK resource and current industry interest[32].

Timing and detailed implementation - The plan/programme is needed so that:

 Further areas of English and Welsh waters can be leased for offshore wind and other marine renewable technologies.

 Further areas on the UKCS can be licensed for hydrocarbon exploration and production in currently unlicensed blocks/unleased areas.

 Further relevant areas of the EEZ can be leased/licensed for offshore gas storage (including for carbon dioxide).

 Early implementation of the plan would allow potential synergies in terms of use of existing infrastructure (e.g. pipelines) to be taken advantage of (e.g. including for reuse for alternative activities such as natural gas or CO2 transport and storage). The extent of such synergies will decline if the plan is delayed as infrastructure is decommissioned and removed.

Previous SEAs have considered three broad alternatives to the draft plan/programme which are considered again for OESEA3 and were subject to scoping and discussion with the SEA Steering Group. These alternatives have been selected as reasonable since **they reflect the high-level nature of the plan**, its objectives in relation to the national policy context and uncertainties in the scale and location of the leasing/licensing that could take place on its adoption.

In order to compare the evolution of SEA process, Annex 4 summarizes the "conclusions" for the various SEAs and also lists the alternatives considered for each one.

[32] **Annex 1** of this Report details the approved marine plans and discusses the criteria used for the allocation of activities to the users of the marine environment. In particular, they assess the extent to which marine plans can be considered as "prescriptive" or merely indicative of regional priorities.

Table 8 – Overview of reasonable alternatives

Do not proceed with a licensing or leasing round	Proceed with a licensing or leasing round	Proceed with a licensing or leasing round, but restrict these spatially or temporally
This alternative would fail to meet the objectives of the plan/programme and is further restricted by DECC's, and others, legal obligation to pursue recovery of domestic hydrocarbons and to decarbonise the UK energy mix. If the plan were not pursued, this could lead to greater reliance on hydrocarbon imports, a reduction in potential security of supply delivered by enhancing UK gas storage capacity and a reduction in the ability of UK Government to meet its renewable energy and carbon dioxide emissions reduction obligations from domestic marine renewable sources or offshore carbon dioxide storage.	This alternative would allow the plan/programme to contribute to the achievement of a range of UK Government policy goals and legal requirements on security of supply and energy decarbonisation. The scale of any round is contingent on the level of commercial interest and so the potential level of activity which could follow the adoption of the plan/programme under this alternative is not certain, and therefore the individual sectoral contribution to the achievement of Government targets (e.g. renewables, carbon emission reductions) cannot be accurately quantified. Experience of previous rounds of activity can be used to infer the timing and scale of interest for future rounds (Section 2.7).	This alternative is likely to provide a similar outcome as continuing with the leasing/licensing round, but allows for the restriction of activities in certain areas where it can be clearly demonstrated at a strategic level that activity could not take place there, or where levels of uncertainty are such that further evidence or research is required to inform assessment. There is the possibility that this restriction could result in fewer leases/licences being issued.

OVERVIEW OF ENVIRONMENTAL BASELINE

As defined at item 6 of table 6, the baseline will be described under a series of headings which relate to topics identified by the SEA Regulations on which to judge the "…likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and **secondary, cumulative and synergistic effects**…" The issues to be considered were slightly modified for OESEA3:

- Biodiversity, habitats, flora and fauna
- Geology, substrates and coastal processes
- Landscape/seascape
- Water environment
- Air quality
- Climate and meteorology
- Population and human health
- Other users, material assets (infrastructure, other natural resources)
- Cultural heritage
- Conservation of sites and species, and the interrelationships of the above.

The criteria for determining the likely significance of effects are considered at Annex II of the SEA Directive:

Table 9 - Criteria for determining the likely significance of effects on the environment

1.	The characteristics of plans/programmes, having regard, in particular, to:- (a.) the degree to which the plan/programme sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources; (b.) the degree to which the plan/programme influences other plans/programmes including those in a hierarchy; (c.) the relevance of the plan/programme for the integration of environmental considerations in particular with a view to promoting sustainable development; (d.) environmental problems relevant to the plan/programme; and (e.) the relevance of the plan/programme for the implementation of Community legislation on the environment (for example, plans/programmes linked to waste management or water protection).
2.	Characteristics of the effects and of the area likely to be affected, having regard, in particular, to:- (a.) the probability, duration, frequency and reversibility of the effects; (b.) the cumulative nature of the effects; (c.) the transboundary nature of the effects; (d.) the risks to human health or the environment (for example, due to accidents); (e.) the magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected); (f.) the value and vulnerability of the area likely to be affected due to – (i.) special natural characteristics or cultural heritage; (ii.) exceeded environmental quality standards or limit values; or (iii.) intensive land-use; and (g.) the effects on areas or landscapes which have a recognised national, Community or international protection status.

LIKELY EVOLUTION OF THE BASELINE AND RELEVANT EXISTING ENVIRONMENTAL PROBLEMS

The SEA Directive also requires that the Environmental Report provides information on the likely evolution of the relevant aspects of the current state of the environment (without implementation of the plan/programme), as well as “Relevant existing environmental problems” and implications for SEA.

These issues are dealt with relatively briefly in items 4.4 and 4.5 of the Environmental Report prior to the Assessment itself.

THE ASSESSMENT

Assessment approach

OESEA3 covers a very large marine area comprising all UK waters with water depths ranging from the intertidal to more than 2,400m. The draft plan/programme includes the licensing/leasing of offshore oil and gas activities, the storage of gas and CO_2, offshore wind farms and marine renewables. **The assessment has to address complex issues and multiple interrelationships, where a score based matrix assessment on its own would be inadequate**.

The assessment for the SEA is a staged process incorporating inputs from a variety of sources (see Figure 5 below:

 Baseline understanding of the relevant receptors … together with existing environmental problems and the likely evolution of the baseline conditions.

 The likely activities, and potential sources of effect and **the existing mitigations, regulatory and other controls.**

 The evolving regulatory framework.

 The evolution of technology.

 The SEA objectives

 The evidence base regarding the relative risks and potential for significant effects from offshore wind farm, wave, tidal stream and tidal range developments, offshore oil and gas exploration and production, carbon dioxide storage and gas storage related activities.

 Steering Group, statutory consultee and stakeholder perspectives on important issues, information sources and gaps, and **potential areas to exclude from licensing** derived from scoping, assessment workshop, regional stakeholder workshops, sector meetings, and other meetings and communications.

At a strategic level, a distinction has been drawn for various effect mechanisms between impacts which may be significant in terms of conservation status of a species or population (and hence are significant in strategic terms), and impacts which may be significant to individual animals, but which will not influence sufficient numbers to have a significant effect on population viability or conservation status.

Examples of this approach include the consideration of acoustic effects on marine mammals, collision risk for birds and oil spill effects. **This approach does not imply that mortality or sub-lethal effects on individual animals are unimportant** (clearly there are welfare considerations, particularly for avian and mammalian species); but it is appropriate that strategic considerations are made at a biogeographic population or species level.

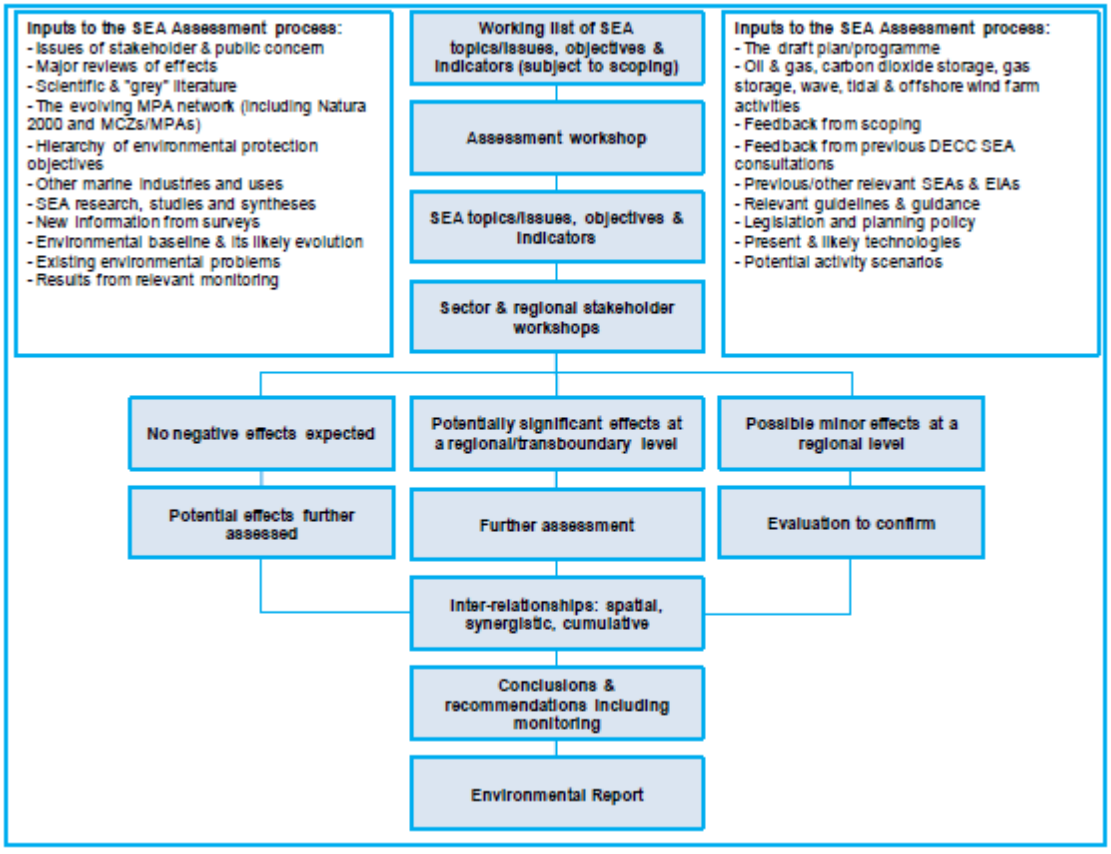


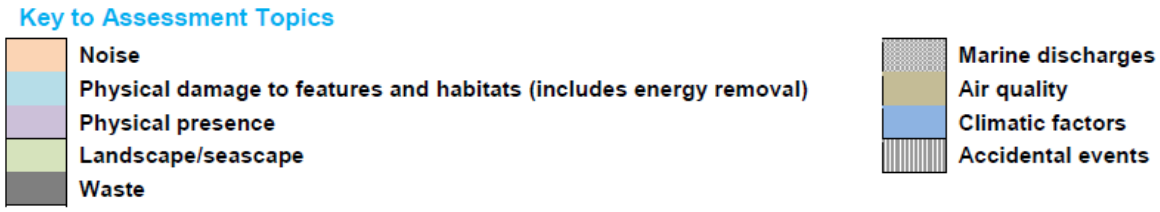
Figure 5 - Assessment process (OESEA3 Environmental Report)

Potential sources of significant effects

Potential sources of effects from the activities which could follow adoption of the draft plan/programme in terms of the likely significant effects on the environment, identified by **SEA topic** (receptors possibly affected as a result of the plan implementation - biodiversity, habitats, flora and fauna; geology and soils; landscape/seascape; water environment; air quality; climatic factors; population and human health; other users, material assets - infrastructure, other natural resources; and cultural heritage), are listed below.

The **sources of potentially significant effect** were categorised by **Assessment Topic**. The potentially significant effects identified represent potential issues for further consideration in the assessment. For example, for the noise topic, the following are considered potentially significant

effects: behavioural and physiological effects on marine mammals, birds and fish from seismic surveys, and from other geophysical surveys; and also those associated with construction phase noise, operational noise and decommissioning noise.



A question mark indicates uncertainty of potential for effect.

Table 10 - Potential sources of effects from the activities which could follow adoption of the draft plan/programme

Assessment Topic	Box 5.1:Potentially significant effect	Oil & Gas	Gas Storage	Carbon Dioxide Storage	Offshore Wind	Tidal Stream	Tidal Range	Wave
	Biodiversity, habitats, flora and fauna							
	Physical damage to biotopes from infrastructure construction, vessel/rig anchoring etc (direct effects on the physical environment)	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish from seismic surveys	X	X	X				
	Behavioural and physiological effects on marine mammals, birds and fish from other geophysical surveys	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish associated with construction phase noise[41]	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish associated with operational noise	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish associated with decommissioning noise	X	X	X	X	X	X	X
	The introduction and spread of non-native species	X	X	X	X	X	X	X
	Behavioural disturbance to fish, birds and marine mammals etc from physical presence of infrastructure and support activities	X	X	X	X	X	X	X
	Collision risks to birds				X	X	X	X
	Collision risks to bats				X			
	Collision risks to water column megafauna (e.g. fish, marine mammals).					X	X	X
	Barriers to movement of birds				X	X	X	
	Barriers to movement of fish and marine mammals					X	X	X
	Changes/loss of habitats from major alteration of hydrography or sedimentation (indirect effects on the physical environment)				X	?	X	?
	Potential for effects on flora and fauna of produced or treated water and drilling discharges	X	X	X	X	X	?	X
	EMF effects on electrosensitive species				X	X	X	X

Assessment Topic	Box 5.1:Potentially significant effect	Oil & Gas	Gas Storage	Carbon Dioxide Storage	Offshore Wind	Tidal Stream	Tidal Range	Wave
	The nature and use of antifouling materials				?	X	?	X
	Accidental events – major oil or chemical spill	X	?	?	?	?	?	?
	Accidental events – major release of carbon dioxide			X				
	Geology and Soils							
	Physical effects of anchoring and infrastructure construction (including pipelines and cables) on seabed sediments and geomorphological features (including scour)	X	X	X	X	X	X	X
	Sediment modification and contamination by particulate discharges from drilling etc or resuspension of contaminated sediment	X	X	X	X	X	X	X
	Effects of reinjection of produced water and/or cuttings and carbon dioxide	X	X	X				
	Onshore disposal of returned wastes – requirement for landfill	X	X	X				
	Post-decommissioning (legacy) effects – cuttings piles, footings, foundations, *in situ* cabling etc	X	X	X	X	X	X	X
	Changes to sedimentation regime and associated physical effects					X	X	X
	Accidental events – risk of sediment contamination from oil spills	X	?	?	?	?	?	?
	Accidental events – blow out impacts on seabed	X	X	X				
	Offshore disposal of seabed dredged material	X	X	X	X	X	X	X
	Landscape/Seascape							
	Potential effects of development on seascape including change to character (interactions between people (and their activities) and places (and the natural and cultural processes that shape them))	X	X	X	X	X	X	X
	Water Environment							
	Contamination by soluble and dispersed discharges including produced water, saline discharges (aquifer water and halite dissolution), and drilling discharges from wells and foundation construction	X	X	X	X	X	?	X
	Changes in seawater or estuarine salinity, turbidity and temperature from discharges (such as aquifer water and halite dissolution) and impoundment		X	X			X	
	Energy removal downstream of wet renewable devices					X	X	X

Assessment Topic	Box 5.1:Potentially significant effect	Oil & Gas	Gas Storage	Carbon Dioxide Storage	Offshore Wind	Tidal Stream	Tidal Range	Wave
	Accidental events - contamination of the water column by dissolved and dispersed materials from oil and chemical spills or gas releases	X	X	X	?	?	?	?
	Air Quality							
	Local air quality effects resulting from exhaust emissions, flaring and venting	X	X	X	X	X	X	X
	Air quality effects of a major gas release or volatile oil spill	X	X	X				
	Climatic Factors							
	Contributions to net greenhouse gas emissions	X	X					
	Reduction in net greenhouse gas emissions			X	X	X	X	X
	Population and Human Health							
	Potential for effects on human health associated with reduced local air quality resulting from atmospheric emissions associated with plan activities	X	X	X				
	Potential for effects on human health associated with discharges of naturally occurring radioactive material in produced water	X	X	?				
	Accidental events – potential food chain or other effects of major oil or chemical spills or gas release	X	X	X	?	?	?	?
	Other users of the sea, material assets (infrastructure, and natural resources)							
	Positive socio-economic effects of reducing climate change			X	X	X	X	X
	Interactions with fishing activities (exclusion, displacement, seismic, gear interactions, "sanctuary effects")	X	X	X	X	X	X	X
	Other interactions with shipping, military, potential other marine renewables and other human uses of the offshore environment	X	X	X	X	X	X	X
	Accidental events – socio-economic consequences of oil or chemical spills and gas releases	X	X	X	?	?	?	?
	Cultural Heritage							
	Physical damage to submerged heritage/archaeological contexts from infrastructure construction, vessel/rig anchoring etc. and impacts on the setting of coastal historic environmental assets and loss of access.	X	X	X	X	X	X	X

The SEA details the effects for each of the key assessment topics (noise, physical damage/change to features and habitats, consequences of energy removal, physical presence - ecological implications, physical presence and other users, landscape, marine discharges, waste, air quality, climatic factors

and accidental events) and presents at the end of each topic a summary of findings and recommendations.

For each topic, the Report gives a description of the problem (introduction), followed by the identification of the sources of potentially significant effect; consideration of the evidence; controls and mitigation; likelihood of significant effects and a Summary of findings and recommendations. The correct perception of impacts and effective mitigation conditions form the basis for the next steps of the assessment that will eventually determine the most appropriate alternative for the adoption of the plan.

In addition to these topics, the "ancillary development" are also analyzed in the same format, including "other interactions with shipping, military, potential other marine renewables and other human uses of the offshore environment; potential effects of development on seascape including change to character and places and the natural and cultural processes that shape them; physical damage to biotopes from infrastructure construction, vessel/rig anchoring etc.; physical effects of anchoring and infrastructure construction on seabed, sediments and geomorphological features; physical damage to submerged heritage/archaeological contexts from infrastructure construction, vessel/rig anchoring etc. and impacts on the setting of coastal historic environmental assets and loss of access; local air quality effects resulting from exhaust emissions, flaring and venting".

The Report also covers the "overall spatial considerations", concerning the activities provided for in the plan and their interaction with shipping, military, potential other marine renewables and other human uses of the offshore environment, as well as their "potential for transboundary effects".

As an example, a brief summary of the discussions for the topic "Noise" is given below.

Table 11 – Potentially significant effects derived from Noise

Assessment Topic	Potentially Significant Effect	Oil & Gas	Gas Storage	Carbon Dioxide Storage	Offshore Wind	Tidal Stream	Tidal Range	Wave
	Behavioural and physiological effects on marine mammals, birds and fish from seismic surveys	X	X	X				
	Behavioural and physiological effects on marine mammals, birds and fish from other geophysical surveys	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish associated with construction phase noise[42]	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish associated with operational noise	X	X	X	X	X	X	X
	Behavioural and physiological effects on marine mammals, birds and fish associated with decommissioning noise	X	X	X	X	X	X	X

Sources of potentially significant effect

"Sources of potentially significant effect are grouped by the element of the draft plan/programme that they are more directly or historically associated with even though it is recognised that many noise generating activities (e.g. vessel traffic, geophysical surveys) are common across all elements. Noise generated during pile-driving and disposal of UXO[33] are described under "offshore wind farms" together with operational wind farm noise. Operational noise generated by wave and tidal energy devices is the focus of 'wave and tidal power'. Noise from seismic surveys, other geophysical surveys, production platforms, drilling, pipe laying, helicopters, support vessels and decommissioning are under 'Oil & Gas'…"

[33] Large amounts of legacy unexploded ordnance (UXO) are present in UK waters. Sources of the munitions vary, ranging from munitions dumps, wrecks/crashes, weapon firing ranges or mines, torpedoes and depth charges dating from WWI and WWII. Most reported UXO are detonated in a controlled way out of concern for the safety of fishers and other users of the sea (OESEA3 Environmental Report).

Consideration of the evidence

"Given the variety of sounds to which marine organisms may be exposed, potential effects are wide ranging, involving both physiology and behaviour. In addition to direct effects on a receptor, indirect effects may also occur for example via potential changes to prey species.
The most acute effects can be lethal, involving the direct physical damage of body tissues and air filled cavities from rapid pressure change (i.e. barotrauma); these effects are spatially restricted to the immediate proximity of very high amplitude impulsive sounds (e.g. explosions) and are relatively well understood in part thanks to the interest in establishing safe levels for humans working underwater. In marine mammals, there is also a risk of nitrogen bubbles being formed, which may result in physiological effects similar to decompression sickness in humans. Although evidence on the exact mechanism remains equivocal, bubble formation has been suggested as causal mechanism between certain sound exposure (e.g. military sonar) and stranding events in beaked whales and other species…"

Controls and mitigation

"Both planning and operational controls are currently in place to cover all significant noise generating activities on the UKCS, specifically including geophysical surveying and pile-driving.
The main focus is to ensure compliance with the Habitats Directive. Regulations state that it is an offence to deliberately injure or disturb wild animals of any species listed on Annex IVa of the Habitats Directive (which includes all cetaceans), particularly where disturbance is likely to impair breeding, rearing, hibernation and migration or to affect significantly the local distribution or abundance of the species to which they belong. In addition, any proposed activity with a potentially significant acoustic impact on a designated SAC or SPA[34] would also be subject to the requirement for Habitat Regulation Assessment (HRA)".

"To help avoid or minimise the risk by activities in the marine environment to kill, injure or disturb cetaceans guidance has been prepared by JNCC, Natural England and Countryside Council for Wales, for the marine area in England and Wales and the UK offshore marine area and by Marine Scotland for Scottish inshore waters. The guidance is based on a risk assessment approach, assessing the likelihood of a statutory offence, and then whether a licence to undertake the proposed activity should be sought. The likelihood of an activity resulting in injury or disturbance to a marine European Protected Species (EPS) will very much depend on the characteristics of the activity, of the environment and the species concerned, hence the need for a case-by-case approach when assessing the risk of it occurring…"

Likelihood of significant effects

"To consider the potential for significant effect, and potential for mitigation, the following rationale were adopted: Definition of possible spatial effects ranges for injury and disturbance; based on synthesis of source level characterisation, propagation characteristics, effects criteria, and animal response observations; Review of frameworks for assessment of long-term population effects; Consideration of potential activity levels and specific sensitivities of individual Regional Seas; Identification of specific geographical areas of concern; Consideration of operational mitigation and potential for seasonal restrictions and Consideration of potential cumulative effects".

"It is appropriate to focus on marine mammals and in particular on the harbour porpoise in this SEA as they are appear to be more sensitive to sound than other receptors. Therefore if sufficient protection is offered to the harbour porpoise, it is assumed this would be sufficient for the marine environment as a whole.

Chronic exposure to increased levels of underwater noise has the potential to have long-term consequences for the health of marine species, as well as the potential to mask important biological signals but **at present the evidence is insufficient to be able to set targets to ambient noise**. The

[34] SAC - Special Area of Conservation - Areas designated as European Sites (Natura 2000) under the Habitats and Species Directive; SPA - Special Protection Area - Areas designated as European Sites (Natura 2000) under the Birds Directive.

process established through Marine Strategy Framework Directive - MSFD, including noise indicators and noise registry, will help to improve our understanding.

Acute non-auditory physical damage, leading to death, is limited to the immediate vicinity (<10m) of impulsive, high amplitude sounds. Cetacean strandings may be the exception; a behavioural response (e.g. panic) to certain sounds may be the cause of abrupt change in diving behaviour, which in turn may result in decompression sickness and/or spatial disorientation leading in some instances to mass strandings. Beaked whales appear to be particularly at risk…".

Summary of findings and recommendations

"Considerable uncertainty surrounds many elements of our understanding of the effects of anthropogenic noise on the marine environment. Efforts to identify and address these gaps are ongoing through a variety of initiatives, including academic, government and industry projects….

Given the potential risk from chronic exposure to increased ambient noise level, the degree of uncertainty with population level assessment of acoustic effects and the need to achieve "Good Environmental Status under the Marine Strategy Framework Directive", the SEA recognises the importance of minimising underwater noise emissions and emphasises the value of further voluntary mitigation measures at the project scale, in particular technical noise emissions reductions and careful planning to reduce temporal and spatial overlap between activities and marine mammals".

To facilitate the understanding of the assessment logic, a summary of **findings and recommendations** for the other assessment topics is presented below:

Physical damage/change to features and habitats

"Physical disturbance associated with activities resulting from proposed oil and gas licensing and OWF, wave and tidal stream leasing will be negligible in scale relative to natural disturbance and the effects of demersal fishing. The potential for significant effects, in terms of regional distribution of features and habitats, or population viability and conservation status of benthic species, is considered to be low... In areas with vulnerable habitats and species such as cold water coral reefs mitigation may be required for physically damaging activities such as rig/vessel anchoring, discharges of drilling wastes and cable, pipeline or umbilical installation (from hydrocarbon, gas storage or renewable energy related activities). Prior to decisions on activity consenting in such areas, developers should provide a detailed assessment and seabed information so that appropriate site specific mitigation can be defined, for example no anchoring and zero discharge. Detailed site surveys should also be evaluated with regard to archaeological sensitivities".

Physical presence

"Considerable uncertainty surrounds our understanding of the potential ecological effects of the physical presence of the infrastructure associated with energy developments; this is true across all elements of the draft plan but particularly so in the case of offshore wind and marine renewable developments".

"This SEA recognises the critical importance of site identification as a mitigation measure but once a site has been carefully chosen, monitoring and targeted studies are key to successful management and provide the best opportunities to improve the knowledge base".

"Given the controls and mitigation proposed, it is highly unlikely that the implementation of the draft plan will result in a significant ecological effect from the introduction and spread of non-native species or from interactions with mobile species (collision, barrier effect and displacement) as presented in the evidence. For some species, effects will be incurred by single individuals but even in the case of offshore wind farms and marine birds, it is highly unlikely that a population level effect will take place over the life of this SEA. It is acknowledged that these conclusions are based on limited available evidence, including uncertainties in relation to bird distribution, abundance and behaviour and how these may vary spatially and temporally".

“The primary issues for other users of the marine environment relate to navigation risk and the interactions of fishing activities with marine devices, although it is recognised that poorly sited developments can have significant effects on other users, including coastal tourism and recreation”.

“Exclusion and displacement as a result of offshore development reduces the remaining area available for other users to operate in. As navigation routes, and grounds for fishing, aggregate dredging and other activities become excluded from areas of offshore development, other areas may come under increasing pressure from multiple potential users and competition between users will be concentrated in the smaller space available. While each individual offshore development may only result in a relatively minor route adjustment or displacement, the cumulative effect of several such developments can lead to significant displacement and barrier effects. For industry, and particularly small-scale industry activity such as inshore fisheries, the combination of an enforced route adjustment, coupled with exclusion from all or part of a favoured fishing ground, could have a significant and damaging economic impact…”

“The effect of offshore installations on fishing activities are more complex, with negative effects of the exclusion of large areas and potential displacement to other areas and therefore intensification countered by positive effects on fish stock numbers, seabed disturbance and reef effects. At a strategic level the siting of major renewable energy developments (especially ones covering large areas or multiple arrays in close proximity) needs to consider fisheries implications (and potential mitigation for them) and avoid any areas of significance”.

Landscape/seascape

“A range of physical attributes which are locally variable, in combination with the design of a development, and the attitudes of individual receptors define the sensitivity and capacity of a particular location to change in landscape and visual resource”.

“Landscape designations provide a relatively objective general assessment of the ‘value’ attached to certain areas of the coast, though in keeping with the European Landscape Convention, all landscapes should be considered in seascape assessment. The occurrence of multiple overlapping designations (Heritage Coast, National Park, World Heritage Site and Areas of Outstanding Natural Beauty - AONB) may be taken to indicate areas of particularly high value. In deciding new lease areas, and in early zone appraisal, **the potential for a development to be refused on the basis of landscape/seascape issues, and indirectly generate economic effects on tourism, should be considered**. Siting wind farms further from shore is likely to generate fewer effects at the coast and experience to date suggests less public opposition to such projects”.

“The likelihood of cumulative effects to be generated by more than one aspect of the plan together is limited by the lack of significant overlap in resource areas for most activities. Offshore wind developments are already starting to characterise certain seascapes, and any additional siting of this technology in combination with that already in place has the potential to generate significant cumulative effects at day and night (e.g. through navigational and aviation lighting). Continuing urbanisation in some areas, onshore energy infrastructure such as wind turbines, and grid reinforcement (e.g. new overhead power cables) have the potential to act cumulatively in certain areas. The general trend in European waters, including the UK, of offshore wind farms being progressively sited further from shore helps to mitigate such cumulative effects at the coast, if this trend continues”.

Marine discharge

“The environmental effects of the major discharges from oil and gas activities have been extensively studied, and are considered to be relatively well understood. The environmental effects of produced water discharges not reinjected are limited primarily by dispersion. Discharges of WBM cuttings in the North Sea and other dispersive environments have been shown to have minimal ecological effects”.

Still in relation to “marine discharges”, the Report adds that “The effects of the majority of these are judged to be negligible and are not considered further here” and establishes a clear separation between the objects of SEA and EIA for projects evaluation: “**note, they would be considered in detail in Environmental Statements and chemical risk assessments under existing activity specific permitting procedures**”.

Waste

“At around 0.1% of total UK waste generation, the contribution from offshore energy industry is, and is expected to remain, minor. Effective regulatory controls are established which have minimised the generation of hazardous and other waste materials, and provided waste management procedures comparable with those onshore”.

“In view of the volumes of material (drilling wastes and general oilfield waste) likely from drilling or operations together with the stringent control of waste disposal activities under IPPC and the Landfill Directive it is considered that any effects on land will be negligible”.

“Substantial waste generation would be expected at decommissioning of offshore infrastructure (both oil & gas and renewables), although at end of life a high proportion of materials (especially structural steel, copper cabling and other metals) would be expected to be reused or recycled. Offshore decommissioning activity is expected to rise in the coming years, increasing the potential waste generated from this sector of the offshore industry. Regulatory controls over decommissioning are in place and will require a detailed assessment of re-use, recycle and waste disposal prior to end of life”.

Air quality

“Major sources of emissions to atmosphere from offshore gas storage and carbon dioxide storage, are internal combustion for power generation by installations (e.g. for compression and injection), vessels and aircraft. Significant combustion emissions from flaring are not expected from potential development in the proposed licence areas, given the availability of existing gas process and export infrastructure”.

Climatic factors

“Renewable energy and carbon dioxide storage have the ability to contribute to the reduction in UK GHG emissions, and therefore to meet a target carbon intensity for the energy supply sector of 100g CO2 eq. by 2030, and to meet the interim CO_2 reduction targets of 34% on 1990 levels by 2020, and 50% on 1990 levels by 2025”.

“Decarbonisation of UK energy supply would make a substantial contribution to meeting the next (fourth and fifth) carbon budgets, however new measures are required to meet these budgets and deployment of CCS is not expected until after 2020”.

“Oil and gas production is declining on the UKCS, though emissions associated with energy generation and shipping in this sector is likely to continue for the foreseeable future. Future carbon emissions from shipping are likely to decline through operational and technical and other controls”.

“**The UK reliance on fossil fuels for energy generation will continue for the foreseeable future**, though a dependence on imports may be reduced through the increased uptake of renewable energy”.

Accidental events

“The environmental risks of accidental spill events associated with proposed activities following further rounds of oil & gas licensing are qualitatively similar to those of previous and ongoing activities in the North Sea, Irish Sea and west of Shetland, and mitigation in the form of risk assessment and contingency arrangements is well established”.

“The incremental risk associated with activities resulting from the proposed licensing (i.e. additional to existing risk; primarily associated with shipping and other maritime activities) is low. This results from the combination of low probability and low severity (since most spills would be small in volume). The **overall risks of a major crude oil spill, which would require catastrophic loss of well control, are quantitatively and qualitatively comparable to those considered ALARP** (As Low As Reasonably Practicable) under the relevant UK health and safety regulations”.

“The potential for accidental spills to have transboundary impacts is recognised in project-level oil spill modelling which includes assessment of travel times to cross boundaries as well as the likelihood of beaching on different countries. The review of oil spill modelling undertaken for the assessment

indicates that potential transboundary impacts were identified for large oil spills in Regional Sea 1 (Norway), Regional Sea 6 (Republic of Ireland, Isle of Man), and in Regional Seas 8 and 9 (Norway, Faroes). The prospectivity of much of Regional Sea 2 (natural gas, also present in the eastern Irish Sea) precludes transboundary impacts as significant oil spill is not likely".

"E&P project-specific risk is highly associated with reservoir fluid type (e.g. heavy oil compared with condensate or gas), distance from sensitive coastal habitats and locations, and prevailing winds and currents. The areas of enhanced risk are therefore west Shetland (Regional Sea 8) and to a lesser extent the northern North Sea (Regional Sea 1). Project-specific risk of major incidents in Regional Seas 2, 3, 4 and 6 are moderated by prospective fluid type (primarily condensate or gas) although oil is also present in the Eastern Irish Sea".

"Subsea drilling equipment has evolved over the years into reliable systems with multiple redundancy. The subsea drilling pressure control system comprises several inter-related components including the wellhead assembly, BOP stack, choke & kill line system and riser. There have been very few drilling incidents resulting in loss of well control, and historic improvements in spill prevention and mitigation have stabilised the volume of oil spilled from E&P operations on the UKCS at a relatively low level, primarily through identification of root causes of spills and improvements in operational control procedures. The causes of the recent Deepwater Horizon blowout have been identified and a combination of technical, operational and regulatory measures have been put in place to effectively control the risk of a similar event in UKCS operations".

"Effective National Contingency Planning, and adequate response resources at a national level, including Emergency Towing Vessels (ETVs), are considered to be important mitigation measures".

"In some cases, there is strong seasonality in specific species' sensitivities, in particular in relation to bird populations and breeding/moulting seals. Existing regulatory controls emphasise the risk management and contingency planning aspects of environmental management, including the timing of operations; **and additional controls at an SEA level are not considered necessary"**.

"Oil spill response planning and capability, by the Maritime and Coastguard Agency - MCA, the oil industry and relevant authorities is generally consistent and as effective as practicable".

Oil Pollution Emergency Plans - OPEPs set out the arrangements for responding to incidents with the potential to cause marine pollution by oil, with a view to preventing such pollution and minimising its effect. Operators are required to follow international and UK best practice when responding to oil spills and the OPEP must identify appropriate strategies to facilitate a prompt and effective response to a pollution event, including site specific details of how and when they would be employed.

Annex 3 summarizes the assessments of **accidental event** impacts for all SEAs, indicating the methodology employed and its relationship to project-level requirements. It also presents in more detail a compilation of results from oil drift modelling carried out in the context of impact assessment of projects in the area of interest and arrangements for responding to incidents described in the OPEPs, as well as estimated time to beach derived from simplified deterministic calculations.

Overall spatial considerations

"The *Marine and Coastal Access Act 2009* is intended to simplify and strengthen strategic management of the marine environment by enabling economic, social and environmental impacts and objectives to be considered simultaneously. A key objective of the Act is to implement a nationwide system of marine planning that will clarify marine objectives and priorities for the future, and direct decision-makers and users towards more efficient, sustainable use and protection of marine resources. The Marine Policy Statement (MPS) was jointly adopted in March 2011 by the UK Government, Scottish Government, Welsh Government and the Northern Ireland Executive and applies to all UK waters. The MPS provides an overarching framework within which regional marine plans are presently being drafted".

"The Act established the Marine Management Organisation (MMO) with responsibility for marine plan development covering English territorial and offshore waters on behalf of the UK Government. In Scotland, Wales and Northern Ireland, marine plan development is through the devolved administrations".

As stated above Marine planning has a key role in informing strategic and project level spatial considerations, as indicated in the MPS, "Marine Plans should reflect and address, so far as possible,

the range of activities occurring in, and placing demands on, the plan area. The Marine Plan should identify areas of constraint and locations where a range of activities may be accommodated. This will reduce real and potential conflict, maximise compatibility between marine activities and encourage co-existence of multiple uses". The first marine plans for English waters contain a number of policies which relate to the potential for spatial conflict and/or the potential for activity co-location, including for areas of defined resource for particular activities but with no existing development so as not to risk precluding future use. Whilst the marine plans acknowledge the potential interactions between activities and map these, **they are not spatially prescriptive and therefore provide a limited indication of the location of possible future development**.

"In advance of the full implementation of formal marine planning and as part of the offshore energy SEA process, an initial high level screening of spatial constraints, issues and data gaps was carried out in 2007 for use in consideration of a potential 3rd Round of leasing for offshore wind energy developments. An updated analysis for both offshore wind and wave and tidal energy was carried out for OESEA2, and a similar exercise was undertaken for OESEA3".

According OESEA3, the potential resource areas for future oil and gas exploration and production are likely to coincide with areas of existing producing fields, as these remain the most prospective areas on the UKCS. **The potential footprint of any new development is likely to be very small** and isolated, and the interactions with other users from such developments are generally well understood, for example through the other regulatory issues compilations published by DECC in relation to blocks offered in former seaward rounds.

In the context of offshore energy developments[35], the following key spatial issues were identified:

Navigation - maintenance of free and unconstrained navigation routes is clearly vital to the UK as an island nation, and is a requirement for both territorial waters and the EEZ under the terms of United Nations Convention on the Law of the Sea;

Fishing activities (including their cultural and economic values) - these are highly variable in space and time; while the vast majority of UK waters are fished to some extent, fishing effort is often focussed in specific areas of prime importance to the industry. Fishing grounds exploited by smaller vessels with a limited home range and/or of prime importance to a local community may be of particular sensitivity to spatial conflict; such areas may exhibit apparently low effort and value relative to the UK as a whole. It is recognised that as the UK's system of formal marine spatial planning evolves, there is a need to better understand fishing practices, particularly in inshore areas where information continues to be lacking.

Conservation sites - compatibility with the provisions of the Habitats and Birds Directives and Natura 2000 sites. The selection and designation of nearshore and offshore Natura 2000 sites (and extension of coastal SPAs and SACs) was ongoing, and the spatial location and extent of a number of sites were not yet finalised, at the time of preparation of the Environmental Report. The designation of an area as a Natura 2000 site does not necessarily preclude activities within or close to the site boundaries. However, the potential likely significant effects of an activity on a site must be considered.

Other sources of potential spatial conflict include:

- Other present and potential future uses of the seabed including: aggregate extraction, communication cables, electricity interconnectors, oil and gas infrastructure, carbon capture and storage, and other marine renewable energy generation may represent spatial constraints.

- Visual intrusion: there are various socio-economic drivers, including the importance of coastal tourism, to minimise significant visual impact of offshore developments.

- The spatial extent of Ministry of Defence - MoD practice and exercise areas; and constraints associated with civilian aviation and helicopter-based Search and Rescue (SAR).

"The concept of a coastal buffer for offshore wind development was introduced in Round 2, with 0-8km and 8-13km used to assess seascape sensitivity. Reflecting the relative sensitivity of multiple receptors in coastal waters, previous offshore energy SEAs concluded that the bulk of future wind

[35] The footprint of offshore wind farms is extensive, and the total area occupied by a development may be very large (e.g. between ~170 and 305km^2 for individual farms in Round 3 developments); but not intensive, in that individual turbines are usually separated by large distances (>1,000m in some cases); or exclusive, in that a variety of other marine activities may be possible within the boundaries of an operational development.

generation capacity should be sited well away from the coast, generally outside 12 nautical miles. **The proposed coastal buffer zone was not intended as an exclusion zone**, since there may be scope for further offshore wind development within this area, but instead is included as mitigation for the potential environmental effects of development which may result from this draft plan/programme. As international context, wind farms in the Netherlands and Germany are on average 31.4km and 52.6km from the coast, compared with a current UK average of just 9.4km and a European average of 43.3km".

Landscape and seascape issues have been considered as significant for those Round 3 zones within viewable distance of the coast (sites of "Rampion" and "Navitus Bay"). Whilst effects on landscape were identified for Rampion, the Secretary of State indicated that with agreed mitigation their effects were not significant enough to refuse the application. A greater number of landscape issues associated with Navitus Bay was the principal reason for **the refusal of planning consent**.

"This was indicative and subject to a site specific consideration of potential effects (including on seascape) which may result in developments being more acceptable either closer to the coast, or further away. Landscape and seascape issues have been considered as significant for those Round 3 zones within viewable distance of the coast. Whilst effects on landscape were identified for Rampion, the Secretary of State indicated that with agreed mitigation their effects were not significant enough to refuse the application. A greater number of landscape issues associated with Navitus Bay was the principal reason for the refusal of planning consent. The implementation of a 12nm coastal buffer as indicated above would substantially mitigate conflict with the most sensitive fishing sector (small inshore vessels, which cannot easily relocate and are often of marginal commercial viability").

As noted in the consultation process, **the refusal of planning consent** to Navitus project has been established as concrete evidence that projects even in areas approved by the SEA and licensed by regulators may be rejected for environmental reasons. As will be seen later, the reference to the need for refinement of site-level or project-level environmental studies appears throughout the SEA, including the possibility of project refusal due to environmental constraints.

Potential for transboundary effects

"OESEA3 covered a range of activities, some of which could take place in all UK waters, and others which are considered only for England and Wales. Transboundary effects are therefore possible with all neighbouring states whose waters touch the UK. These are France, Belgium, the Netherlands, Germany, Denmark, Norway, the Faroes and the Republic of Ireland. Since activities from this draft plan/programme may occur in UK waters and including adjacent to the majority of median lines, the sources of potentially significant environmental effects with the additional potential for transboundary effects include:

- Underwater noise
- Marine discharges
- Atmospheric emissions
- Impact mortality on migrating birds and bats
- Accidental events – oil spills and major carbon dioxide releases

All of the five aspects above may be able to be detected physically or chemically in the waters of neighbouring states. However the scale and consequences of environmental effects in adjacent state territories due to activities resulting from adoption of the draft plan/programme will be less than those in UK waters and **are considered unlikely to be significant"**.

Consideration of potential for cumulative impacts

The SEA Directive and the *Environmental Assessment of Plans and Programmes Regulations 2004* require that secondary, cumulative and synergistic effects be considered.

The document "A Practical Guide to the Strategic Environmental Assessment Directive" - Appendix 8 (September 2005)[36] suggests that "Many environmental problems result from the accumulation of multiple small and often indirect effects, rather than a few large and obvious ones. Examples include

[36] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf

loss of tranquillity, changes in the landscape, loss of heathland and wetland, and climate change. These effects are very hard to deal with on a project-by-project basis through EIA. **It is at the SEA level that they are most effectively identified and addressed**".

The degree of difficulty in understanding cumulative impacts can be inferred from the "key points in the assessment of cumulative, secondary and synergistic effects", suggested in the same document: "Predict and assess the cumulative effects of the plan or programme on the key receptors, i.e. the cumulative effects of current and reasonably foreseeable plans, programmes and strategies, with and without the plan or programme" and "Recognise that there is uncertainty in predicting effects and determining significance and this can arise due to the variation in natural systems and their interactions; a lack of information, knowledge or scientific agreement regarding cause-effect relationship; or the inability of predictive models to accurately represent complex systems".

According to the SEA 2 Post Public Consultation Report[37], "the relationship between Strategic Environmental Assessment and project-specific Environmental Assessment (or EIA) has also been the subject of much discussion. Assessment and management of cumulative effects is commonly accepted to be the fundamental weakness of project-specific EA. NEPA[38] guidelines cite Odum's (1982) succinct description of environmental degradation from cumulative effects as 'the tyranny of small decisions'".

"Equally, however**, it is inappropriate for Strategic Environmental Assessment to result in prohibition of activities with substantial socio-economic benefits, where adequate regulatory control is available at a project-specific level, and SEA does not identify significant risk of incremental or cumulative effects**.

For example, SEA 2 concluded that available mitigation measures and regulatory controls, together with implementation of a monitoring programme, were sufficient to prevent cumulative effects of seismic noise on marine mammals, and chemical discharges in produced water".

As a general principle, therefore, SEA 2 has aimed to identify potential sources of incremental and cumulative effects, and recommend mitigation through a combination of "policy-level" management (for example that produced water should be re-injected where possible) and project-specific controls. SEA 2 did not identify any potential cumulative issues which justify alternatives to the licensing of the proposed blocks, but did recommend an integrated and comprehensive programme of monitoring to enable adaptive management at a project-specific level.

In conclusion, the challenge for SEA is to balance a precautionary approach to environmental protection and conservation of natural resources from incremental and cumulative effects, with legitimate objectives for economic and social benefits. The difficulty of this task in view of scientific uncertainty is reflected by the U.S. Council on Environmental Quality, who conclude: "**The continuing challenge of cumulative effects analysis is to focus on important issues, recognizing that a better decision, rather than a perfect cumulative effects analysis, is the goal**....".

According to OESEA3 Environmental Report:

Cumulative effects are considered in a broader context, to be potential effects of activities resulting from implementation of the plan **which act additively or in combination with those of other human activities (past, present and future)**; **in an offshore SEA context notably fishing, shipping (including crude oil transport) and military activities, including exercises (principally in relation to noise) – i.e. what could be described as the other major 'industrial' uses of the sea**.

Secondary effects comprise indirect effects which do not occur as a direct result of the proposed activities, but as a result of a more complex causal pathway (which may not be predictable).

Incremental effects have been considered within the SEA process as effects from licensing exploration and production activities (including gas and carbon dioxide storage), and leasing OWF and marine renewable developments; which **have the potential to act additively with those from other licensed/leased activity**.

[37] Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea SEA 2. SEA 2 Post Public Consultation Report, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197795/SEA2_Postconsultationreport.pdf

[38] U.S. National Environmental Policy Act (NEPA)

Synergistic effects occur where the joint effect of two or more processes is greater than the sum of individual effects – in this context, synergistic effects may result from physiological interactions or through the interaction of different physiological and ecological processes (for example through a combination of contaminant toxicity and habitat disturbance).

In contrast to other elements of the plan, to some extent, all potential sources of effect (i.e. disturbance, emissions and discharges) resulting from oil and gas activity within an area with a long (40 year) history of exploration activity are cumulative, insofar as they are incremental to previously existing sources (although the net trend of overall source level may be a reduction, due to improved environmental management and/or declining production levels, and in the coming years, cessation of production and decommissioning).

Therefore, effects are considered secondary, incremental, cumulative or synergistic only if:

- the physical or contamination "footprint" of a predicted project overlaps with that of adjacent activities;
- or the effects of multiple sources clearly act on a single receptor or resource (for example a fish stock or seabird population);
- or if transient effects are produced sequentially.

The Report discusses for each of the assessment topics the question of cumulative effects within the framework of OESEA3.

Underwater noise

Cumulative effects on marine mammals resulting from the proposed licensing/leasing are considered likely. Activity levels are likely to be concentrated in Regional Seas 1, 2 and 6, with additional oil and gas activity likely in Regional Seas 8/9, but there is the potential for oil and gas licences to be awarded in any area of the UKCS. Consideration of this likely activity, in combination with propagation ranges for noise, concluded that it is likely that multiple sources (including seismic surveys and pile-driving) will occur at the same time, that both activities may extend throughout much of the year, and be audible to marine mammals over a large proportion of their range.

The JNCC guidelines on the deliberate disturbance of marine European Protected Species also suggest that for most cetacean populations in UK waters, disturbance, in terms of the Habitats Regulations or Offshore Marine Regulations, is unlikely to result from single, short-term operations, e.g. a seismic vessel operating in an area for 4-6 weeks, or the driving of a dozen small diameter piles. Such activities would most likely result in temporary disturbance of some individuals, which on its own would not be likely to result in significant effects on the local abundance or distribution. Non-trivial disturbance, which would constitute an offence under the Regulations, would most likely result from more long-term noisy activities in an area, chronically exposing the same animals to disturbance or displacing animals from large areas for long periods of time.

Evidence obtained over the last 10 years has shown that harbour porpoise are more sensitive to underwater noise than previously thought. Comparison of modelling frameworks designed to analyse the long-term consequences to harbour porpoise of disturbance associated with large scale wind farm construction in the North Sea suggest a high degree of uncertainty in extrapolating from individual to population effects. Nonetheless, these exercises have raised the theoretical possibility for temporal and spatial combinations of large seismic surveys and pile-driving operations to result in significant population disturbance.

Looking forward, project timelines with respect to consented wind farms indicate that on average two pile driving operations will likely take place continuously in the North Sea over the next decade or more – primarily in the central and southern North Sea. The vast majority of seismic survey effort on the UKCS has been undertaken in the developed (in terms of oil and gas) areas of the northern and central North Sea, the Scottish continental shelf and the Faroe-Shetland Channel, and projections of recoverable reserves continue to identify the central North Sea as the area with the largest reserve base and with a significant exploration potential. Therefore, the central and southern North Sea may represent areas with the most potential for incremental underwater noise effects with respect to pile driving activities and seismic survey (note that in many cases, reprocessing of existing seismic data can avoid the requirement for new deep geological survey).

Previous SEAs have recommended consideration of the establishment of criteria for determining limits of acceptable cumulative impact; and for subsequent regulation of cumulative impact. The SEA recognises the advances made in this respect through the establishment of the indicator on low- and mid- frequency impulsive sounds under the Marine Strategy Framework Directive. **While criteria have not yet been defined**, the establishment of a database to collate occurrences of "noisy activities" (the Marine Noise Registry) represents the necessary precursor.

Incremental - Simultaneous and sequential seismic surveys and pile-driving

Cumulative - Seismic survey, pile-driving noise and broadband impulse noise, for example military sonars and continuous mobile sources (e.g. shipping)

Synergistic - None known

Secondary - None known

Physical damage/change to features and habitats

Effects of seabed disturbance resulting from proposed activities will be cumulative to those of other activities, notably demersal fishing. In a UKCS context, the contribution of all other sources of disturbance are minor in comparison to the direct physical effects of fishing, and it can be argued that the positive effect of fisheries exclusion offsets any negative effects of exploration and production and OWF, wave and tidal stream development, but a corollary of this is fisheries displacement. On balance, however, the spatial extents of both positive and negative effects are probably negligible for most seabed habitats.

Incremental - Physical footprint incremental to existing offshore activity – minor increment from oil and gas and gas storage and carbon dioxide transport and storage in existing hydrocarbon reservoirs; higher from OWF and potentially wave, tidal stream and gas and carbon dioxide storage in "other" geological formations (e.g. saline aquifers), although data is currently poor; very high for tidal range.

Cumulative - Cumulative effects dominated by trawling. The disturbance effect of oil and gas and OWF, wave and tidal stream development is likely to be offset by fishing exclusion, however, this could lead to displacement.

Synergistic - None known

Secondary - Possible changes to water movements and associated sedimentation patterns or scour.

Physical presence

The physical presence of structures in the marine environment is not expected to increase significantly following further oil and gas, gas storage and carbon dioxide storage licensing. The potential for interactions both from other marine users and relevant ecological receptors (e.g. birds and marine mammals) with offshore oil and gas infrastructure (whether positive or negative) is likely to be insignificant; in part because the number of existing surface facilities is relatively small (of the order of a few hundred and due to decline in the coming years due to decommissioning and use of existing export infrastructure by subsea developments) and because the majority are at a substantial distance offshore, in relatively deep water. However, the larger numbers of individual surface or submerged structures in offshore wind development, the presence of rotating turbine blades and considerations of their location and spatial distribution (e.g. in relation to coastal breeding or wintering locations for waterbirds), indicate a higher potential for incremental physical presence effects.

The SEA recommends a precautionary approach to facility siting in areas known to be of key importance to bird and marine mammal populations unless evidence indicates otherwise, and also that information on the distribution, behaviour and interactions with offshore renewable devices is in many cases limited and that additional work is required to improve current models on marine mammal and bird response/collision risk.

Incremental - Small increment from oil and gas, CO_2 and gas storage and marine renewables to existing exclusion zones and obstructions, visual intrusion and disturbance; potentially significant increment from offshore wind farms. Displacement, barrier effects and collision risk to birds potentially significant at a local or regional level; considered unlikely to be significant to bird populations at a strategic level. The SEA recognises that **the determination of significant effects and appropriate mitigation will be required on a project-specific basis.**

Cumulative - Exclusion and snagging risks are cumulative to those resulting from natural obstructions, shipwrecks and other debris. Extent of cumulative effect associated with oil and gas, CO2 and gas storage licensing round is negligible. Potential cumulative displacement, barrier effects on birds.

Synergistic - No conclusive data

Secondary - No conclusive data

Landscape/seascape

It is difficult to resolve the local implications on seascape from such developments at a strategic level, though in the areas of the East Irish Sea, Thames and Wash, the concentration of wind farms and their proximity to the coast, may lead to the seascapes of these areas being dominated by this use of the sea in the future.

Incremental - In certain Round 1 and 2 leasing areas, incremental effects are characterised by successive developments of offshore wind farms which are intervisible with the coast and one another. Though Round 3 leasing areas are typically further from the coast and therefore have less potential for visual impacts at the coast, further intervisibility with future wind sites and existing sites could lead to significant incremental effects. Tidal stream, tidal range and wave devices have a low surface elevation but may incrementally add to offshore lighting and ship movements for maintenance.

Cumulative - The location of wind, wave and tidal energy resources are such that there is unlikely to be any significant cumulative effects between these technologies. With regard to gas storage and CCS, any new surface infrastructure may generate cumulative visual effects. Tidal range schemes are inherently shore connected and therefore will have visual effects which may act cumulatively with other changes at the coast, for example loss of intertidal area from sea-level rise.

Synergistic - No conclusive data

Secondary - No conclusive data

Marine discharges

Total produced water discharge from UKCS oil production was 156 million m^3 in 2014, with an average oil in water content of 12.84mg/l. In comparison with this, the potential discharge from new developments following the proposed rounds will be negligible since it is expected that the bulk of produced water will be reinjected rather than discharged. Through OSPAR, the UK is committed to a presumption against discharge from new developments.

Environmental effects of produced water discharges are limited primarily by dispersion, to below No Observed Effect Concentrations (NOECs) in close proximity to the discharge point. Synergistic interactions are possible between individual components, particularly PAHs, specific process chemicals (especially those which are surface-active, including demulsifiers), and other organic components. However, given the anticipation that the bulk of produced water from new field developments will be reinjected rather than discharged, and that such discharges as are made will be treated to required quality standards, the scope for incremental, cumulative or synergistic effects is remote.

Previous discharges of WBM cuttings in the UKCS have been shown to disperse rapidly and to have minimal ecological effects. Dispersion of further discharges of mud and cuttings could lead to localised accumulation in areas where reduced current allows the particles to settle on the seabed. However, in view of the scale of the SEA area, the water depths and currents, and probability of the reinjection (or disposal on land) drill cuttings from any major field development, this is considered unlikely to be detectable and to have negligible incremental or cumulative ecological effect.

Incremental - Produced water: incremental contribution of produced water is dependent on the extent of reinjection but noting the presumption against new produced water discharges, the scale of discharge and effects will be negligible. WBM drilling discharges generally disperse widely and significant accumulations do not occur. It is therefore possible that discharge footprints will overlap, although the ecological effects will be undetectable. Potential “sinks” may occur in areas of sediment accumulation although this is considered unlikely to be detectable.

Cumulative - Principal cumulative sources of major contaminants, including hydrocarbons and metals, are shipping (including wrecks) and atmospheric inputs. Cumulative sources of particulate contaminants include aeolian dust and sediment disturbance from trawling, although these are negligible in the context of natural suspended particulate loads.

Synergistic - Synergistic effects of chemical contaminants in produced water and drilling discharges are conceivable, although substantive data is almost entirely lacking and it is considered unlikely that significant synergistic effects would result from chemicals used in exploration and production, or renewable energy operations.

Secondary - None known

Wastes to land

In view of the relatively small number of wells predicted, and the establishment of a licensing mechanism to allow interfield cuttings reinjection, it is considered unlikely that major incremental or cumulative landfill requirement will result from proposed licensing/leasing

Incremental - Incremental return of general oilfield wastes insignificant; incremental return of drilling wastes also unlikely to represent a significant contribution to onshore waste disposal requirements.

Cumulative - Not quantified

Synergistic - None known

Secondary - None known

Atmospheric emissions

Atmospheric emissions from offshore oil and gas exploration and production activities may contribute to reduction of local air quality. Greenhouse and acid gas emissions effectively contribute to a mixed regional or global “pool” and can therefore be considered cumulative.

The implications of the ultimate use of oil and gas production from UKCS for greenhouse gas emissions and on UK commitments under the Kyoto Protocol and the Paris Agreement, were not considered here since these are subjects for different high level policies, fora and initiatives including UK energy policy, security of supply considerations, emissions trading etc.

Flaring from existing UKCS facilities has been substantially reduced relative to past levels, largely through continuing development of export infrastructure and markets, together with gas cycling and reinjection technologies. In addition, offshore oil industry emissions are subject to an Emissions Trading Scheme. New developments will generally flare in substantial quantities only for emergency pressure relief, with “zero routine flaring” now considered a realistic design target for new developments. Other than start-up flaring, subsea tie-back developments will generally have little effect on host installation flaring.

Incremental - Incremental emissions resulting from internal combustion for power generation by installations, terminals, vessels and aircraft, flaring for pressure relief and gas disposal, and fugitive emissions during tanker loading.

Cumulative - Greenhouse and acid gas emissions effectively contribute to a mixed regional or global “pool” and are therefore considered to be cumulative. On a global scale, cumulative contributions of emissions resulting from predicted activities and developments will be negligible in comparison to the influence of onshore sources.

Synergistic - None known

Secondary - None known

Accidental events

Accidental events (with environmental consequences) that could potentially occur on offshore E&P, and gas storage facilities (including carbon dioxide), and associated support vessels, include oil and chemical spills and gas releases, although large volume oil spills are only possible from oil exploration, production or export facilities.

Although the consequences of a major oil spill could be severe, in both ecological and economic terms, the incremental risk associated with the predicted level of activity is moderate or low. The increasing numbers of offshore installations in UK waters, and in particular the number and spatial footprint of large wind farms, will affect the relative risk of vessel collision. This risk is expected to be mitigated *inter alia* by siting of developments so that they do not impinge on major commercial navigation routes or significantly increase collision risk – for example see related policy in the East Marine Plans. With this caveat, the predicted scale of activity that could follow adoption of the draft plan/programme would not have a significant influence on the cumulative risk.

Incremental - Hydrocarbons from oil spills will be incremental to (minor) offshore exploration and operational discharges; however, it is considered very unlikely that oil spill footprints will overlap given the spill frequency associated with predicted activities.

Cumulative - There are a range of cumulative sources of hydrocarbons to the area. Depending on magnitude, accidental spills represent a minor to major contribution to overall regional inputs of oil.

Synergistic - None known

Secondary - None known

Cumutative effects - Summary and conclusion

A challenge in assessing cumulative impacts in relation to the draft plan/programme lies in the findings that the majority of potential effects identified are of small magnitude, largely sub-lethal and for mobile species, largely associated with behavioural changes. Such effects are difficult to measure in the field and are even more complicated to predict because of numerous other factors which are contributing to overall spatial and temporal variability. To use marine mammals as an example, the most relevant effect from the draft plan/programme is the increase in underwater noise from piling and seismic activity with the consequent risk of disturbance, given that injurious effects are mitigated for.

Current attempts at addressing acoustic cumulative effects have focused on the “incremental” effects of plan activities, and while the understanding is that they are unlikely to have an effect at the population level, the uncertainties in these assessments remain very large. The next step in a more complete cumulative assessment would be to combine the effects of noise disturbance with all other pressures, including direct mortality from by-catch, effects from changes in prey distribution (from fishing and climate change), chronic exposure to contaminants etc. These interactions are likely to be even more complex than those that have been modelled so far; the scale at which they act may also vary so that some interactions can occur at certain temporal and spatial scales but not at others.

Currently, predicting these kinds of interactions remains highly uncertain and quantitatively dubious. **Instead, this should lead to further recommendations of regional scale targeted monitoring efforts to be able to have confidence in the assessment of trends for key ecosystem components.**

As observed in the consultation process (Post-consultation Report), a “**sound modelling exercise”** has been commissioned under the current SEA research programme “to model underwater sound propagation during geophysical seismic surveys, and predict received sound levels for marine mammals with respect to injury sound level thresholds”. The definition of thresholds might contribute to the detection of cumulative effects.

SEA 4

In order to provide a historical perspective on OESEA3 assessment topic considerations, the main conclusions of SEA 4 are presented below.

The base case for the assessment was Alternative 2 (i.e. to offer the area for licensing as proposed) since this was judged to represent the greatest scale of potential interactions and effects.

The initial stage was the identification of interactions between the potential activities following licensing of the SEA 4 area and receptors within the environment (both the natural environment and human uses of the area). The interactions and implications considered include positive, negative, direct, indirect, cumulative, synergistic and transboundary effects. This initial step drew on input from scoping, published descriptions of the effects of oil and gas activities, previous DTI SEAs and the EU SEA Directive.

The next stage was to review the potential interactions to identify those which might potentially have effects of a scale which should be considered further in the SEA.

Conclusions from the consideration of potential effects of licensing the SEA 4 area are summarised below:

Noise – The SEA 4 area is important for a wide range of marine mammals, including beaked whales for which there is limited information on distribution and ecology. The potential effects of seismic and other underwater noise on whales and dolphins remain a significant area of uncertainty, and issue of importance for offshore exploration activities. The range of potential behavioural effects, and the consequent potential for cumulative effects, indicates that all marine mammal populations in the area are likely to be exposed to biologically significant sound levels. However, the proposed level of activity does not represent a significant change to recent seismic survey effort which in turn does not appear to have resulted in significant changes in frequency of sightings or behavioural responses. Mitigation measures already implemented, including the use of passive acoustic monitoring, together with proposed modifications to the consent procedure to manage cumulative effects, appear to provide some degree of protection from acute effects. It is therefore concluded that there is an acceptably low risk of potential effects of underwater noise resulting from SEA 4 activity.

Physical damage at the seabed - The predicted scale of physical disturbance of the seabed, resulting from potential activity scenarios for SEA 4 area, is very small in comparison with the total SEA 4 area. Recovery of the affected seabed is expected to be rapid on the continental shelf and slope whilst in the deep water muds to the north of the area physical evidence of activities can be expected to be long lasting. Prehistoric marine archaeological remains could be affected by pipelaying or other activities in sheltered nearshore waters although further major infrastructure development is not anticipated from SEA 4 activities. Nevertheless, as part of mitigation, a number of initiatives are underway to promote the awareness and reporting of archaeological finds during oil industry activities on the UKCS. It is concluded that the potential incremental and cumulative effects of physical disturbance are not likely to be significant.

Physical presence - Exclusion from large areas of sea by the presence of rigs or installations could result in effects on commercial fishing, as could the presence of snagging hazards associated with pipelines or subsea wellheads. However, although FPSO developments occupy slightly more searoom than fixed installations, the small scale of such effects which could follow from SEA 4 licensing indicates that the number of exclusion zones that may be established is unlikely to cause significant economic impacts. The established oil industry and UK fishing industry consultation, liaison and compensation mechanisms, should serve to mitigate any conflicts.

Discharges - Concerns over produced water discharges include the cumulative effects of oil and the possible biological effects of chemicals. However, for new developments there is a presumption against discharge of produced water in favour of reinjection to sub-surface geological formations and existing developments in the area already reinject the vast majority of the water produced. As a consequence of this, produced water discharges are not viewed as a significant consideration for SEA 4 licensing.

The contaminant composition of drilling wastes has changed significantly over the last few decades, in response to technical and regulatory developments. Previous widespread and substantial discharges of oil-based muds, and later synthetic muds, have been superseded by alternative disposal methods (either containment and onshore treatment, or reinjection) or by use of water-based muds. Discharges of water based muds and cuttings in the SEA 4 area (and elsewhere) have been shown to disperse rapidly with minimal ecological effects. Dispersion of further discharges of mud and cuttings could lead to accumulation in regional sinks (areas where reduced current allows the particles to settle on the seabed). However, in view of the scale of the area, the water depths and currents, and projected level of activity this is considered unlikely to be detectable.

Emissions - Potential environmental effects of acid gas and greenhouse emissions are, respectively, regional and global in nature. Local environmental effects of atmospheric emissions are not expected to be significant in view of the high atmospheric dispersion associated with offshore locations. Incremental contribution to regional and global effects will not be significant. Combustion emissions from power generation would represent only be a minor contribution to oil and gas production industry, other industry and national totals. Similarly, significant combustion emissions from oil or gas flaring are not expected from potential developments in the SEA 4 area in view of regulatory controls and commercial considerations.

Wastes to shore - Oil based muds (OBMs) may be needed to drill through some of the rock types found in the SEA 4 area. Rock cuttings contaminated with oil based mud (i.e. >1% oil on cuttings) are no longer discharged to sea and are either reinjected into underground rock formations or shipped to land to undergo treatment prior to onshore disposal. Sustainable options for onshore disposal of OBM cuttings remain a challenge for the industry. However, the majority of recent exploration wells in the west of Shetland area have been drilled with water based muds and have not involved the shipment to shore of drill cuttings. The transfer between installations for reinjection of OBM cuttings is now permitted under a Food and Environment Protection Act (FEPA) licence. The environmental management of treatment and disposal of such cuttings, both onshore and offshore, is strictly controlled. The incremental volumes of cuttings associated with 22nd licensing round activities will be small in the context of overall waste disposals from offshore.

Accidental events - Specific concerns in relation to oil spills in the SEA 4 area include the location of prospective areas upwind from sensitive coastlines; the importance of aquaculture along adjacent coastlines; and the relative remoteness of the area from stockpiles of oil spill response resources. Seabirds offshore are vulnerable to even small spills, particularly in late summer and autumn when many auks are flightless. In the event of a large spill of persistent oil, coastal oiling could occur.

However, although the consequences of major oil spills in the area may clearly be severe, in both ecological and economic terms, the incremental risk associated with the predicted level of activity is moderate or low. Existing exposure to risk is “high” or “very high” as a result of shipping around the north of Shetland, Fair Isle Channel and western Orkney; and the DTI has regulatory mechanisms in place that require Operators to develop effective oil spill mitigation measures, covering organisational aspects and the provision of physical and human resources. Times to beach, under worst case trajectory modelling conditions, are sufficient to allow the deployment of response measures where appropriate.

Cumulative effects - Cumulative effects from activities resulting from the proposed 22nd Licensing Round, have the potential to act additively with those from other oil and gas activities including both existing activities and new activities in currently licensed areas, or to act additively with those of other human activities (e.g. fishing and crude oil transport). Synergistic effects are considered to be potential effects of exploration and production activities where the joint result of two or more effects is greater than the sum of individual effects. Cumulative effects in the sense of overlapping "footprints" of detectable contamination or biological effect were considered to be either limited (noise, physical presence, physical damage, emissions, discharges), or unlikely (accidental events), although further research is recommended into possible cumulative effects of seismic noise on whales and dolphins. No synergistic effects were identified that were considered to be potentially significant.

Transboundary effects – The SEA 4 area adjoins areas under the jurisdiction of the Faroe Islands and Norway. Prevailing winds and residual water circulation will result in the transboundary transport of discharges to water (including particulates), atmospheric emissions and spills. The environmental effects of underwater noise, drilling discharges, atmospheric emissions and oil spills may be detected physically, chemically and biologically in the marine environments of adjacent states, particularly where activities are undertaken close to international boundaries. The scale and consequences of environmental effects in adjacent state territories will be comparable to those in UK waters at equivalent distances.

Socio-economic effects – The economic impacts of licensing the SEA 4 area are likely to be incremental rather than absolute. Production from fields in the SEA 4 area would serve to slow down declines in overall UKCS production, employment and tax revenues, as well as extending the lives of facilities such as the Sullom Voe and Flotta terminal and assisting in maintaining employment in areas such as Shetland and Orkney. Shetland and Orkney have experienced influences from activity on the UKCS for about 30 years and the oil and gas industry is now a well-established and important part of the two local economies.

Forecasts of UKCS oil production suggest an average decline of 5% per year. Under a pessimistic scenario SEA 4 production would slow the decline, whereas an optimistic scenario predicts that production would actually increase during the five years 2009-13 before the decline resumed.

Under the pessimistic scenario, SEA 4 expenditure could account for 22.5% of total UKCS capital expenditure in 2010. With the optimistic scenario, the SEA 4 expenditure could reach 70% of the total in 2010. Total capital expenditure under an optimistic scenario is estimated at over £4.4 billion.

The implications for employment have also been considered. For the optimistic scenario the overall UK total is 19,830 person years, with a peak of 1970 in 2010. For the pessimistic scenario the overall total is 5,440 person years, with a peak of 695 in 2009[39].

Wider policy objectives - At a wider scale of assessment it is clear that, with the probable exception of seismic noise, the major present day environmental pressures on the SEA 4 area are not associated directly with hydrocarbon exploration and production, but with other sources of disturbance. Fishing mortality (of both target species and bycatch of fish and other animals), and trawling disturbance effects are probably the most significant direct anthropogenic effects on the ecology of the SEA 4 and adjacent areas. In a longer timeframe, the potential interruption of the thermohaline circulation as an outcome of climate change would result in a dramatic (but not unprecedented) ecological shift to cold water communities. In this context, the combined effects predicted as a result of routine and accidental E&P activities which may arise from 22nd Round licensing, are minimal.

Provision of oil and gas from UK resources will contribute to the security of national energy supply. Activities resulting from SEA 4 licensing would have positive socio-economic effects on Shetland, Orkney and north eastern Scotland as well as the UK as a whole.

The SEA Directive requires that, in considering the likely significance of effects, the degree to which the plan or programme influences other plans and programmes should be addressed, together with the promotion of sustainable development. No significant effects are predicted on UK Government or other wider policy and commitments, from the activities likely to follow the proposed 22nd Licensing Round.

[39] The potential socio-economic implications of licensing the SEA 4 area.A report for the Department of Trade and Industry by Mackay Consultants. May 2003, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197366/SEA4_TR_Economics_Mackay.pdf

Consideration of effects of alternatives (OESEA3)

The reasonable alternatives to the plan/programme were:

1. Not to offer any areas for leasing/licensing

2. To proceed with a leasing and licensing programme

3. To restrict the areas offered for leasing and licensing temporally or spatially

The assessment of these three alternatives is based on the consideration of effects in sections 5.3 to 5.16 of the Environmental Report[40]. It is presented below by SEA topic and consists of a two stage process for each topic, which includes:

- Consideration of sources of potentially significant effect with a brief explanatory narrative, including comments where effects are considered irreversible.
- Consideration of OESEA objectives and guide phrases (as described in Section 3)[41]

The consideration of sources of potentially significant effect uses the key below. A "?" denotes where there is uncertainty:

	Potential positive impact on topic
	Potential minor positive impact on topic
	Neutral impact on topic
	Potential minor negative impact on topic
	Potential negative impact on topic

[40] 5.3 Noise
5.4 Physical damage/change to features and habitats
5.5 Consequences of energy removal
5.6 Physical presence - ecological implications
5.7 Physical presence and other users
5.8 Landscape/seascape
5.9 Marine discharges
5.10 Waste
5.11 Air quality
5.12 Climatic factors
5.13 Accidental events
5.14 Ancillary development
5.15 Overall spatial considerations
5.16 Consideration of potential for cumulative impacts

[41] Example - **Biodiversity, habitats, flora and fauna**

Objective: Contributes to conservation of the biodiversity and ecosystems of the United Kingdom and its seas.	***Guide phrases**: Plan activities do not lead to the loss of biological diversity, the degradation in the quality and occurrence of habitats, and the distribution and abundance of species.*
Avoids significant impact to conservation sites designated at an International, European and National level (e.g. Ramsar, Natura 2000, Marine Conservation Zone, Nature Conservation Marine Protected Area and SSSI).	*Plan activities do not cause adverse effects on marine ecosystems/valued ecosystem components*
Avoids significant impact to, or disturbance of, protected species and loss of habitat.	*Plan activities contribute to the ecological knowledge of the marine and coastal environment through survey and discovery.*
	Plan activities do not lead to disruption in habitat and species connectivity.
	Plan activities do not lead to the introduction of noise at levels which adversely affect the marine environment, including by leading to significant effects on conservation sites and sensitive species
	Plan activities do not lead to the introduction of non-native species at levels which adversely alter marine ecosystems.
	The plan recognises the ecosystem importance of land-sea coupling, for instance its role in species migration
	The plan promotes the achievement of good ecological/environmental status for water bodies and marine sub-regions as outlined at a European Level.

For example, considering **“Biodiversity, habitats, flora and fauna”**

Table 12 - Consideration of sources of potentially significant effect (“Biodiversity, habitats, flora and fauna”)

Potentially significant effect	Alternatives 1	2	3	Narrative
Physical damage to biotopes from infrastructure construction, vessel/rig anchoring etc (direct effects on the physical environment)				‘Footprint’ effects associated with OWF, wet renewables, oil & gas and CO_2 storage in saline reservoirs; negligible incremental effect from gas and CO_2 storage in depleted reservoirs. Effects in most areas reversible over time; mitigation may be possible through identification and avoidance of biotopes where this is not the case.
Behavioural and physiological effects on marine mammals, birds and fish from seismic surveys				Geophysical surveys principally associated with oil & gas exploration and development; some seismic potentially required for gas and CO_2 storage. Seismic surveys may generate high source levels with significant potential for propagation.
Behavioural and physiological effects on marine mammals, birds and fish from other geophysical surveys		?	?	Includes echosounders, side-scan sonars and sub-bottom profilers used by all aspects of the plan to provide information on surface or shallow seabed. Sound levels drop off quickly with distance due to high frequency (>10kHz) and high directionality but not all systems have been adequately characterised.
Behavioural and physiological effects on marine mammals, birds and fish associated with construction phase noise[151]				Potential effects associated with pile driving primarily from OWF and to a lesser extent wave, tidal stream and oil & gas; may generate high source levels with significant potential for propagation; negligible incremental effect from gas and CO_2 storage in depleted reservoirs. Construction of tidal range schemes likely to result in significant noise both above and below water.
Behavioural and physiological effects on marine mammals, birds and fish associated with operational noise		?	?	Negligible operational noise from OWF; source levels from oil & gas production, and gas and CO_2 storage (e.g. gas compression) relatively low therefore local effects only. Potential for noise associated with operation of wave and tidal stream devices although limited information.
Behavioural and physiological effects on marine mammals, birds and fish associated with decommissioning noise				Noise emissions associated with decommissioning of all aspects of the plan are likely to be similar in nature to those generated during construction and installation, with the exception of an absence of extensive pile-driving (OWF) and seismic survey (oil and gas) noise.

Potentially significant effect	Alternatives 1	2	3	Narrative
The introduction and spread of non-native species				Possibility of effects mitigated by adherence to ballast water guidance. Presence of OWF and wet renewable foundations may result in localised increases in species diversity but given the widespread natural presence of hard substrates such as glacial dropstones, unlikely that foundations will facilitate the spread non-native species. Depending on species, change may be irreversible.
Behavioural disturbance to fish, birds and marine mammals etc from physical presence of infrastructure and support activities				Potential effects associated with OWF, wet renewables and oil & gas; negligible incremental effect from gas and CO_2 storage in depleted reservoirs
Collision risks to birds		?	?	Principally associated with OWF; mortality rate variable depending on location and weather conditions but unlikely to be significant at a strategic level with locational mitigation. Collision risk to diving birds from wet renewable devices not well understood.
Collision risks to bats		?	?	Limited information to quantify the risk. Principally associated with OWF; mortality rate may vary depending on location but unlikely to be significant at a strategic level.
Collision risks to water column megafauna (e.g. fish, marine mammals).		?	?	Principally associated with wet renewable devices although as yet not fully understood. Unlikely to be significant at a strategic level with locational or operational mitigation.
Barriers to movement of birds				Principally associated with OWF; significance of effect variable depending on location but unlikely to be significant at a strategic level.
				Loss of intertidal areas as a result of tidal range development may have a significant impact on foraging areas for waterbirds causing displacement of birds.
Barriers to movement of fish and marine mammals				Principally associated with wet renewables; significance of effect variable depending on location but unlikely to be significant at a strategic level with locational mitigation.
				Tidal range schemes may represent a significant barrier to the movement of migratory and estuarine fish. Effects potentially irreversible.
Changes/loss of habitats from major alteration of hydrography or sedimentation (indirect effects on the physical environment)				May be associated with OWF and wet renewables although locational mitigation should minimise impacts.
				Tidal range schemes may cause significant changes/loss of habitats as a result of altering hydrography or sedimentation patterns. Effects potentially irreversible.

Potentially significant effect	Alternatives 1	2	3	Narrative
Potential for effects on flora and fauna of produced or treated water and drilling discharges				Associated principally with oil & gas exploration and development; gas and CO_2 storage, and OWF foundations. Produced water discharges limited for new developments, with possible exception of saline aquifer water discharges; drilling discharges limited to WBM.
EMF effects on electrosensitive species		?	?	Principally associated with OWF; albeit limited, current evidence does not indicate significant effects and unlikely to be significant at a strategic level.
The nature and use of antifouling materials				Unlikely to be significant at a strategic level.
Accidental events – major oil or chemical spill				Low risk of occurrence of major spills, predominantly related to oil exploration and production. Very low risk of spills related to navigation for OWF, wave and tidal.
Accidental events – major release of carbon dioxide		?	?	Potential effects associated with CO_2 storage activities. The risk of loss of containment is considered likely to be low, although there is a very limited basis of experience and quantitative risk assessment on which to base this judgement. Potential significant effects likely to be localised and temporary.

Table 13 - Consideration of OESEA3 objectives and guide phrases ("Biodiversity, habitats, flora and fauna")

 Contributes to conservation of the biodiversity and ecosystems of the United Kingdom and its seas.

 Avoids significant impact to conservation sites designated at an International, European and National level (e.g. Ramsar, Natura 2000, Marine Conservation Zone, Nature Conservation Marine Protected Area and Sites of Special Scientific Interest - SSSI).

 Avoids significant impact to, or disturbance of, protected species and loss of habitat.

Guide phrases	Alternatives 1	2	3
Plan activities do not lead to the loss of biological diversity, the degradation in the quality and occurrence of habitats, and the distribution and abundance of species.	Neutral effect – no plan activities take place.	With appropriate regulatory control and the implementation of best practice, plan activities are unlikely to lead to significant loss of biological diversity. Habitats Regulations Assessments screenings at both strategic and project-level will consider the potential of proposed leasing/licensing and subsequent activities to affect the site integrity of Natura 2000 sites. Effects on MCZ/MPAs will be assessed at activity consenting and licensing stage.	Restricting the plan spatially or temporally may allow a precautionary approach to be taken. For example, some areas with relevant interests may either not be leased/licensed until adequate information is available, or be subject to strict controls (e.g. sound exposure limits) on potential activities in the field.
Plan activities do not cause adverse effects on marine ecosystems/valued ecosystem components.	Neutral effect – no plan activities take place.	With appropriate regulatory control and the implementation of best practice, plan activities are unlikely to lead to significant adverse effects on marine ecosystems. Tidal range aspects of the plan may represent the most significant threat to marine ecosystems/valued ecosystem components.	Restricting the areas offered spatially or temporally may facilitate protection of marine ecosystems/valued ecosystem components.
Plan activities contribute to the ecological knowledge of the marine and coastal environment through survey and discovery.	No plan activities and associated surveys take place.	Site surveys associated with plan activities may contribute to ecological knowledge, provided that they are suitably archived and made widely available.	Site surveys associated with plan activities may contribute to ecological knowledge, albeit on a more restricted basis than for alternative 2
Plan activities do not lead to disruption in habitat and species connectivity.	Neutral effect – no plan activities take place.	Principally associated with OWF; significance of effect variable depending on location but unlikely to be significant at a strategic level with locational mitigation with the potential exception of large tidal range schemes.	Restricting the plan spatially or temporally may allow a precautionary approach to be taken thereby minimising the risk of disruption in habitat and species connectivity.
Plan activities do not lead to the introduction of noise at levels which adversely affect the marine environment, including by leading to significant effects on conservation sites and sensitive species.	Neutral effect – no plan activities take place.	With appropriate regulatory control and the implementation of best practice, the potential introduction of noise at levels which may adversely affect the marine environment will be minimised. Habitats Regulations Assessments/ screenings at both strategic and project-level will consider the potential of proposed leasing/licensing and subsequent activities to affect the site integrity of Natura 2000 sites.	Restricting the plan spatially or temporally may allow a precautionary approach to be taken. For example, some areas with relevant interests may either not be leased/licensed until adequate information is available, or be subject to strict controls on potential activities in the field.

Guide phrases	Alternatives 1	2	3
Plan activities do not lead to the introduction of non-native species at levels which adversely alter marine ecosystems.	Neutral effect – no plan activities take place.	The draft plan will not lead to the introduction of non-native species at levels which adversely alter marine ecosystems. Ballast water from shipping/rigs likely to represent the main potential source of non-native species although guidance should minimise risk. Increased local species diversity may be associated with hard foundations although this is unlikely to cause significant ecosystem effects.	Restrictions on areas licensed are unlikely to reduce potential for introduction and spread of non-native species (as described in Alternative 2). However, it is considered that the draft plan will not lead to the introduction of non-native species at levels which adversely alter marine ecosystems.
The plan recognises the ecosystem importance of land-sea coupling, for instance its role in species migration.	Neutral effect – no plan activities take place.	Tidal range aspects of the plan may represent the most significant threat to fish migration. OWF developments may displace birds from migratory routes but this is unlikely to be significant.	Restricting the areas offered spatially or temporally may facilitate protection of important migratory routes (e.g. for diadromous fish returning to rivers and for birds on seasonal migrations).
The plan promotes the achievement of good ecological/environmental status for water bodies and marine sub-regions as outlined at a European Level.	Neutral effect – no plan activities take place.	The objectives of the WFD (coastal and estuarine waters) and the MFSD (marine) to promote the achievement of good status for water bodies are an integral part of the environmental management context within which the draft plan is set (see Section 2.2).	Restricting the plan spatially or temporally will facilitate attainment of the objectives as will allow a precautionary approach to be taken. Relevant areas may either not be leased/licensed until adequate information is available, or be subject to strict controls on potential activities in the field. Given the paucity of information on infield effects of some aspects of the draft plan, a precautionary approach is recommended.
Conclusion	Neutral effect – no plan activities take place.	Habitats Regulations Assessments/ screenings, and the MCZ/MPA assessment during consenting/licensing process, in combination with initiatives and commitments relating to the WFD and MSFD, through adherence to regulatory controls and best practice with respect to environmental management, will ensure that the biodiversity, habitats, flora and fauna objectives are met.	Restricting the plan spatially or temporally will facilitate attainment of the objectives and will allow a precautionary approach to be taken. Relevant areas may either not be leased/licensed until adequate information is available, or be subject to strict controls on potential activities in the field. Given the paucity of information on infield effects of some aspects of the draft plan, a precautionary approach is recommended.

For comparative purposes, the “conclusions” for all topics evaluated in OESEA3 are summarized below.

Conclusions

Biodiversity, habitats, flora and fauna

Restricting the plan spatially or temporally will facilitate attainment of the objectives and will allow a precautionary approach to be taken. Relevant areas may either not be leased/licensed until adequate information is available, or be subject to strict controls on potential activities in the field. Given the paucity of information on infield effects of some aspects of the draft plan, a precautionary approach is recommended.

Geology, substrates and coastal geomorphology

Restricting the plan spatially or temporally will facilitate attainment of the objectives and will allow a precautionary approach to be taken particularly with respect to the future development of large scale wave and tidal stream arrays. However further information from on site monitoring of demonstrator devices and arrays is required before specific restrictions can be suggested. Given their likely scale and longevity, it is unlikely that the significant adverse effect of tidal range schemes on the objectives would be mitigated by temporal or spatial restrictions.

Landscape/seascape

Plan activities have the potential to have a significant adverse impact on the landscape/seascape objective. Most (oil & gas, gas storage, CO_2 storage, some wind and potentially wave) will take place at sufficient distance offshore that seascape impacts at the coast will be confined to ancillary developments, and these will be largely temporary. The recent trend of wind farms being sited further from shore, the emergence of tethered turbines and expected cost reduction for this technology, means there is scope for continued siting at distance from shore, but the appropriateness of wind farm locations in relation to landscape/seascape is highly site specific. In the absence of mitigation at the project level, those activities most likely to take place within close proximity of the coast (tidal range and stream) could adversely impact the objective.

Consideration is required at the project level as to the appropriateness of the siting of a particular development, both in isolation and in combination with existing and potential future developments. Existing controls, including the requirement to undertake a Seascape and Visual Impact Assessment (SVIA) should provide a suitable level of mitigation provided that cumulative impacts considerations are made and the latest available guidance followed.

Water environment

Restricting the areas offered spatially or temporally may increase protection of particular areas at risk from pollution events. Restricting the areas offered for tidal range devices may limit the potential for alteration of hydrographical conditions and could facilitate attainment of positive flood and coastal risk management objectives.

Air quality

Emissions could lead to local air quality effects around those ports from which operations associated with plan activities are concentrated, particularly in existing problem areas. Emissions offshore are unlikely to significantly contribute to national totals, or to human health or wider environmental effects, and are otherwise controlled through appropriate regulation

Climate and meteorology

The spatial restriction of certain activities could reduce the overall potential of the draft plan/programme to contribute towards reduced net UK GHG emissions

Population and human health

Plan activities should not contribute to wider adverse effects on physical and mental health, subject to project level assessment.

Other users and material assets (Infrastructure, Other Natural Resources)

Plan activities have the potential to negatively impact existing users of the sea. There is the potential for colocation of activities where it is appropriate. Activities will not generate waste related impacts at sea or at the coast, nor will they impact upon present or potential marine resources.

Cultural heritage

Preparatory survey work will both help to minimise potential damage to marine archaeological sites, and further knowledge in the area.

RECOMMENDATIONS[42]

The above assessment does clearly not support the alternative not to lease or license areas for development (Alternative 1). The conclusion of OESEA3 is that **alternative 3 to the draft plan/programme is the preferred option**, with the area offered restricted spatially **through the exclusion of certain areas** together with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea.

This conclusion has been reached through a consideration of the agreed reasonable alternatives to the draft plan/programme and the potential environmental implications of the resultant activities in the context of the objectives of the draft plan/programme, the SEA objectives, the existing regulatory and other control mechanisms, the wider policy and environmental protection objectives, the current state of the environment and its likely evolution over time, and existing environmental problems.

While not clearly identifying possible restriction areas, the Environmental Report suggests some of the positive (and also negative, in the case of restrictions on renewable energy generation projects that would contribute to reducing net UK GHG emissions) effects from the option for alternative 3.

In addition to the conclusions already mentioned, it is possible to select other statements from the tables related to "**Consideration of OESEA3 objectives and guide phrases"** that reinforce the choice of alternative 3.

Biodiversity, habitats, flora and fauna

Restricting the areas offered spatially or temporally may facilitate protection of marine ecosystems/valued ecosystem components…

Restricting the areas offered spatially or temporally may facilitate protection of important migratory routes…

Landscape/seascape

The spatial restriction of certain plan activities may reduce the potential visual impact at the coast and at sea in certain locations. In addition, current controls, marine policy and accordance assessment guidance should provide a suitable level of mitigation.

Population and human health

…discharges may be reduced in line with a potentially smaller number of developments, subject to any spatial restrictions;… spatial and temporal restriction will reduce the number of people potentially affected by plan activities.

Other users and material assets (Infrastructure, Other Natural Resources)

The spatial restriction of certain plan activities would reduce the potential for interactions with other users of the sea.

Plan activities should not sterilise areas of potential future use (e.g. potential hydrocarbon resources) or compromise those presently in use (e.g. aggregate extraction areas) through inappropriate siting.

[42] The document **Status of Recommendations made in the current and previous Offshore Energy Strategic Environmental Assessments** presents a compilation of recommendations from OESEA, OESEA2 and OESEA3. The recommendations are grouped into the broad themes of regulation and management, understanding the baseline, and understanding effects and monitoring. It should be noted that as part of the BEIS offshore energy SEA programme, research priorities are identified in collaboration with the SEA steering group and other relevant stakeholders, and work is commissioned to fill data gaps. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/635382/OESEA_Recommendations_Status_July_2017.pdf

Though further spatial restrictions based on environmental and socio-economic considerations would lead to a reduced likelihood of adverse effects on marine assets and resources.

Cultural heritage

The impact of plan activities on the archaeological resource is largely mitigated through statutory controls and project level assessment and reporting in keeping with industry guidelines, though in the absence of the same level of protection offshore as afforded onshore**, site specific surveys would be required** to prevent any loss to the marine archaeological resource. Though certain areas would be avoided though primarily for environmental or socio-economic reasons, though these may confer indirect protection to certain areas of interest, for instance intertidal areas.

It is important to note that throughout OESEA3 Environmental Report considerations are made that somehow "postpone" the decision-making about the effective environmental viability of a project to its assessment phase and the corresponding EIA.

It should also be noted that in many situations the adoption of constraints would depend on project level decisions. For example "further information from on site monitoring of demonstrator devices and arrays is required before specific restrictions can be suggested" (Geology and geomorphology);

"Landscape/seascape is highly site specific. In the absence of mitigation at the project level, those activities most likely to take place within close proximity of the coast (tidal range and stream) could adversely impact the objective";

"Plan activities should not contribute to wider adverse effects on physical and mental health, subject to project level assessment" (Population and human health);

"The impact of plan activities on the archaeological resource is largely mitigated through statutory controls and project level assessment and reporting in keeping with industry guidelines, though in the absence of the same level of protection offshore as afforded onshore, site specific surveys would be required to prevent any loss to the marine archaeological resource" (Cultural heritage).

The Report lists a number of recommendations that are made arising from OESEA3 process. The recommendations were grouped under the four categories of: **spatial considerations, managing environmental risk, improving the information base, and best practice/mitigation**.

By way of example, project-level considerations are underlined in the following items.

Spatial considerations

It is recommended that leasing/licensing and any subsequent consenting of activities should ensure the minimisation of disruption, economic loss and safety risks to other users of the sea and the UK as a whole**.** It is recognised that individual projects will be assessed on a case by case basis through the relevant planning process. However, in advance of formal and spatially explicit marine planning for most UK seas, and recognising the overarching policy of the UK Marine Policy Statement, developments (individually or cumulatively) should aim to:

 avoid impingement on major commercial navigation routes where this could significantly increase collision risk or lead to appreciably longer transit times;

 avoid causing alteration to the ease and safety of navigation in port approaches or reduce the commercial attractiveness of the ports e.g. through increases in vessel insurance premiums;

 avoid occupying recognised important fishing grounds in coastal or offshore areas (where this would prevent or significantly impede sustainable fisheries);

 avoid potential disruption of existing and potential future aggregate supplies;

 avoid interference with civilian aviation operations necessary to ensure aviation safety, efficiency and capacity, including radar systems, unless the impacts can be mitigated, are deemed acceptable, are temporary or can be reversed;

 avoid jeopardising national security for example through interference with radar systems or unacceptable impact on training areas unless the impacts can be appropriately mitigated or are deemed acceptable in consultation with MoD;

 avoid causing significant detriment to tourism, recreation, amenity and wellbeing as a consequence of deterioration in valued attributes such as landscape, tranquillity, biodiversity and hydrographic features;

 explore opportunities for co-location which could mitigate potential spatial conflicts with existing users.

Constraints mapping has indicated that there are areas of the UKCS in which "hard" constraints currently preclude feasible development (e.g. MoD danger areas, oil and gas platform/infrastructure, existing offshore wind farms), **and therefore leasing in these areas will of necessity be spatially restricted.** At a local site specific level, other constraints may be significant while some hard constraints mentioned here may be less exclusive dependent upon mitigation measures employed. Where information on use is less certain (e.g. fisheries), consultation with relevant representatives or individuals will be required. Some hard constraints (e.g. platform buffers, aggregate extraction zones) are anticipated to be relaxed in the future as infrastructure is decommissioned or resources depleted. Draft and approved decommissioning programmes are available from the DECC oil and gas website; and indicate significant "space" becoming available within the coming years.

As part of the Natura 2000 and linked initiatives, further offshore SACs, SPAs, MCZs and MPAs[43] (and extensions to them) are being identified. Although in line with the UK Marine Policy Statement, existing and future Natura 2000 and MCZ/MPA **sites are not intended or treated as strict no-go areas for other activities**, competent authorities have a responsibility to secure compliance with the requirements of the Habitats and the Wild Birds Directives. It is recommended **that developers are made aware at the licensing/leasing stage that SAC/SPA or MCZ/MPA designation may, subject to the conclusions of any Habitats Regulations or MCZ/MPA Assessment, preclude development or necessitate suitable mitigation measures so as to avoid adverse effects on a designated site or species**.

The importance of territorial waters and adjacent coasts is reflected in numerous, often overlapping designations to protect their scenic, geological, ecological and cultural features, and designations or use for recreational, shellfishery, fishery, navigational, commercial and other activities. The environmental sensitivity of coastal areas is not uniform and the intensity of designations and uses typically declines further offshore away from the coast. However, the environmental sensitivity of coastal areas is not uniform, and in certain cases, new offshore wind farm projects may be acceptable closer to the coast. Conversely, some areas at greater distance (more than 12nm) may not be suitable for development. Detailed site-specific information gathering and stakeholder consultation is required before the acceptability of specific major wind farm projects close to the coast can be assessed. This consideration applies primarily to OWF because of their large spatial footprint. **For hydrocarbon developments, technical measures are potentially available to allow mitigation e.g. through direction drilling from shore as in the development of the offshore extension of the Wytch Farm oilfield into Poole Bay, Dorset**. For all developments, site specific information, consultation and planning will be required before they can take place

Although not explicitly included in the recommendations, the proposal to create a coastal buffer for offshore wind development was previously mentioned and that "reflecting the relative sensitivity of multiple receptors in coastal waters, previous offshore energy SEAs concluded that the bulk of future wind generation capacity should be sited well away from the coast, generally outside 12 nautical miles".

For the area to the west of the Hebrides it is recommended that blocks west of 14 degrees west should continue to be withheld from oil and gas licensing for the present. This recommendation also applies to the deeper parts of the Southwest Approaches, beyond the shelf break, in waters >200m deep. This is in view of the paucity of information on many potentially vulnerable components of the marine environment, and other considerations. Once further information becomes available, the possible licensing in these areas can be revisited. The potential for collaborative investigations in the areas is recognised reflecting the cost and difficulty of studies in distant, deep waters.

[43] Marine Protected Areas – MPA; Marine Conservation Zones - MCZ

Managing environmental risk

The offshore wind and marine renewable industry remains relatively young, with appreciable technological development expected in for example, turbine size, rotation speed, foundation structure, spacing and potentially rotational axis. A firm base of information is required to inform risk assessments and adaptive management, and consequently in respect of ecological receptors **a precautionary approach to facility siting in areas known to be of key importance to bird and marine mammal populations is recommended** unless evidence indicates that impacts can be appropriately mitigated.

Previous SEAs have recommended consideration of the establishment of criteria in relation to underwater noise for determining limits of acceptable cumulative impact and for subsequent regulation of cumulative impact. The advances made in this respect through the establishment of the indicator on low- and mid- frequency impulsive sounds under the Marine Strategy Framework Directive are recognised. While criteria have not yet been defined, the establishment of the Marine Noise Registry database to collate occurrences of 'noisy activities' represents the necessary precursor. It is recommended that these efforts are prioritised to allow effective consideration of the cumulative impacts of underwater noise.

Beaked whales are very sensitive to anthropogenic noise (particularly to powerful sonar but potentially also to seismic survey) and their behaviour makes them difficult to observe visually or acoustically as part of implementation of standard seismic survey mitigation procedures. In recognition of this, it is recommended that opportunities to enhance mitigation measures for beaked whales beyond those in the JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys should be considered during deep water seismic survey planning and implemented during operations.

The subject of cumulative effects assessment (CEA) is challenging at project, industry and strategic levels, and is frequently raised by stakeholders as an issue. The establishment of a Cross-Government Cumulative Effects Assessment Working Group is welcomed as, is its aim to "develop guidance for regulators, advisors and applicants to help increase consistency in application of CEA. At all levels of assessment, guidance on the spectrum of certainty and the point beyond which CEA is considered conjectural would be useful".

Improving the marine management information base

Although the information base continues to improve, there remain a number of subject areas for which information is limited and should be enhanced to support appropriate development site selection and project-specific consenting. These information gaps include aspects of the natural world and human uses, with regional context and long-term trend data notably lacking.

Although there has recently been significant boat based and aerial survey effort in coastal waters, there is a general lack of modern survey data on waterbirds in offshore areas.

In view of the potential interest in deepwater hydrocarbon exploration to the west of the Hebrides, improved understanding of the ecology and location of important areas for beaked whales should be obtained to underpin assessments of effects and identification of mitigation measures.

A number of conservation sites have been recently proposed for harbour porpoise in parts of the UK. To support the assessment of potential effects of proposed activities sites and beyond), improved understanding of their ecology is needed, along with that of their prey and interspecific interactions (such information will assist in the management of the population(s) in UK waters).

Whilst the information base has improved in recent years, further data are required on the spatial scale at which marine mammals and their prey respond to well characterised noise sources, and whether this varies according to individual characteristics, behavioural state or other environmental variables, and whether the scale of effects is sufficient to cause significant adverse effects at an individual or population scale.

The information collected by offshore renewables and oil industry site surveys and studies is valuable in increasing the understanding of UK waters.

Best practice/mitigation

The volumes of rock used for example in cable armouring, foundation scour protection and pipeline protection and upheaval buckling prevention must be the minimum required to provide the necessary protection in order to minimise permanent habitat change and to ensure areas developed as a result of the current draft plan/programme are left fit for other uses after decommissioning. Alternative methods of protection/control should be considered to minimise the potential for permanent habitat change.

In areas with vulnerable habitats and species such as maerl beds and cold water coral reefs mitigation may be required for physically damaging activities such as rig/vessel anchoring, discharges of drilling wastes and cable, pipeline or umbilical installation (from hydrocarbon, gas storage or renewable energy related activities). Prior to decisions on activity consenting in such areas, developers should provide a detailed assessment and seabed information so that appropriate site specific mitigation can be defined.

Whilst it is recognised that most developers in the marine environment have Health, Safety & Environmental management systems in place, it is recommended that companies involved in the planning, undertaking and control of marine activities resulting from the current draft plan/programme operate Environmental Management Systems which are consistent with an international standard.

MONITORING

The SEA Regulations require the responsible authority for the draft plan/programme to:

"….monitor the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action."

In so doing, the Regulations allow for the responsible authority's monitoring arrangements to comprise or include arrangements established otherwise than for the express purpose of complying with the Regulations e.g. monitoring conducted for other regulatory purposes.

The types of relevant monitoring already undertaken or proposed for OESEA3 includes:

- Emissions monitoring
- Effects monitoring
- SEA objectives monitoring

As can be seen from OESEA3 Environmental Report, with the exception of maintaining the proposed exclusion of the area to the west of the Hebrides, it does not explicitly propose any spatial constraints, although it suggests throughout the text and, especially in the assessment, that restrictions on the licensed areas could bring environmentally beneficial aspects. However, by choosing as preferred alternative 3 (with the area offered restricted spatially **through the exclusion of certain areas** together with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea), the regulator seems to suggest to decision-makers the need for balancing measures to restrict a block where mitigation seems unlikely, but also reinforcing the possibility of transferring decisions to the project scale. A clear example is presented for areas for wind farms:

"In this context, the conclusions are consistent with alternative 3 of the draft plan/programme, to restrict the areas offered for leasing and licensing temporally or spatially, however in view of National policy and as the potential location and type of future developments are subject to commercial interest (with potential for limited mitigation), prescriptive restriction is difficult to make at this stage, other than providing the recommendation that wind farms be sited away from the coast. Therefore, project level assessment, including cumulative assessment with operational, consented and proposed developments, will be required to inform the potential impact on landscape and seascape character, and the suitability of future developments".

SEA 4 pointed out the alternative of exclusion of Blocks in Quadrant 217 which include the Pilot Whale diapirs "until they are better understood (particularly the possible presence of seep chemosynthetic communities) or if licensed, should include explicit controls to avoid potentially damaging activities such as anchoring and cuttings discharge". However, the regulatory authority, at

that time, seemed to have chosen to maintain the quadrant blocks, only noting the need for more stringent mitigation measures[44] (see also **Annex 4**).

The decision seems to make clear the purely advisory character of the SEAs.

In Annex 4, the conclusions of the various SEAs are compared in order to improve the understanding of the process and its evolution over the 15 years from the first evaluation (SEA 1) to OESEA3. There seems to be a consistent pattern that holds throughout the process, even when its scope has expanded from oil and gas activity to consideration of renewable energy and CO_2 and natural gas storage. **Annex 4** also provides suggestions and comments from stakeholders about the SEA process, as part of the Post-consultation, and respective SEA team responses that help to clarify the reasons that led to the alternatives adopted.

THE DEFINITION OF BLOCKS FOR OFFERING IN BIDDING ROUNDS

As seen above, the SEA process is primarily advisory, and the Environmental Report generally does not precisely define areas to be excluded from subsequent rounds.

After its approval, a "written statement"[45] is published. For OESEA3 the following topics were highlighted:

"The Department (DECC) has decided to adopt the draft plan/programme, with the area offered restricted spatially through the exclusion of certain areas together with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea. On the basis of the evidence set out in the Environmental Report, which discussed the alternatives to the chosen approach, and the comments received during consultation, the Department concludes that there are no overriding environmental considerations that would prevent the achievement of our draft plan/programme of offshore marine renewables leasing (wind, wave and tidal technologies), offshore oil and gas licensing, and offshore gas storage and carbon dioxide storage leasing/licensing, provided appropriate measures are implemented that prevent, reduce and offset significant adverse impacts on the environment and other users of the sea.

In all cases, the relevant competent authority should undertake any appropriate assessments(s) prior to awarding licences or leases, where screening shows this to be necessary. This meets the requirements of EU Council Directive 2009/147/EC on "the conservation of wild birds" and Council Directive 92/43/EEC on "the conservation of natural habitats and wild fauna and flora", and UK implementing regulations...OESEA3 paves the way for the Oil & Gas Authority to make preparations for further rounds of offshore licensing for oil and gas and to consider future licence applications for gas storage and carbon dioxide storage to ensure that the UK continues to have a diverse, affordable and reliable mix of energy sources as we continue to move towards a low carbon economy".

Thereafter, it is up to The Oil and Gas Authority - OGA to start the process of offering blocks, taking into account the suggested alternatives. For example, in the case of the 32nd Round (see figure 6 below), the announcement of the round states that "The SEA concluded that there are no overriding environmental considerations to prevent the achievement of the plan / program. However, **the SEA made a number of recommendations regarding precautions, with the area offered restricted spatially through the exclusion of certain areas** together with a number of mitigation measures to

[44] "Applicants for certain blocks designated should be aware that the Strategic Environmental Assessment (SEA) conducted in advance of the 22nd Round of Offshore Licensing recommended that "Blocks in Quadrant 217 which include the Pilot Whale diapirs (mud volcanoes) should be considered for exclusion from licensing until they are better understood (particularly the possible presence of seep chemosynthetic communities) or if licensed, should include explicit controls to avoid potentially damaging activities such as anchoring and cuttings discharge. Although each operation will be assessed on a case-by-case basis it is anticipated that the following measures will usually apply to operations in licensed areas on or near the diapirs unless a specific waiver is given by BEIS: no anchoring of rigs where the anchor spread could affect the diapirs; no drilling of wells through the diapirs; no cuttings from surface hole section(s) to be discharged on the diapirs. No discharge of mud or cuttings from lower hole sections if deposition on the diapirs is likely; no pipeline to be trenched through the diapirs; and no installation to be sited on the diapirs. In addition, early consultation on proposed activities must be undertaken with BEIS and JNCC (and others as directed) to identify and discuss any site-specific requirements including information gaps which may require survey work". Other Regulatory Issues – version at July 2019, available at: https://www.ogauthority.co.uk/media/5883/other-regulatory-issues-july-2019.pdf

[45] Offshore Energy Strategic Environmental Assessment: Written statement - HLWS86, available at: https://www.parliament.uk/business/publications/written-questions-answers-statements/written-statement/Lords/2016-07-13/HLWS86/

prevent, reduce and offset significant adverse impacts on the environment and other users of the sea. **The excluded areas will not be part of the offer**".

The OGA also reiterates the demand to BEIS / Offshore Petroleum Regulator for the Environment and Decommissioning - OPRED[46] to carry out a screening exercise in accordance with the Habitats Directive to determine whether the activities proposed to be carried out are likely to have a significant effect on the management of a Special Area of Conservation Area (SAC) or Special Protection Area (SPA). Where the screening exercise determines that there is a potential for likely significant impact, OPRED will undertake an Appropriate Assessment to determine if the activities could have an adverse effect on the integrity of such SACs or SPAs[47]. In this case, licences will only be awarded where it has been ascertained that there will be no adverse effect on the integrity of such SACs and SPAs.

OPRED and the Health and Safety Executive (HSE) will also consider whether applicants meet the safety and environmental requirements of the Offshore Safety Directive, and will make recommendations accordingly for or against the award of each licence, and finally, licences that are awarded in the round may contain conditions to protect environmental sensitivities, and the interests of other sea users. In addition, activities carried out under the licences will be subject to a range of legislation which is designed to protect the marine environment and other users of the sea, including regulations which apply the Environmental Impact Assessment and Habitats Directives in relation to offshore oil and gas activities. However, there seems to be a lack of transparency in the process between the publication of the advisory Environmental Report and the definition of blocks that will not be offered, as shown below (Figure 6 - hatched blocks).

It is not clear, however, in which instance the general constraints proposed by OESEA3 were shaped by cutting out well-defined areas.

[46] OPRED is part of the BEIS and responsible for administering environmental regulations covering offshore petroleum operations, including oil and gas exploration and production and gas unloading and storage, and for offshore CO2 storage operations. OPRED also forms part of the competent authority established to implement the Offshore Safety Directive (OSD), in partnership with the Health and Safety Executive (HSE).

[47] Item "Habitats Regulation Assessment (HRA)" on page 27 and Annex 2 provide further details on the HRA process.

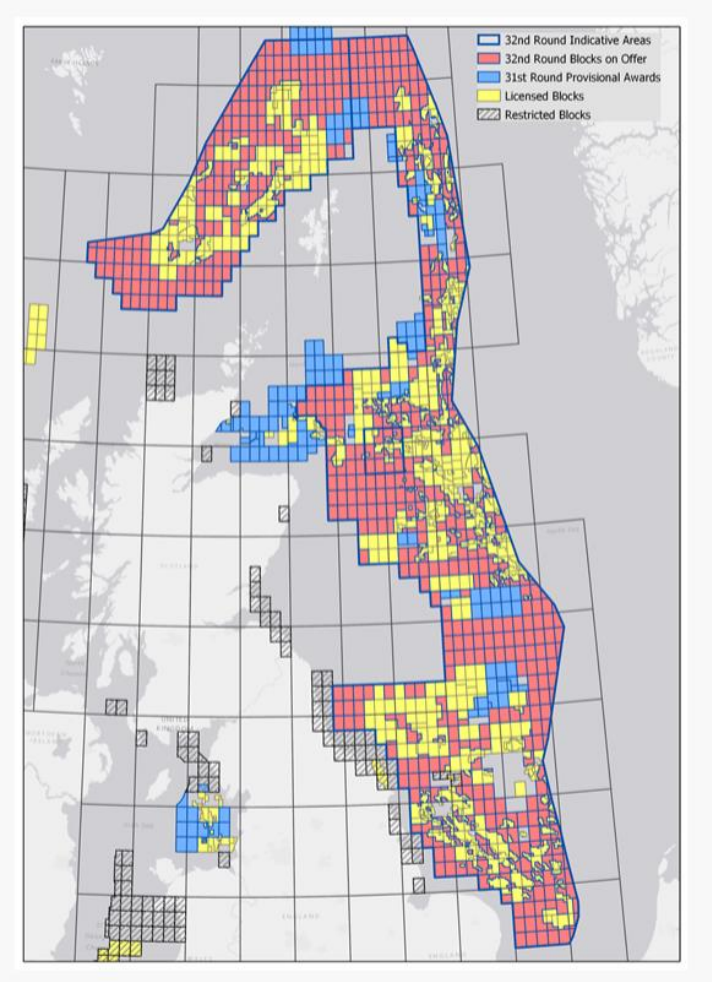


Figure 6 – Area included in the 31st and 32nd Licensing rounds[48]

According to BEIS, following the conclusion of the SEA, other issues and constraints are identified based on discussion between the Department and OGA. However, it is not a formally documented process[49].

BEIS was also consulted on the issue of “regulatory uncertainty” and the refusal of the Navitus Offshore Wind Farm; and if any oil and gas project consent (drilling, production, etc.) has been denied due to environmental problems in previously licensed areas. The response reiterates "the possibility of adaptation" and mitigation, even when previously aware of possible restrictions. Also for oil and gas projects, the normal situation is to reach consensus on appropriate mitigation measures, but the "final sanction for refusal of consent always remains"[50].

[48] https://www.ogauthority.co.uk/news-publications/news/2019/oga-launches-32nd-offshore-licensing-round-with-groundbreaking-supporting-datasets/

[49] “*Offshore oil and gas licensing in the UK has a long history (back to the 1960s) and for almost all prospective areas most blocks have been licensed, relinquished and relicensed many times. Renewed interest in particular blocks may come from new geological models, hydrocarbon discoveries or new technology e.g. seismic techniques allowing imaging below basalt strata. Similarly, the environmental and socio-economic constraints applying to blocks are not static and can change over time. For these reasons, the UK’s approach to oil and gas licensing is evidence based and flexible, rather than being dogmatic.*

In addition to blocks or areas identified for exclusion in the SEA Environmental Reports, ***OGA takes advice from BEIS on new issues and constraints****. Two specific examples of this are 1) IMO vessel traffic routeing measures that would preclude rig siting anywhere within a block and a consideration of if it would be technically feasible to explore the block from an adjacent block (in this instance blocks were withheld from the licensing round), and 2) blocks covering a* ***recently designated*** *conservation site whether there was adequate information to base an assessment of the potential effects of oil & gas activities that could follow licensing (in this instance blocks were initially withheld from licensing rounds, studies commissioned and based on the results the blocks were offered for licensing with explicit conditions attached to the licence*)... (however) **The process is not formally documented**”. C. Campbell, OEP/BEIS, pers. comm. October 2019.

[50] The OESEA3 Environmental Report (and the earlier OESEA and OESEA2 Environmental Reports) provided clear recommendations regarding the difficulties that would accompany windfarm applications close to shore in sensitive areas; it was a conscious decision not to ‘ban’ any such developments from nearshore areas since local conditions, societal attitudes,

Figure 7 shows another example map; the legend provided by BEIS gives more detail on the reasons for the exclusion of certain blocks. According to the Department, “These are concrete examples of the outcome of the processes used to identify blocks to withhold (perhaps temporarily) from licensing”[51].

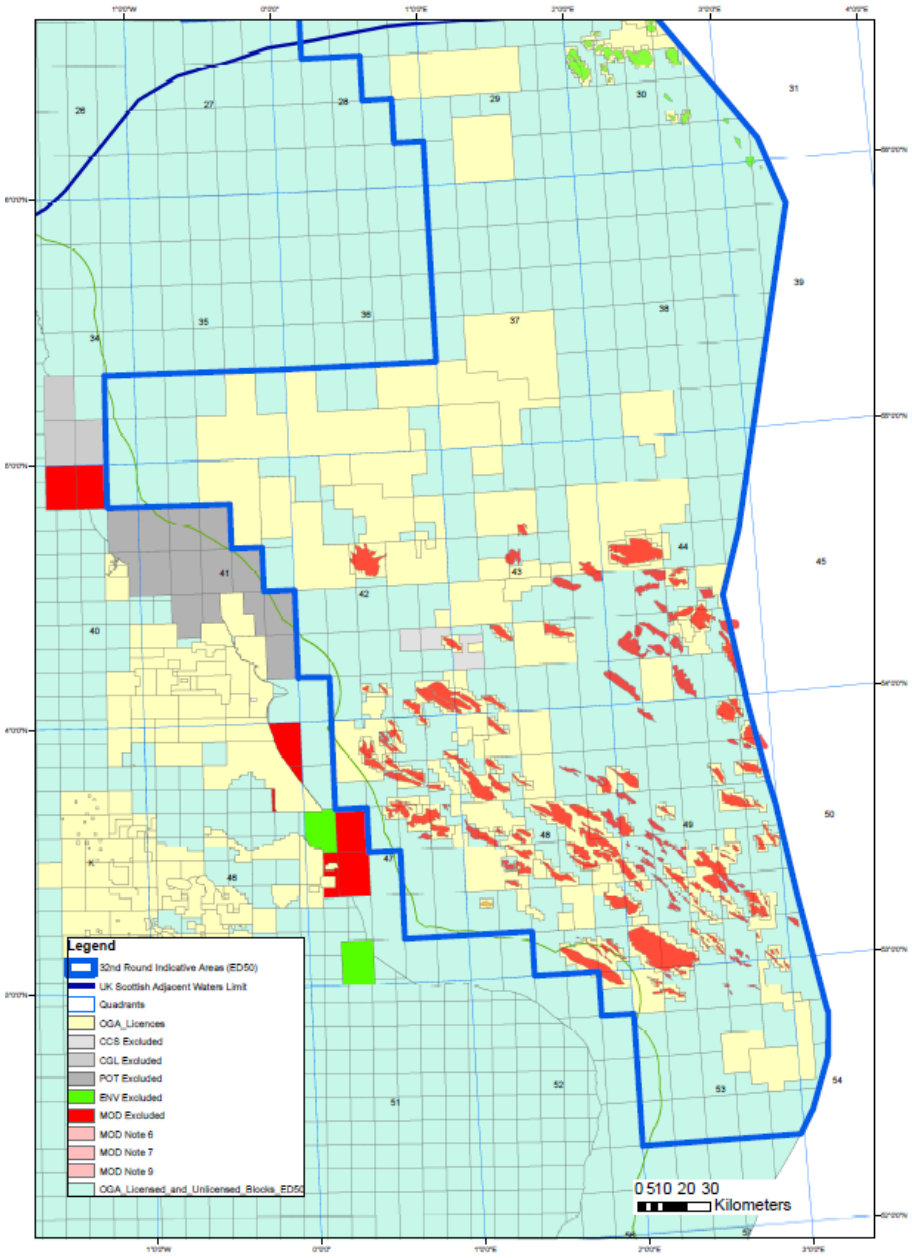


Figure 7 – 32nd Round Indicative Areas – South North Sea (SNS)

and developer proposed mitigation may make a proposal consentable. An outright ban prevents the possibility of adaption and assumes perfect knowledge on the part of government, which never the case. **It was the developer’s choice to propose the Navitus Bay Offshore Wind Farm in the location they did, and in the knowledge of the potential constraints.** Several other offshore windfarms have been proposed and approved in other nearshore areas around the UK.

Typically liaison between the regulator, its advisers, the developer and other stakeholders results in adequate mitigation measures being identified (e.g. change pipeline route, change in well location or timing, revised rig anchor locations, agreement to ship cuttings to shore, avoidance of rock placement etc) which allow consent to be granted – **but the ultimate sanction of consent refusal always remains**”. C. Campbell, OEP/BEIS, pers. comm. October 2019.

[51] https://ogauthority.maps.arcgis.com/apps/webappviewer/index.html?id=... (turn on the “Blocks – Restricted” layer). Further information on seasonal restrictions to be considered at project level consent can be found at “Other Regulatory Issues” document., available at: https://www.ogauthority.co.uk/licensing-consents/licensing-rounds/ (Select to expand the 32nd Round Offshore Licensing Round information).

CCS - existing carbon capture and storage licences; POT - known potash resources; CGL – restrictions in relation to Coal Authority licences for Underground Coal Gasification; MOD – Ministery of Defence; ENV – environmental restrictions[52].

Therefore, it appears that it is up to the BEIS and OGA to exclude areas already compromised for other uses or restricted due to vessel traffic; military activities or "recently designated conservation site"[53].

As can be seen at the legend of Figure 7, Environmental restrictions are also applied, in line with alternative 3 – "to restrict the areas offered for leasing and licensing temporally or spatially". **However, it does not appear to be the result of a formal procedure based on the recommendations or alternatives outlined by SEA.**

THE EVALUATION OF SEA PROCESSS

A recent evaluation of the application of the SEA Directive was conducted as part of the European Regulatory Fitness Check and Performance (REFIT) program[54]. In general terms the study found that the "SEA Directive brings considerable benefits to the EU, contributing to wider goals on sustainable development and environmental protection through integration of environmental concerns into the appropriate plans and programs".

The study however raised some issues of concern limiting the Directive's potential to achieve its objectives in an efficient way: uncertainties about the scope of application and **the risk of ensuing legal challenges**; the necessity for a flexible application of the SEA procedure and a more efficient practice, in particular in the drafting of environmental reports.

In terms of effectiveness, the study considered the SEA Directive has contributed to the high level of protection of the environment and this continues to be a valid objective. The Directive is considered most effective in addressing certain environmental issues, such as biodiversity, water, fauna, flora and landscape and cultural heritage, and rather less effective for material assets, population, human health, and climatic factors. There are challenges (limited methods, tools, and data) in addressing global and emerging environmental concerns in SEA, such as climate change, ecosystem services and natural capital.

One of the key factors supporting the effectiveness of the SEA Directive in contributing to a high level of protection of the environment is effective **consultation with relevant environmental authorities as well as the public.** It fosters a meaningful decision-making process and a sense of ownership of the SEA process and plan or programme evaluated, which are important both for successful implementation of the SEA and the plan in question.

The study found that the SEA Directive is considered to influence the content of plans and programmes by adding more emphasis and systematically addressing environmental issues; including the opinions of various stakeholders and the public; adding mitigation and compensation measures; and considering new alternatives.

However, concerns were raised that "**SEA does not affect the content of final planning outputs as much as it should",** and that might be due to "**other prevailing (political, economic, social) interests**, '**closed' and pre-determined decision-making**, **poor integration of SEA into planning and decision-making processes** or **late start of the SEA process"** in relation to the development of the plan or programme assessed.

[52] The two blocks on the SNS map were excluded on environmental grounds based on an agreement with the SEA Steering Group early in the SEA programme to withhold a number of coastal blocks on account of their relative environmental sensitivity (primarily seabirds, marine mammals and benthic habitats). C. Campbell, OEP/BEIS, pers. comm. November 2019.

[53] Recently designated conservation site could refer to another designation e.g. Marine Conservation Zones or national designations such as Sites of Special Scientific Interest that are outside the scope of the HRA process, and so would not be captured by the subsequent AA. P. Davis, Wood PLC, pers. comm. October 2019.

[54] Study to support the REFIT evaluation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) Final report. June 2019, available at: https://publications.europa.eu/en/publication-detail/-/publication/c85d0724-a131-11e9-9d01-01aa75ed71a1/language-en/format-PDF/source-105624202. It is Important to note that this is a 28 member state review – covering all the sectors to which SEA applies – and as such, it is necessary to treat with caution the application of any findings to the specifics of the OESEAs.

In terms of efficiency, the study concluded a more effective use of scoping would greatly improve efficiency in SEA practice. This is likely to include the scoping process and consultation being extended beyond the environmental authorities to a dialogue with wider stakeholders, including NGOs and the public.

The stakeholders consulted identified a **tendency to produce lengthy and overly detailed Environmental Reports**, based on time-consuming data collection, **with a view to avoiding non-compliance** and a tendency to assess concrete and specific impacts rather than gaining an understanding of the strategic level environmental aspects of a plan/programme[55]. A public scoping process could help to streamline the overall assessment process. Although, at least in the UK, the lengthy reports can be explained by regulators demand for "more baseline information, additional plans and programmes and additional topics to be scoped in"[56]. A more proportionate and focused Environmental Report on the environmental aspects that matter most at plan/programme level, informed by an effective public scoping process, would help reduce the cost of the entire SEA procedure.

In practice, stakeholders refer frequently to **opportunities to maximise synergies between the SEA and EIA.** However, **practical implementation challenges still exist** and can prevent the achievement of these synergies, e.g. authorities and developers can sometimes find it difficult to clearly distinguish the purpose and scope of SEA and EIA, resulting in overlaps, especially when inexperienced SEA practitioners fail to narrow down the scope of the assessment, resulting in 'mega EIAs'.

Another study carried out in Ireland brought up similar results[57]. As the EC study this one recognizes that SEA provides new opportunities for **consultation**.

According the study "Scoping is identifying key environmental issues at an early stage, but is generally better at identifying what should be addressed in the SEA Environmental Report than at justifying what can be excluded", and **"an upward creep of data expectations is resulting in some very long Environmental Reports"**. In some cases there are problems in identifying the right scale of data for the baseline description, and so the assessment may not be at the right level of detail.

The identification and consideration of reasonable **alternatives** is one of the biggest challenges in SEA and plan-making. However, the consideration of alternatives is often limited by political agendas and a lack of integration between the SEA and planning teams. Planners often believe that there are no other reasonable options for their plan, and that consultants' alternatives are not 'reasonable'. In some cases, alternatives are developed retrospectively and put forward only to satisfy the requirements of the SEA Directive. The do-nothing scenario is often the only alternative considered.

Cumulative and transboundary effects, and the interrelationship of effects, are less well identified and assessed than direct effects.

The Reports often do not focus on key issues and as a result can be unnecessarily long. There are difficulties in deciding the level of detail to be included in the Environmental Reports for the purpose of strategic decision making. They do not always clearly explain and justify why choices have been made and how mitigation measures have been incorporated into the plan.

As most plans for which SEA has been undertaken have only recently been implemented and SEA related monitoring has not taken place for a sufficient timeframe, if at all, it remains **unclear whether SEA is leading to widespread positive environmental** outcomes and sustainable development and preventing adverse environmental effects on the ground.

[55] The reports that make up SEA 1 total around 370 pages, while for SEA 7, the last one focused only on oil and gas, the total pages was around 2,500.

[56] "The vast majority of SEA scoping consultations in the UK include the public and the UK regulators repeatedly ask for more baseline information, additional plans and programmes and additional topics to be scoped in. This is a reluctance by the environmental regulators to accept that effects can be scoped out and a desire to ensure that the topics included within their scope of competence are fully reflected within the assessment". P. Davis. Pers. Comm. October 2019.

[57] Environmental Protection Agency, Ireland. Review of Effectiveness of SEA in Ireland. Key findings & Recommendations. 2012, available at:
http://www.epa.ie/pubs/advice/ea/SEA%20EFFECTIVENESS%20REVIEW%20MAIN%20REPORT%202012.pdf

There is also a Scottish Government review of the equivalent SEA legislation (the Environment (Scotland) Act 2005)[58] with some suggestions for improvement, such as: improving the understanding of SEA among policy-makers and senior decision-makers, including elected members; improving the scope of assessments to be more focused on the issues of significance; refocusing Consultation Authority and stakeholder engagement to earlier stages in SEA to allow for greater front loading of information about key issues (this will also require Responsible Authorities to provide appropriate information at an earlier stage to make such engagement work); significantly improving the simplicity and clarity of SEA documents and making them more engaging tools for public consultation. The study also considered the importance of improving the identification and implementation of mitigation and enhancement measures; and ensuring that the time and resources used for SEA are in balance with its benefits for public policy.

Finally, a fourth study[59] assessed the quality of EIAs from OWF, pointing to problems that may apply to the previous analyses on the increasing extent of SEA Environment Reports.

Figure 8 shows that from 2005 to 2013 Environmental Statements (ES) for offshore wind farms increased from 1,000 pages to 9,500 pages. Over the same time period scoping reports went from a low of 25 pages in 2007 to 250 pages in 2012.

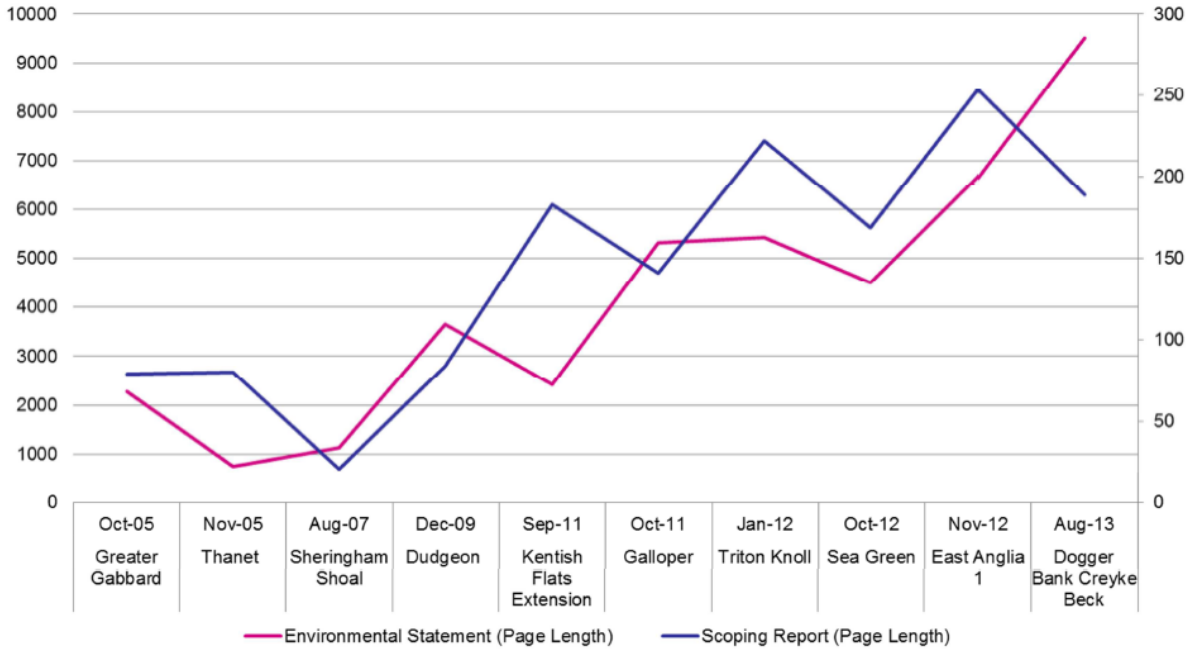


Figure 8 – Environmental Statement Trends over time in Offshore Wind

According the study the increasing size and complexity of EIA and ES is further compounded by a reduction in resources, particularly in staff numbers, amongst many of the key statutory advisors, stakeholders and regulators. Moreover, in May 2017, the new EIA regulations which came into force in the UK require that the reviewers and competent authorities demonstrate sufficient expertise in the assessment of the EIA. However, due to the reduction in authority and statutory consultee staff, many specialist knowledge areas have been lost, leaving only generalists to cope with the wide range of content on which advice and comment is sought. In some cases the advisors now need to bring in external specialist advisors, and often seek developers and scheme proponents to fund these additional consultants.

The study suggested that “many parties involved in EIA act in **a risk averse** manner when scoping the assessment. Legal pressures to ensure all topics are rigorously assessed in case of challenge to

[58] The Scottish Strategic Environmental Assessment Review - A Summary. 2011, available at: https://www.sepa.org.uk/media/27556/sea-review_summary.pdf

[59] Howard, R. Industry Evidence Programme Offshore Wind Farms-Pilot Industry Evidence Base. June 2018, available at: file:///C:/Users/p0088722/Downloads/IndustryEvidenceProgrammeOffshoreWindPilotFinalRecommendationReportJune2018.pdf

the project. Inexperience of both consenting authorities and EIA practitioners can lead to either or both to err on the side of caution". This would lead to progressively longer Reports, disproportionate to the plan's objectives, generating a spiral of costs and time spent.

OVERALL CONCLUSIONS

SEA has been applied in the UK for about 20 years, based on European Union Directives that require the assessment of the impacts of "plans or programs" on the environment. In the specific case, the plans refer to block licensing rounds for oil and gas, expanded from 2009 on to consider also the possible effects of hydrocarbon gas storage, carbon dioxide storage and marine renewables including wind, wave, tidal stream and tidal range.

The United Kingdom, as a Member State, was required to comply with the Directive before 21 July 2004. Although the European Strategic Environmental Assessment Directive was not incorporated into UK law until 2004, SEAs have been carried out since 1999 in accordance with its requirements. This means that the UK has taken a "proactive stance on the use of SEA as a means of striking a balance between promoting economic development of the UK's offshore energy resources and effective environmental protection".

Besides that, the Offshore Petroleum Activities (Conservation of Habitats) Regulations implemented the requirements of Articles 6(3) and 6(4) of the Habitats Directive with respect to oil and gas activities in UK territorial waters and on the UK Continental Shelf. As the petroleum licensing aspects of the plan/programme are not directly connected with or necessary for nature conservation management of European (Natura 2000) sites, to comply with its obligations under the relevant regulations, at each round of oil and gas blocks licensing, the regulator has to undertake the Habitats Regulations Assessment (HRA) to ensure the integrity of the sites of interest vis-à-vis the oil and gas activity.

In 2009, The Marine and Coastal Access Act (MCAA) introduced a number of measures to deliver the United Kingdom Government's vision of "*clean, healthy, safe, productive and biologically diverse oceans and seas*". These included the introduction of a marine planning system, comprising the United Kingdom Marine Policy Statement. Like any other plan, marine plans also require a strategic assessment, in this case specifically called "Sustainability Appraisal" (SA). In principle, SA differs from SEA in that it gives greater consideration to socio-economic issues. In England, the Marine Management Organisation is preparing plans for 11 predefined areas. The first plans were published in 2014 and 2018 and all plans are due to be in place by 2021.

Thus, despite being a different instrument, marine plans will co-exist with the latest SEA currency (OESEA3), including an added level of complexity in the process.

It should be borne in mind that SEA does not intend to replace all existing project-level regulation, although there is inevitably an expectation of "regulatory certainty" that would ensure consent for projects in areas not restricted spatially or temporally by SEA, as long as necessary mitigation measures are applied. As seen above, "*the relationship between SEA and EIA*" has also been the subject of much discussion and SEA *"would play a leading role in the assessment and management of cumulative effects*".

On the other hand, it would be inappropriate for SEA an extrapolation of its objectives the prohibition of activities with substantial socio-economic benefits, where adequate regulatory control is available at a project-specific level, and SEA does not identify significant risk of incremental or cumulative effects.

There is a clear tendency to avoid prescriptive recommendations that might inhibit the development of new technological solutions or "sterilize" areas where coexistence of diverse projects and concomitant environmental preservation would be plausible. Therefore, there is a certain "aversion" from SEA to the recommendation of spatial planning measures, even because these would be decisions more related to "marine plans". However, as noted by OESEA3, "w*hilst the marine plans acknowledge the potential interactions between activities and map these,* ***they are not spatially prescriptive*** *and therefore provide a limited indication of the location of possible future development*".

Notwithstanding, as discussed in **Annex 1**, there seems to be a gradual approach when defining areas for specific activities in marine plans. In the case of the East of England Marine Plans (prepared in compliance of the MCAA), this led to the option of developing different types of maps - information maps, indicative maps and policy maps. This happens because "*many of the policies refer to 'proposals'*

(and) it is difficult for the plans to be prescriptively comprehensive, as this would risk omitting some potentially important decisions or types of decision"

In cases where a policy map could be defined, the report emphasizes that the policy applies specifically to the area defined on the map. Thus, the spatial planning do not close a preferential area for other activities, but defines a kind of protection against "intruders". Thus, the plan moves towards spatialization as far as possible, given the limitation of the quality of available information and, in particular, that "*the large majority of the policies in the plan are generic or criteria-based policies without a clear spatial dimension*".

Generally SEA tended to avoid recommendations for the exclusion of areas. Only from SEA 7 onwards was there an explicit recommendation to exclude blocks west of 14 degrees west, also applicable to "deeper parts of the Southwest Approaches, beyond the shelf break, in waters> 200m deep". Also in SEA 7, it was recommended that the blocks in or overlapping with the boundaries of Moray Firth and Cardigan Bay SACs "should be withheld from licensing until subjected to an AA". Following these AAs, only the blocks near Cardigan Bay SAC were restricted.

An extremely important aspect is related to the issue of impact mitigation, in the sense that several of the "probable" effects **are not inevitable** consequences of oil and gas exploration and production since they can be mitigated through timing, siting or technology (or a combination of these).

As noted in **Annex 4**, the comparison of SEAs conducted between 2001 and 2016, despite the specific characteristics of each region evaluated, shows that the first four recommended the continued implementation of the plan, without excluding areas. The subsequent ones opted for recommending a possible spatial or temporal restriction to the areas to be offered, possibly giving greater flexibility to further decisions from the regulator.

It seems clear the SEAs in the UK decided to adopt an advisory feature. This means to define a series of recommendations to support the decision of the regulator, based on the detailed survey of the environmental baseline and the knowledge of the expected effects of the activities considered in the plans on the sensitive receptors for those activities. In such a way, this advisory character reinforces the importance of future EIAs and project-level decisions.

Especially in the Appropriate Assessments there are constant warnings that projects in a given area "approved" within SEA may have their consent refused. "*Moreover, once project plans are in place, subsequent permitting processes relating to exploration, development and decommissioning, would require assessment as appropriate, allowing the opportunity for further mitigation measures to be identified as necessary, and for permits to be refused if necessary***"**.

However, there is criticism of this advisory character, as "*SEA must define areas more precisely to be excluded*". In OESEA3 post-consultation, The Crown Estate - TCE, member of the Offshore Energy SEA Steering Group, endorsed the conclusion of OESEA3 that the area offered for leasing / licensing should be restricted spatially, but noted that "**however it is unclear how such restrictions will be defined and applied"**.

TCE also considers that the approach described in the overall spatial considerations section of the assessment is "*helpful in understanding at a strategic level where constraints to development may lie*". However, "*given the high-level nature of the assessment and broad-scale approach to mapping sensitivities*", TCE cautions against this exercise "*taking the place of marine planning and site-specific assessment*". In other words, TCE warns, on the one hand, of a possible overlap with the objective of marine plans and, on the other hand, of the possible invasion of the competence of the project level evaluations, which, in practical terms, would lead to a narrowing of SEA's field of action.

Throughout the SEA reports and, with more emphasis on AA, there are multiple references on the role of EIA to carry out more rigorous assessments that could lead to the exclusion or restriction of areas for certain activities: "*the assessment of mitigation is highly recommended site specific and dependent on site conditions and other technical constraints so it would be inappropriate to set out prescriptive mitigation requirements in a strategic document*". Some stakeholders also understand that more detailed consideration of mitigation measures should be undertaken on a project-specific basis.

This perception is also the basis for the SEA and almost all AA recommendations that no (or almost no) blocks should be selected for exclusion given that, in principle, existing mitigation techniques are suitable for the consent of individual projects; however, as specific spatial and temporal conditions are

involved, it is up to the project approval procedure to indicate further mitigation measures or even the refusal of project development.

There is also no clear definition on how the strategic constraints proposed by SEA are applied to restrict areas in licensing rounds during the consultation process between BEIS and OGA. The logic of the process shows the appropriateness of deferring the detailed mitigation actions to the project assessment phase. However this can lead to uncertainties in terms of consenting in areas approved by SEA and offered in a licensing round. The possibility of a project being rejected in the licensed area may bring regulatory uncertainty to the process as a whole, as noted in the reaction to the Navitus case. This can be especially problematic when the regulators responsible for SEA and project consent are independent (as in Brazil, where the decision to project consent is restricted to the environment agency, without any participation from other governmental institutions or consultation process).

At least conceptually, as stated in OESEA3 Environmental Report, SEA should only consider the restriction of activities in certain areas where it can be clearly demonstrated at a strategic level that activity could not take place there, or where levels of uncertainty were such that further evidence or research is required to inform assessment.

It is also important to reiterate the statement that at a strategic level, a distinction should be drawn for various effect mechanisms between impacts which may be significant in terms of conservation status of a species or population (and hence are significant in strategic terms), and impacts which may be significant to individual animals, but which will not influence sufficient numbers to have a significant effect on population viability or conservation status. Examples of this approach include the consideration of acoustic effects on marine mammals, collision risk for birds and oil spill effects.

Although apparently conflicting with common sense, this approach does not imply that mortality or sub-lethal effects on individual animals are unimportant; but it is appropriate that strategic considerations are made at a biogeographic population or species level.

SEA's historical review suggests that the process is becoming more generic, adopting more qualitative approaches rather than quantitative methodologies. This is clear in the comparison between the first SEA and the latter, as regards the characterization of the predicted potential type and scale of activity. Initially, it was based on estimates based on previous rounds results, considering the probable extent of seismic research, number of exploratory wells and development and production infrastructure. At that time based on the acceptable level of accuracy from previous estimates, the SEA team chose not to consider lower and upper activity “scenarios” for the activity scale, having adopted only the most likely one.

OESEA3 considered the declining trend in the number of exploration and development wells drilled in areas awarded in 27th and 28th Rounds, as well as the evolution of the number of blocks applied and exploration drilling between 2000 and 2015. It was suggested thereafter that only the general expected type and scale of activities (e.g. **it is likely / it is possible**) which could take place in each Regional Sea should be applied to further Blocks during the currency of the SEA.

Also according OESEA3 Environmental Report, “*the assessment had to address complex issues and multiple interrelationships, where a score based matrix assessment on its own would be inadequate*. *The assessment was therefore supported by an evidence based consideration*”. Also, concerning marine plans, a qualitative approach was used comprising the appraisal and description of effects rather than a quantitative approach which was “*not considered appropriate or feasible at this strategic level*…”[60].

Cumulative effects

As emphasized above, the SEA would play a leading role in the assessment and management of cumulative effects, taking into account its strategic feature, especially when compared to EIAs. However, in general, consideration of these effects tends to be more theoretical, and even “rhetorical”, than operational in function of gaps in knowledge which may lead to misleading conclusions in the long run. Possibly, due to the absence of well-defined thresholds for the various

[60] “Like all plan level assessment processes there are significant challenges in achieving sufficient spatial specificity to facilitate a meaningful assessment – environmental impacts tend to be site specific so understanding where development might occur is important in understanding potentially significant effects. This is an inherent weakness in SEA”. Stephen Hull. ABPmer. pers. comm. October 2019.

receptors regarding the impacts of the activity, the identification of cumulative effects becomes problematic.

The issue was present throughout the post-consultations, especially regarding acoustic "disturbance" (unlike the "injurious" effects for which mitigation measures are well defined), such as the statement that "*the lack of adequate cumulative effects assessments is a major shortcoming of current processes and there is an urgent need to establish ways in which this can be undertaken and to develop the means to manage cumulative effects if needed*" and "*we strongly suggest the SEA report should recommend that a cumulative effects framework is developed by UK Regulators so that pressures are recorded and effects modelled and new projects and plans assessed against a background of existing and past pressures*". Such a framework "*would contribute to impact assessments that more appropriately reflect the relevant biological scales*". The existence of a "Cross-Government Cumulative Effects Assessment Working Group" was mentioned by the SEA team, but it was not possible to obtain more up-to-date information about it.

The consultation process

The consultation system plays a key role in SEA, not only in validating the assessment, conclusions and recommendations, but also in effectively contributing to the process. The reading, in particular of the post-consultation reports, provides an accurate picture of stakeholder vision. The answers and considerations of the SEA team also favor a deeper understanding of the concepts that underlie the SEA methodology.

Scoping document, for example, is central to the consultation process, as it allows corrections at an early stage, including new subjects of interest and avoiding having to reconsider results or redo work later. As noted above, the more recent scoping draft document is much more detailed including a comprehensive initial list of the main potential sources of environmental effects from activities that could follow the adoption of the draft plan / program, as well as SEA indicators and related monitoring. Thus, the answers to the scoping tended to be objective and complementary, reinforcing the **additional** character of the information requested in the consultation.

Despite the importance of the consultation process, involving the scoping phase, assessment workshops, regional stakeholder meetings and Post Consultation Report, there is no unanimity regarding the effectiveness of the procedure. The most pointed criticism of this was forwarded by WWF in SEA 6 Post Consultation Report (March 2006)[61]: "*(it was) difficult to find an instance during the SEA process where NGO concerns have actually prompted an area to be deemed 'off-limits' to development. The UK SEA Stakeholder consultation process seems to lack transparent opportunities to truly influence decision-making*".

The above discussion suggests an evolution pattern for SEA in the UK, incorporating a more consistent scoping phase; extremely comprehensive and detailed Environmental Reports; the consideration that certain issues should be dealt within the EIA, due to their spatial and temporal characteristics related to specific projects; and a more qualitative rather than quantitative approach. It is also emphasized the trend to avoid prescriptive decisions related to restrictions and exclusion of areas. The SEA then has an advisory purpose, focusing on the recommendations to be adopted throughout the plan adoption.

[61] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197727/SEA_6_Post_Consultation_Report_Rev1.pdf

Recommendations may have a strategic[62] or operational[63] character and in some cases they will result in projects commissioned by SEA to different research institutions[64].

Also the SEA Regulations require the **responsible authority for the draft plan/programme** to monitor[65] the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action. The types of monitoring include emissions monitoring; effects monitoring; and SEA objectives monitoring.

Another relevant aspect of the process is the "permanency" of an active SEA research program supported by the regulator during SEA's period of currency, as well as interaction with the SEA Steering Group. This implies that an adequate budget is possibly available for funding research and knowledge base reviews.

The importance of oil and gas during the transition phase

During SEA 7 Post Consultation, some stakeholders considered "*the exploration and subsequent use of oil and gas resources is likely to be in the UK in terms of climate change impacts and also have irreversible impacts on the marine environment*" and "*the objectives of ensuring energy security in the UK without compromising the biodiversity and ecosystem functioning*" would be **irreconcilable**. In its response, the SEA team noted that maintaining the reliability of energy supplies is essential and would not compromise UK emissions reduction targets (*the draft plan must be seen in the context of the UK government's overall energy strategy which has 4 long term goals: to cut the UK's CO2 emissions by some 60% by about 2050, with real progress by 2020; to maintain the reliability of energy supplies; to promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and improve productivity; to ensure that every home is adequately and affordably heated*). It also considered "*in the near term, UK energy demand not met from indigenous sources (whether fossil or renewable) and will be supplied by imported fossil fuels, with little distinction in terms of resulting emissions to atmosphere"*.

As it appears in OESEA3 Environmental Report, "*during this transition, which by 2050 is likely to comprise an increasing proportion of energy from renewable sources, plus abated (with CCS) coal, biomass or gas-fired power stations and nuclear energy; gas and oil will continue to play a valuable role for heating and electricity generation*". In addition to decarbonising the energy supply sector, wider measures include reducing demand through greater energy efficiency in homes, businesses and in transport" and "*the UK reliance on fossil fuels for energy generation will continue for the*

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[62] "In areas with high renewable energy generation potential the DTI should ensure decisions on licensing for oil & gas are coordinated with renewable energy leasing to minimise potential sterilisation of areas for either industry. A similar recommendation applies to maintaining options for potential geological storage of captured carbon dioxide; DTI should consider providing more explicit guidance regarding the requirement for licence applicants to demonstrate an adequate appreciation of the environmental sensitivities, potential temporal/spatial constraints and information gaps relevant to the blocks in their application and their proposed approach to environmental management of the issues".

[63] "In areas of cold water coral reefs and other vulnerable habitats and species, physically damaging activities such as rig anchoring and discharges of drilling wastes should be subject to detailed assessment prior to activity consenting so that appropriate mitigation can be identified and agreed which may include no anchoring and zero discharge; For blocks which contain good examples of habitats/species on the Habitats Directive Annexes, operators should be made aware that a precautionary approach will be taken and blocks or part-blocks with relevant interests may either not be licensed until offshore designations are completed or subject to strict controls on potential activities in the field; In some nearshore areas, temporal controls on activities may be required for example to prevent significant disturbance of divers, scoters and other seaduck or as a spill risk reduction measure for areas in proximity to major seabird breeding colonies; The onshore implications of offshore activities in areas where there are not established supply bases and routes (e.g. for materials transport and waste disposal) should be considered in the EIA process; Some prospective blocks are close to the coast with potential implications for local air quality management plans in adjacent areas and other onshore impacts such as nuisance from light, airborne noise and odour. These issues should be drawn to operator attention during scoping; Nearshore oil and gas developments should take account of visual impact techniques and guidance developed for the offshore windfarm industry; Observations and research should be undertaken if necessary by block operators and others on cetacean distribution and ecology, including of beaked whales in deeper water areas, to increase the confidence with which predictions of behavioural responses and mitigation proposals can be made; Potential applicants for licences … should be reminded that the expectation for facilities design will be for zero discharge of oil in produced water".

[64] Status of Recommendations made in the current and previous Offshore Energy Strategic Environmental Assessments, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/635382/OESEA_Recommendations_Status_July_2017.pdf

[65] The Regulations allow that monitoring arrangements can also include monitoring conducted for other regulatory purposes.

foreseeable future, though a dependence on imports may be reduced through the increased uptake of renewable energy".

The same consideration was made by OGA, reiterating to "*fully support the transition to a low carbon economy*" and "*Government forecasts show that oil and gas will remain an important part of our energy mix for the foreseeable future, and maximising economic recovery from the UKCS is therefore vital to meet our energy demands and reduce reliance on imports*"[66].

Also the East of England Marine Plan noted, in relation to oil and gas, that "*Maximising the recovery (and transmission) of oil and gas sustainably, where it is economic to do so, is a priority for energy supply and security as stated in the United Kingdom.., and is crucial to meeting our energy needs during the transition to a low-carbon economy*".

The importance of SEA

For a more objective appraisal of the possible importance of SEA with regard specifically to licensing rounds for oil and gas, it is necessary to assess the magnitude of expected impacts from exploration and production activity.

In terms of hard constraints, the oil and gas infrastructure impose a 500m buffer as safety zones, as well as 6nm buffer to prevent impacts to helicopter approach.

In particular, in **Annex 2**, concerning Appropriate Assessments, very small limits were considered for the perception of effects arising from seismic activities and physical presence and discharges from exploration and production facilities (<15 km).

For the issue of oil spill accidents, the low frequency of catastrophic events indicates that the overall risks of major oil spill are quantitatively and qualitatively comparable to those considered ALARP[67].

Cumulative effects, although difficult to detect, were generally considered negligible. Regarding noise emissions, as a precautionary action, OESEA3 Environmental Report "*recognises the importance of minimising underwater noise emissions and emphasises the value of further voluntary mitigation measures at the project scale, in particular technical noise emissions reductions and careful planning to reduce temporal and spatial overlap between activities and marine mammals*".

Also, the regulatory requirements and mitigation measures available to minimize the effects of activity on sensitive receptors appear to have been essential to the relatively small environmental effects of activity over time in the North Sea[68].

It can be said, therefore, that the life cycle of oil and gas activity has a reduced environmental footprint, mainly due to mitigation availability. This makes debatable the need for a continuous expansion of the knowledge base and the tendency to produce lengthy and overly detailed Environmental Reports, based on time-consuming data collection, as commented above. On the other hand, the broadening and detailing of knowledge facilitates interaction with stakeholders and demonstrates to society at large that the activity is effectively compatible with environmental preservation. However, it should be borne in mind the recommendation of the Practical Guide to the Strategic Environmental Assessment Directive that a SEA "*need not be done in any more detail, or using any more resources, than is useful for its purpose*".

The consultation process, which is essential for the "environmental" validation of the energy production activity, and the preparation of recommendations, largely resulting from the consultation process, can be considered as the most important contribution of SEA; as seen above, more efficient

[66] https://www.ogauthority.co.uk/licensing-consents/licensing-rounds/

[67] "As Low As Reasonably Practicable".

[68] "…although the acute effects of oil spills can be severe at a local scale, the cumulative effects of around a century of oil spills from shipping to the North Sea – and thirty years of oil and gas development – do not appear to have resulted in wide-scale or chronic ecological effects. It is therefore concluded that the limited incremental effects of SEA 4-related activity, assuming that effective risk management practices continue to be implemented, will be minimal". Report to the Department of Trade and Industry Strategic Environmental Assessment Area North and West of Orkney and Shetland Consultation Document September 2003 4th Strategic Environmental Assessment – Area North & West, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197814/SEA4_assessment.pdf

use of scoping can help model the scope and detail of the Environmental Report and help optimize the overall cost-effectiveness of the process.

The expected low footprint of oil and gas activity and the wide knowledge of its effects and availability of mitigation suggest the possibility of adopting a less complex procedure in cases where other forms of offshore energy production will not be included in the assessments in the near future as it is the case of Brazil.

STRATEGIC ASSESSMENT IN BRAZIL (AAAS) – PECULIARITIES AND COMPARISON WITH THE METHODOLOGY IN THE UK

The first AAAS in Brazil covers the Sergipe / Alagoas-Jacuípe sedimentary basin, in the northeastern part of the Brazilian EEZ (started in July 2018). The assessment should analyze the basin, considering oil and natural gas resources, and socio-environmental characteristics, and also take into account the environmental impacts and risks associated with the installation, maintenance and expansion of the oil activity.

After this first basin, possibly other more consecutive assessments will take place, covering all the remaining offshore areas in the near future.

Expected products from the assessment

Several products are supposed to be delivered by the assessment: a characterization of the oil and natural gas activity in the study area; regional socio-environmental baseline; 20 year time horizon scenarios for the activity (expected trends); guidelines for the development of new oil and gas activity in the basin considering the opportunities and risks; transport and drift of oil simulations based on a minimum of twelve points of oil spill, covering different latitudes and distances from the coast; and finally, an analysis of the environmental impacts and risks of the proposed development scenarios.

The assessment should support the decision process concerning the licensing of blocks, as well as governmental actions that may guide the development of the exploration and production activities.

The main product, however, will be the definition of criteria to classify the areas according their “suitability” for the development of the activity ("fit, unfit or in moratorium"). The criteria should take into consideration: i) the significance of the socio-environmental impacts, positive and negative, and risks of the scenarios of development; ii) environmental and territorial sensitivities; and iii) legal restrictions.

For the areas “in moratorium” due to absence or insufficiency of knowledge, specific action plans should be proposed to fill the knowledge gaps. Recommendations for the subsequent steps of environmental permits, such as specific mitigation measures; in-depth study requests, and specific monitoring are also expected.

On more practical and operational grounds, from the environment agency's point of view, the assessment objective is more related to the identification and exclusion of areas supposedly incompatible with oil and gas activity, either because of its chronic or acute effects. As far as the energy statutory body is concerned, the basic question is to avoid or minimize "regulatory uncertainties" during the environmental permit process (projects consents); in areas already submitted to strategic assessment, the refusal of a project consent due to environmental issues is not expected.

Table 14 below provides a comparative summary of the procedures and concepts adopted in Brazil and the UK.

Table 14 - comparative summary of the procedures and concepts adopted in Brazil and the UK

Topic	Brazil	UK
Objective	The AAAS aims to classify the areas according their suitability for the development of the activity ("fit, unfit or in moratorium"). The criteria should take into consideration: i) the significance of the socio-environmental impacts, positive and negative, and risks of the scenarios of development; ii) environmental and territorial sensitivities; and iii) legal restrictions. Recommendations for the subsequent steps of environmental permits, such as specific mitigation measures: In-depth study requests and specific monitoring are also expected.	To inform licensing decisions by considering the environmental implications of the proposed plan/programme and the potential activities which could result from their implementation. The SEA tends to be an "advisory purpose" report, focusing on the recommendations to be adopted throughout the plan adoption.
Spatial considerations	AAAS is expected to indicate in **spatial terms** where the activity may actually be carried out.	The draft plan for future leasing/licensing **is not a spatial plan**, but has been drafted in the context of knowledge of the potential UK resource and current industry interest (also see below "Marine plans"). Proposals for explicit exclusion of areas or spatial or temporal restrictions directly by the SEA are uncommon. There is no precise definition of how the general constraints proposed by SEA are configured in restricting areas in licensing rounds. The definition of areas to be excluded appears to be the result of a consultation process between BEIS and OGA taking into account the SEA outcome, as well as, "*other Governmental considerations*" (possibly areas already compromised for other uses or restricted due to vessel traffic; military activities, etc.)
Strategic level vs. project level definitions (SEA vs. EIA)	There is no clear separation of analyses that would fit at the strategic level and those most pertinent to project EIAs. This is probably due to the underlying proposal to AAAS that **regulatory uncertainty in the project phase would be reduced or eliminated**.	SEA generally considers that it is not appropriate at the strategic level to anticipate spatial or temporal constraints that relate to the project. In this sense, it is not proposed to exclude areas, given that subsequent instances will or will not validate the effectiveness of mitigation measures. "*Moreover, once project plans are in place, subsequent permitting processes relating to exploration, development and decommissioning would require assessment as appropriate, allowing the opportunity for further mitigation measures to be identified as necessary, and for permits to be refused if necessary*". SEA does **not prevent regulatory uncertainty**, as a project may be rejected if available mitigation measures were considered as insufficient when the project is analyzed in its actual location.
Quantitative vs. qualitative approach	A quantitative risk analysis is required for the estimated accidental events. For the potential impacts of the activity, matrices are elaborated with the definition of weights for the different impacts and the spatial comparison between predefined geographical "sectors". As mitigation is not explicitly considered in the matrices, this artificially results	The assessment methodology favors qualitative aspects over quantitative approaches. A qualitative approach was used comprising the appraisal and description of effects rather than a quantitative approach that was "not considered appropriate or feasible at this strategic level". The analysis of the effects arising from the activities takes into account the possible mitigation of the impacts. Several of the "probable" effects **are not inevitable** consequences of oil and gas

	in the indication of "high impact" areas when compared to others with lower activity.	exploration and production since they can be mitigated through timing, siting or technology (or a combination of these)
Primary data	There was no primary data collection.	Primary data – For example, during SEA 4, scoping concluded that although parts of the area had been surveyed between 1996 and 2000, additional information on seabed habitats and fauna would be needed for the assessment purposes and, as such, a survey of targeted areas of SEA 4 was conducted in the summer of 2002, comprising geophysical and biological sampling.
Environmental Report	There is not an Environmental Report with the same scope of that produced in the UK. The compilation of environmental information is limited. Most of the research effort was focused on compiling economic data from coastal municipalities facing the basin; as well as the construction of scenarios; and the search for quantitative indicators to compare the impact of the activity on the environment.	The Environmental Report is the central piece of the SEA process and includes a detailed survey of the environmental baseline, pre-existing problems, their expected evolution without the implementation of the plan, likely significant environmental effects, mitigation measures, recommendations and monitoring proposals. It is a robust, comprehensive and detailed document.
Scenarios	The assessment should consider (for Sergipe/Alagoas basin) eight different scenarios based on activity intensity and depth ranges (up to 100m and >100m deep). An estimate was made for the intensity of activity (seismic, drilled wells and production facilities) with more emphasis on possible oil and gas reserves in the region than on trends of activity in previous rounds.	Only one scenario is considered based on estimates from activity in previous rounds. SEA was “predicated on the projections of the likely scale and location of activities that could follow licensing” and “if these are likely to be substantially exceeded” the conclusions of the SEA will be re-examined.
Alternatives	The possible environmental impacts for each scenario are assessed based on the estimated intensity of the activity, but the purpose of this approach is not clear. In practical terms, the final proposal should indicate in spatial terms where the activity can be admitted.	The usual alternatives are: Not to offer any areas for leasing/licensing; to proceed with a leasing and licensing programme; or to restrict the areas offered for leasing and licensing temporally or spatially.
Onshore effects	The AAAS makes an extensive socioeconomic assessment of coastal municipalities to assess the local / regional economic impact of the activity on job creation and income generation. In Brazil part of the royalties derived from oil and gas production is distributed directly to States and Municipalities according to their geographic location related to the offshore areas. The study also includes shoreline sensitivity taking into account potential impacts resulting from oil spill.	The SEA includes waste disposal onshore as one of the potential sources of environmental effects from activities that could follow adoption of the draft plan/programme. The onshore implications of offshore activities in areas where there are not established supply bases and routes (e.g. for materials transport and waste disposal) should be considered in the EIA process. In addition, the effects of blocks close to the coast with potential implications for local air quality management plans in adjacent areas and other onshore impacts such as nuisance from light, airborne noise and odour should be evaluated.
Consultation	The consultation process begins with the evaluation of the Term of Reference for hiring the consultancy in charge of the AAAS (electronically). As it is a document focused on the hiring of services, it does not favor the analysis by stakeholders. There is no scoping phase based on a	Consultation process – scoping (electronically), assessment workshops, regional stakeholder meetings and Post Consultation Report (electronically). SEA 4: a scoping document was prepared providing an overview of: proposed licensing; the Strategic Environmental Assessment process; draft contents list for the public consultation assessment document; key information sources on the

	consolidated document considering what is expected from the process. During the study, two workshops are planned in cities in the geographical region of the project, for the presentation of preliminary results and methodological discussion. There will be two face-to-face meetings for the draft plan post-consultation.	environment; and further consultation to be conducted as part of the SEA process. OESEA3: document considering the range of energy related activities in the UK marine environment and their geographical limits; the SEA's objective and policy context; prospectivity and likely scale of SEA related activity; a list of other relevant Plans and Programmes; a summary of the Environmental Baseline; the likely evolution of the environmental baseline; initial list of the main potential sources of environmental effects from activities which could follow adoption of the draft plan/programme, as well as possible SEA indicators and related monitoring. Thus, the answers tended to be objective and complementary, reinforcing the **additional** character of the information requested in the consultation.
Marine plans	Not applicable. There are isolated governmental initiatives for the preparation of spatial marine plans, but still at a very preliminary stage and unrelated to AAAS.	According to the last SEA report "Marine planning in the UK has to date **not been spatially prescriptive** but has defined the range of offshore uses and potential constraints on certain types of development by location, emphasising priorities and promoting activity co-location where appropriate". **It has been noted that the plan moves towards spatialization as far as possible**, taking into account the difficulty of obtaining adequate data and, in particular, that "*the large majority of the policies in the plan are generic or criteria-based policies without a clear spatial dimension*".
HRA and AA	Not applicable	At each round of oil and gas block concessions, it is up to the regulator to undertake a "Habitats Regulations Assessment (HRA)", to ensure the integrity of the sites of interest vis-à-vis the oil and gas activity. The "screening assessment" is the first stage of the HRA to determine whether licensing of any of the Blocks offered in a round may have a significant effect on a relevant site, either individually or in combination with other plans or projects. The Blocks screened in will be subject to a second stage of HRA, the "Appropriate Assessment", before licensing decision is taken.
Oil spills modelling	Transport and drift of oil simulations based on a minimum of twelve points of oil spill, covering different latitudes and distances from the coast. In Brazil, the Environment Agency, responsible for the project consent, tends to consider the possibility of **oil landfall as an important factor in refusing consent** even though at low likelihood of beaching.	Modelling is not done within SEA; it is required only for project consent. The SEA compiles the times to beach estimates from pre-existing projects in the area of interest or derived from simplified deterministic calculations. However based on the historical frequency of accidents in the UK and the requirements for prevention and spill response strategies, **in no case (in the SEA or AA) did the accidental hypothesis led to the exclusion of blocks.**
Steering group	A Technical Committee including members from the Ministry of Environment - MMA, Ministry of Mines and Energy - MME, and other statutory agencies is responsible for overseeing the assessment. The Regulation provides for SEA results to be approved by an Inter-Ministerial Committee (MMA and MME)	The SEA Steering Group includes membership from industry, Government, statutory advisors and environmental organisations including NGOs. The Group keeps a continued engagement with the plan and the review of the information base for the SEA.

Research	No resource available for research. It is common the Environment Agency to impose research programmes on a regional scale as a condition for the project consent, even if the research programme exceeds the activities' temporal or spatial scale.	There are resources in order to maintain an active SEA research programme; identifying information gaps (some of which were outlined in the recommendations of previous SEA Environmental Reports), commissioning new research where appropriate, and promoting its wider dissemination through a series of research seminars.
Monitoring	AAAS will propose monitoring of key issues but there is no specific resource available. There is no mention of responsibility for future monitoring.	The SEA Regulations require the **responsible authority for the draft plan/programme** to "monitor the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action". The types of relevant monitoring fall into three types: emissions monitoring; effects monitoring and SEA objectives monitoring.

NEXT STEPS

A workshop will be held in March 2020 in Brazil, with the presence of representatives of Ministries and Agencies involved with AAAS, as well as other stakeholders, in order to evaluate the results and methodological problems of the first strategic assessment.

The analyses and observations contained in this document will be presented as a contribution to the debate and in particular to inform how SEA has been conducted in the UK.

Also as a result of the review, and considering the differences between SEA and AAAS, it is already possible to highlight key points and suggest lessons that could benefit Brazil from the experience of the United Kingdom. Some important points come directly from the comparison of the topics in Table 14.

Spatial mapping - It is possibly inadequate to be spatially prescriptive at a strategical decision level. UK SEAs tend to avoid prescriptive recommendations that might inhibit the development of new technological solutions or "sterilize" areas where coexistence of diverse projects and concomitant environmental preservation would be plausible. The SEA process is primarily advisory, and the Environmental Report does not precisely define areas to be excluded from subsequent rounds.

Regulatory uncertainty - On the other hand, SEA and even AAAS do not prevent regulatory uncertainty, as a project may be rejected if available mitigation measures were considered as insufficient when the project is analyzed in its actual location. The underlying proposal of AAAS that regulatory uncertainty in the project phase would be reduced or eliminated proved unrealistic.

Quantitative approach - Assessment methodologies based on qualitative approach seem to be more useful and appropriate for strategic decisions. Quantitative methodologies used in ongoing AAAS in Brazil tend to produce artificial results by amplifying impacts and the overstatement of effects, disregarding mitigation measures.

Scoping - A key purpose of scoping is to identify key issues of concern at an early stage so that they can be considered in appropriate detail in the SEA and AAAS. Scoping also aids in the identification of information sources and data gaps that may require to be filled by studies or surveys to underpin the assessment. The scoping process should be based on a robust and structured document including the main points to be considered in the Environmental Report, such as the range of related activities in the marine environment; the strategic assessment's objective; and a summary of the Environmental Baseline and its likely evolution. The document should also propose an initial list of the main potential sources of environmental effects from activities which could follow adoption of the draft plan/programme, as well as possible indicators and related monitoring.

Environmental Report - The Environmental Report is the central piece of the SEA process and includes a detailed survey of the environmental baseline, pre-existing problems, their expected evolution without the implementation of the plan, likely significant environmental effects, mitigation measures, recommendations and monitoring proposals. It is a robust, comprehensive and detailed document. On the other hand, the expected low footprint of oil and gas activity and the wide knowledge of its effects and availability of mitigation suggest the possibility of adopting a less complex procedure in AAAS, where other forms of offshore energy production will not be included in the assessments in the near future as it is the case of Brazil.

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ANNEX 1 – MARINE SPATIAL PLANNING[69]

Following the development of the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010, the **UK Marine Policy Statement** (MPS) 2011 was jointly prepared by the UK, Scottish, Welsh and Northern Ireland governments. The MPS provides the policy framework for the preparation of all UK marine plans and for all decisions capable of affecting the marine area. It reiterates the UK vision for the marine environment for "clean, healthy, safe, productive and biologically diverse oceans and seas", and the UK's High Level Marine Objectives.

The Marine and Coastal Access Act 2009 - MCAA divides UK waters into marine planning regions with an inshore region (0-12 nautical miles) and offshore region (12 – c.200 nautical miles) and limits the boundaries of any marine plan to being within a region (meaning a marine plan cannot include both inshore and offshore regions).

The preparation of marine plans is the responsibility of the respective governments within the UK, reflecting the devolution of powers to Scotland, Wales and Northern Ireland. In England, the Department for Environment, Food & Rural Affairs (DEFRA) is the statutory body for marine planning, while the body responsible for preparing marine plans is the Marine Management Organisation (MMO). The organisations responsible for delivering marine planning in Scotland, Wales and Northern Ireland are, respectively, Marine Scotland, the Welsh Government and the Department of Agriculture, Environment and Rural Affairs (DAERA).

England[70]

The Marine Management Organisation is preparing plans for 11 predefined areas in England - the first set of marine plans for English waters providing more detailed area specific guidance on marine issues. The first plans were published in 2014. The South Marine Plans were the second to be adopted in 2018.

These are now being followed by plans for the North West, North East, South East and South West. All plans are due to be in place by 2021.

Northern Ireland[71]

The Department for Agriculture, Environment and Rural Affairs is currently developing marine plans for both the inshore and offshore regions, which will be published as a single document, the Marine Plan for Northern Ireland. This will provide more detailed area specific guidance on marine issues.

Scotland[72]

Marine Scotland has prepared Scotland's National Marine Plan (2015), which provides a single framework for managing Scotland's seas. Aligned with the UK Marine Policy Statement, it sets out strategic policies for the sustainable development of Scotland's marine resources out to 200 nautical miles. Scotland's National Marine Plan will be supplemented by 11 Regional Marine Plans prepared by Marine Planning Partnerships. These will provide more detailed guidance for inshore waters (out to 12 nautical miles). Pilot plans have been developed or are in development by the regions of Clyde, Shetlands, remarks Firth & Orkney. The National Marine Plan will be reviewed every three years.

Wales[73]

The Welsh Government is preparing plans for the inshore and offshore Welsh regions to be published as a single document - the Welsh National Marine Plan. Its purpose is to guide the sustainable development of the Welsh marine area through the sustainable management of marine natural resources. The Welsh Government is currently formally consulting on the possible merits of sub-national marine planning.

As an example, figure below presents the Marine Plan Areas in England

[69] https://www.msp-platform.eu/countries/united-kingdom

[70] https://www.gov.uk/government/collections/marine-planning-in-england

[71] https://www.daera-ni.gov.uk/articles/marine-plan-northern-ireland

[72] http://www.gov.scot/Topics/marine/seamanagement

[73] http://gov.wales/topics/environmentcountryside/marineandfisheries/marine...

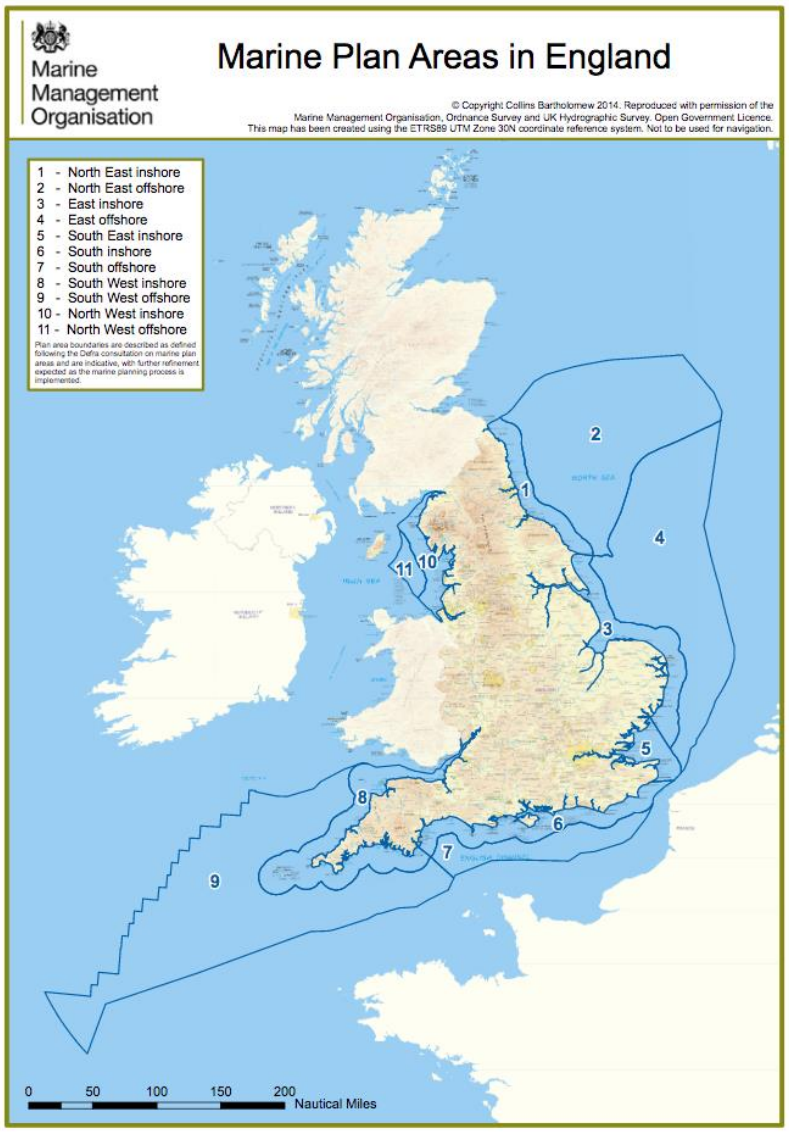


Figure 1 – Marine Plans in England[74]

This Annex discusses the implementation of plans for East inshore and offshore regions.

Like any other "plan", Marine Spatial Plans also meets the requirements of Directive 2001/42 / EC of the European Parliament and of the Council of 27 June 2001 “on the assessment of the effects of certain plans and programmes on the environment”. This means that they must previously undergo a strategic assessment. In the case of Marine Plans, the instrument used is the “Sustainability Appraisal” - SA.

The SA process incorporates the requirements of the European Union (EU) Strategic Environmental Assessment (SEA) Directive, “for identifying the social, economic and environmental impacts of a plan, assessing their significance and mitigating significant impacts where possible. As such, SA aims to ensure that sustainable development is at the heart of the plan-making process”.

The SA has been undertaken throughout the development of the marine plans and has informed the consideration of options (alternatives) which underpin them.

Based on early stakeholder feedback, and to provide a consistent and simple approach to the East Inshore and Offshore Marine Plans, the MMO decided to prepare adjacent inshore and offshore plans through a single integrated process. Therefore, a single plan document was produced with distinctions made as to which policies are relevant to either the East Inshore or East Offshore marine

[74] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/325688/marine_plan_areas.pdf

plan area, or to both. The East marine plans evolved in response to the SA, with recommendations made in the SA being incorporated into subsequent drafts of the East marine plans.

SA differs from SEA in that it gives greater consideration to socio-economic issues (although the SEA Directive refers to a possible need to consider issues such as “population” and “human health”).

The East Marine Plans Sustainability Appraisal (SA)[75]

The stages in the SA process have been developed to take into account the five procedural stages of SEA:

Stage A: Setting the context establishing the baseline and deciding on the scope of the appraisal

Stage B: Developing and appraising marine plan alternatives and appraising the draft plan

Stage C: Preparing the SA Report

Stage D: Consulting on the draft marine plans and the SA Report

Stage E: Monitoring the significant effects of implementing the marine plans as identified through the SA.

According to the SA Report, *“by 2033 the East Inshore and Offshore marine areas are providing a substantial part of the electricity generated from offshore wind in the UK as a result of collaboration and integration between sectors”…*

“Offshore wind farms in the East Inshore and East Offshore Marine Plan areas will be making a significant contribution to meeting the UK’s target under the EU Renewable Energy Directive and the Climate Change Act 2008;… Gas extraction continues to be an important activity and new technologies will have improved the ability to extract oil and gas from reserves in the marine areas, with minimal environmental impact”...

“As a result of effective planning across land and sea, and an appreciation of the unique features of the East Marine Plan areas, tourism and recreation continues to make a significant contribution to the prosperity and wellbeing of people”.

Like SEA, a set of alternatives were subjected to SA

A) Emphasise support for wind energy (leading to less support for co-location in Round 3 Zones[76] – i.e. the areas most recently licenced for offshore wind development - than is the case currently)

B) Emphasise support for co-location of wind with other activities in Round 3 Zones (i.e. more so than is the case currently / would be the case under a business as usual scenario)

C) Emphasise strong support for aggregates (i.e. maximum safeguarding for aggregates extraction across the marine plan area, including within Round 3 Zones)

D) Emphasise support for aggregates (i.e. maximum safeguarding for aggregates extraction across the marine plans, other than within Round 3 Zones)

The Report considered as “uncertainties” the existence of gaps in knowledge with regards to the location of habitats and species of conservation interest in the marine plan areas, and therefore other areas may be afforded protection through site designation in future, either at the coast or offshore, and that with the exception of certain activities (and those covered by marine plan policies which may be spatially represented, e.g. in policy maps), the detailed location and timing of many developments is not known,

Over 60 issues were identified to test the alternatives, which were refined to a list of 13:

1. Co-location

[75] Marine Management Organization. Sustainability Appraisal of the East Inshore and East Offshore Marine Plans Sustainability Appraisal Report Volume 2: SA Report Final following post-consultation changes. January 2014, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/549921/Sustainability_Appraisal_Report.pdf

[76] The Crown Estate owns the rights to the seabed out to 12 nautical miles. It also has rights to exploit the seabed for renewable energy out to 200 mile international waters. Round 3 awarded 9 Zones for Offshore Wind Farms - OWF >32 GW in total in January 2010.

2. Displacement (and other impacts on receptor activities)

3. Economic (growth)

4. Growth of renewables (particularly wind energy)

5. Future change/growth in aggregates

6. Cabling

7. Oil and gas

8. Seascape

9. Environmental concerns/ Marine Strategy Framework Directive - MSFD

10. Marine Protected Areas - MPAs

11. Need for more evidence/research (need to relate this to MMO research programme and those of other organisations)

12. Planning approach – explanation of it and guidance

13. Sufficient focus on local issues or relevant local locations/hot spots

Approach to Appraising the Draft East Marine Plans

A qualitative approach was used comprising the appraisal and description of effects **rather than a quantitative approach**, which is not considered appropriate or feasible at this strategic level, in view of the form and contents of the plans.

The basic idea for the appraisal was to consider how marine planning under the East marine plans would be different from marine planning under a 'business as usual' scenario (without the East marine plans but with a continuation of current policy). This appraisal asks “how will environmental, social and economic conditions change under the East marine plans compared with 'business as usual'”?

The Options process used two of the key issues (those relating to offshore wind and aggregates) as the starting points for options generation. It focused on these as they were the only key issues that could be successfully and **consistently expressed spatially** (a requirement of the SEA directive); which had evidence available that projected future change relating to these issues; and where evidence existed to present a robust baseline for these issues. Other key issues, such as those pertaining to **oil and gas extraction**, were not able to be expressed in terms of their future development, as **there was insufficient evidence available to project the location of suitable commercial gas resources and the potential nature of any related developments.**

Reasons for selecting the preferred approach

The judgement considered the degree to which an eight points baseline (Air and Climate; Communities and Health; Cultural Heritage; Marine Ecology (Plankton, Benthos, Fish and Shellfish, Cephalopods, Birds, Marine Mammals); Economy; Geology, Geomorphology and Coastal Processes; Landscape and Seascape; and Water Environment) conditions may change (significance of change) compared with the situation where no plans are produced; reversibility of effects; and certainty of prediction.

The judgement was made that Option A would probably mean an increase in offshore wind energy development (compared to the baseline), whilst Option B would result in the “roll-out” being hindered somewhat. In terms of Options B and C, the expansion of the aggregates industry has implications for some (environmental) SA topics, but not all. The SA has also taken into account the fact that more (Option A) or less (Option B) wind farm development and more (Options C and D) aggregates extraction could have knock-on implications for other sectors; however, the effect to other sectors is uncertain, as are any knock-on implications for sustainability issues.

MMO selected **Option B, plus the spatial extent of aggregates resource areas from Option C**, considering they would meet the plan objectives best and address national and local policy.

It was considered that Option B met policy objectives across government more fully than the other Options, because of its emphasis on addressing other issues as well as offshore wind. This option

better represented the needs of a wider cross section of sectors including shipping and fishing. It holds the potential to have a minor positive effect on the economy topic through the support across sectors, but was assessed as not being likely to significantly alter the other topics represented in the baseline. Further analysis and evolution of the plans informed by the SA process, led to the inclusion of some positive economic aspects of Option A, presenting a more positive economic picture. This support for offshore wind was assessed as not being in conflict with the supportive policies for other sectors represented under Option B. It also does not have a differential effect on environmental and social topics than Option A, thereby ensuring no negative impact for those topics.

Discussion

The significance of cumulative effects resulting from a range of activities, or multiple incidences of one activity, may vary based on factors such as the nature of the projects proposed and the sensitivity of the receiving communities and environment.

The large majority of the policies in the plan are generic or criteria-based policies without a clear spatial dimension. It is therefore difficult to assess the extent to which the implementation of these policies might conflict with other existing economic, social or environmental policies other than at a high level as this will substantially be determined by the spatial locations where the marine policies are given effect.

The marine plan policies do not create a presumption in favour of development or allocate space for activities in the way that land-use plans can, **instead they highlight key resource areas and support certain activities and co-location where possible**.

The document also warns that as "these are the first marine plans to ever be produced, it is unclear as to the extent of influence they will have on the implementation of marine activities compared to the situation without them (i.e. under the MPS and the present regulatory system). This is why monitoring of the implementation is so vital so that information can be gathered to benefit future plans and their ongoing reviews".

East Marine plan[77]

The Plan considered a list of 11 objectives, covering multiple themes, such as promoting the sustainable development of economically productive activities, taking account of spatial requirements of other activities of importance to the East marine plan areas; to support activities that create employment at all skill levels, taking account of the spatial and other requirements of activities in the East marine plan areas; **to realise sustainably the potential of renewable energy, particularly offshore wind farms, which is likely to be the most significant transformational economic activity over the next 20 years in the East marine plan areas**, helping to achieve the United Kingdom's energy security and carbon reduction objectives; to protect, conserve and, where appropriate, recover biodiversity that is in or dependent upon the East marine plan areas; to have a healthy, resilient and adaptable marine ecosystem in the East marine plan areas; and to facilitate action on climate change adaptation and mitigation in the East marine plan areas.

From there, 19 different policies were defined; each one can be subdivided into two or three categories:

AGG-Aggregates; AQ Aquaculture; BIO Biodiversity; CAB-Cabling; CC-Climate Change; CCS-Carbon Capture and Storage; DD-Dredging and Disposal; DEF-Defence; EC Economic ECO-Ecosystem; FISH-Fisheries; GOV-Governance; MPA-Marine Protected Areas; OG-Oil and Gas; PS-Ports and Shipping; SOC-Social and Cultural; TIDE-Tidal Stream and Wave; TR-Tourism and Recreation; and WIND-Offshore Wind Renewable Energy

For example, ("proposals" should be understood as "**new** proposals" for the area being considered):

Policy AGG1 – (new) Proposals in areas where a licence for extraction of aggregates has been granted or formally applied for should not be authorised unless there are exceptional circumstances; **AGG2 -** (new) Proposals within an area subject to an Exploration and Option Agreement with The

[77] Department for Environment, Food and Rural Affairs. East Inshore and East Offshore Marine Plans. April 2014, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/312496/east-plan.pdf

Crown Estate should not be supported unless it is demonstrated that the other development or activity is compatible with aggregate extraction or there are exceptional circumstances; and **AGG3 -** Within defined areas of high potential aggregate resource, (new) proposals should demonstrate in order of preference: a) that they will not, prevent aggregate extraction, b) how, if there are adverse impacts on aggregate extraction, they will minimise these, c) how, if the adverse impacts cannot be minimised, they will be mitigated, d) the case for proceeding with the application if it is not possible to minimise or mitigate the adverse impacts.

Policy WIND1 - (new) Developments requiring authorisation, that are in or could affect sites held under a lease or an agreement for lease that has been granted by The Crown Estate for development of an Offshore Wind Farm, should not be authorised unless a) they can clearly demonstrate that they will not compromise the construction, operation, maintenance, or decommissioning of the Offshore Wind Farm, b) the lease/agreement for lease has been surrendered back to The Crown Estate and not been re-tendered, c) the lease/agreement for lease has been terminated by the Secretary of State, d) in other exceptional circumstances; **WIND2 -**(new) Proposals for Offshore Wind Farms inside Round 3 zones, including relevant supporting projects and infrastructure, should be supported.

Policy OG1 - (new) Proposals within areas with existing oil and gas production should not be authorised except where compatibility with oil and gas production and infrastructure can be satisfactorily demonstrated; **OG2 -** Proposals for new oil and gas activity should be supported over proposals for other development[78].

Plan policy OG1 clarifies that, where existing oil and gas production and infrastructure are in place, the areas should be protected for the activities authorised under the production licence consent until the licence is surrendered, (including completion of any relevant decommissioning activity), or where agreement over co-located use can be negotiated. The policy will be implemented by the public authorities responsible for authorising the oil and gas activities and all other developments, including co-located activities.

In some cases, private agreements between oil and gas operators and other users are already in place. These may not be considered determinative in any proposals made in an area of existing oil and gas production activities, though they may be part of the information supporting an application.

Policy OG2 - All oil and gas activity is spatially restricted to the areas where the resource is found, or likely to be found. Although some of these are known, the total extent and recoverability of the reserves is not, therefore exploration and appraisal activity is ongoing. This creates uncertainty as to the future location and spatial extent of exploration and potential production activity. Future oil and gas activity has the potential to require access to the same area of seabed as other activities. **In most cases, the consequence of this will be insignificant due to the small footprint of oil and gas production infrastructure.** In some cases, this may not be the case, such as where another user of the sea bed has a lease in place. Where a lease has been agreed for a co-located activity, there may be a requirement for negotiation between parties involved.

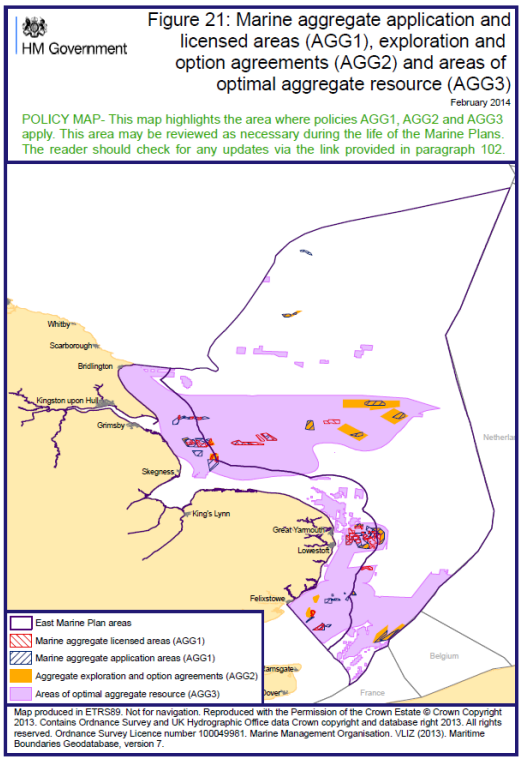
Policy Maps

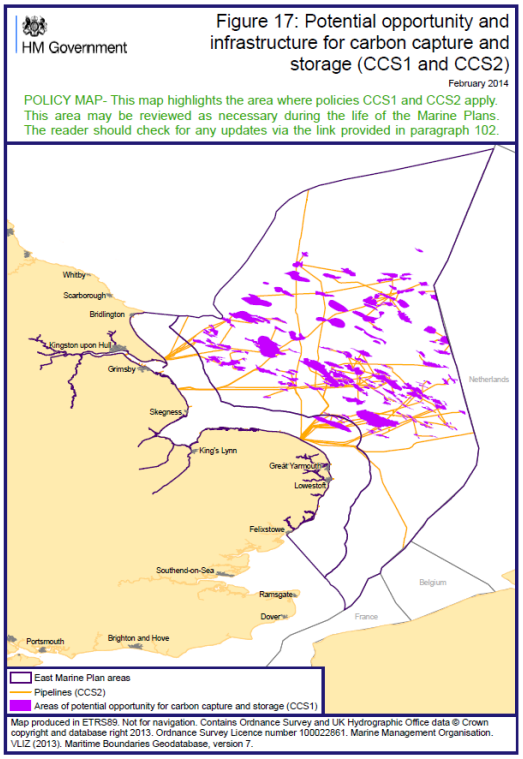
As many of the policies refer to “proposals”, it is difficult for the plans to be **prescriptively comprehensive**, as this would risk omitting some potentially important decisions or types of decision.

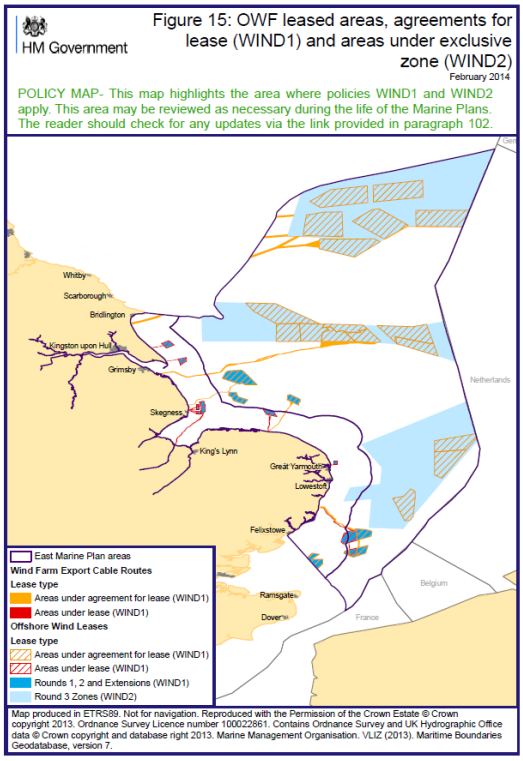
Notwithstanding, the marine plans include five maps where the Marine Management Organisation has defined a spatially discrete area to which a policy applies (CCS1, TIDE1, PS2, AGG3 and AQ1). The policy boundaries presented on these maps are derived from analysis undertaken by the Marine Management Organisation on third party data.

[78] **Oil and Gas – “**Maximising the recovery (and transmission) of oil and gas sustainably, where it is economic to do so, is a priority for energy supply and security as stated in the United Kingdom Government’s Statutory Strategic Security of Supply Reports of 2010 and 2011, and is crucial to meeting our energy needs during the transition to a low-carbon economy. Looking ahead, a specific consideration for the oil and gas industry is the recovery of remaining oil and gas reserves, and it is likely there are new discoveries still to be made that will need to be accessed to achieve the policy priority of ‘maximising economic recovery of United Kingdom oil and gas resource sustainably’, new areas may also be subject to exploration and potential developments following future licensing rounds”. East Inshore and East Offshore Marine Plans. P.111

Policy maps are also included for policies which refer to discrete areas of activity, resource, designations, leases or licences defined by a third party. **Where a policy map is provided, the policy applies specifically to the area defined on the map**.







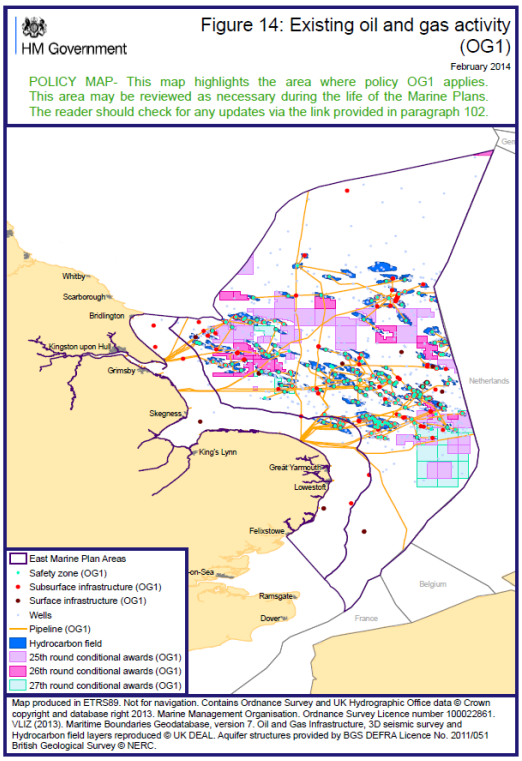


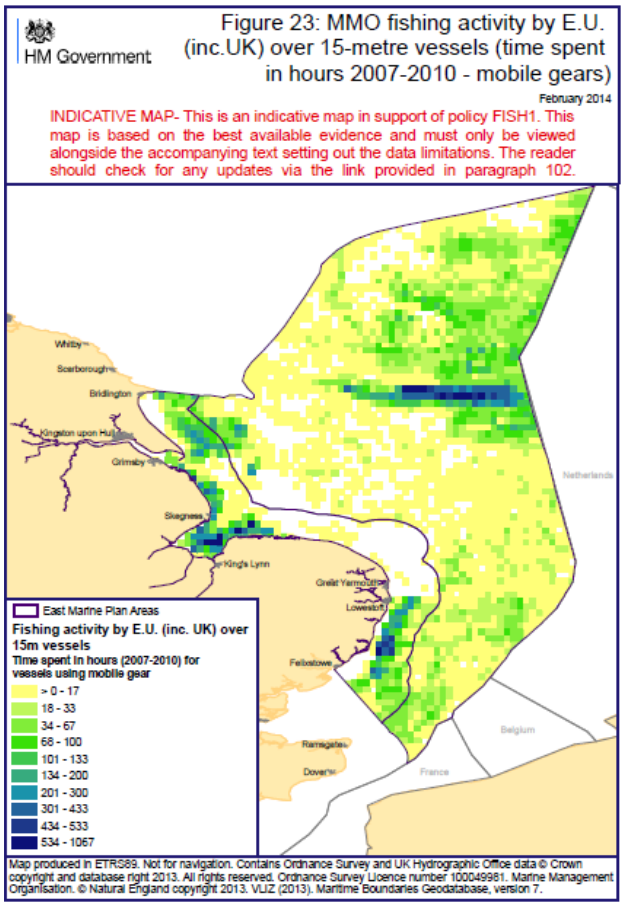
Figure 2 – Examples of Policy Maps.

Indicative Maps

Where confidence in the data supporting a policy is not high enough to designate specific policy boundaries, indicative maps have instead been included. For example, the application of FISH1 and FISH2 relies on evidence of fishing activity, spawning and nursery areas. Maps have been included in the marine plans to provide an indication of locations that are particularly relevant for these policies based on the best available evidence. More locally specific data collected in support of project applications will be considered to supersede information provided in indicative maps, so these maps should only be seen as guidance. As there are no spatially defined boundaries to these policies, the information provided on the indicative maps should not be assumed to cover all locations to which the policies apply. Therefore, **where an indicative map is provided, the policies should be taken to apply across the whole of the East marine plan areas**.

Information Maps

Information maps (Selected statutory and non-statutory management plans; County council and local authority areas; Submarine telecommunication and power cables) have been provided for context, or signposting, taking into account other statutory and non-statutory plans with marine relevance. Information maps show the boundaries of local authorities, county councils, and a selection of statutory and non-statutory plans.



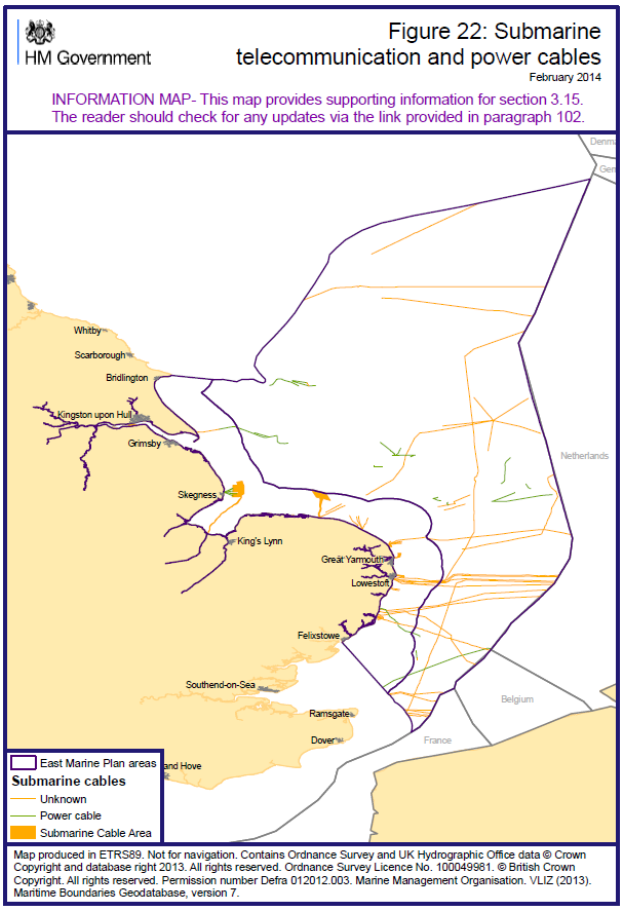


Figure 3 – Examples of Indicative and Information Maps.

FINAL REMARKS

According the OESEA3 Environmental Report **"***Marine planning has a key role in informing strategic and project level spatial considerations*"…"*Marine Plans should reflect and address, so far as possible, the range of activities occurring in, and placing demands on, the plan area. The Marine Plan should identify areas of constraint and locations where a range of activities may be accommodated. This will reduce real and potential conflict, maximise compatibility between marine activities and encourage co-existence of multiple uses*." "*The first marine plans for English waters contain a number of policies which relate to the potential for spatial conflict and/or the potential for activity co-location, including for areas of defined resource for particular activities but with no existing development so as not to risk precluding future use. Whilst the marine plans acknowledge the potential interactions between activities and map these,* ***they are not spatially prescriptive*** *and therefore provide a limited indication of the location of possible future development*".

and…,

"…*Marine planning in the UK* ***has to date not been spatially prescriptive*** *but has defined the range of offshore uses and potential constraints on certain types of development by location, emphasising priorities and promoting activity co-location where appropriate*".

The East Inshore and East Offshore Marine Plans refer to the prescriptive issue, implying that the absence of prescriptive definitions is related to the availability or quality of data, and rigid spatial definitions could lead to omission of decisions:

"Gaps in the evidence base mean that these first marine plans do not include specific spatial or resource allocations ***for some policies****. Instead of being prescriptive, such plan policies act as a guide for public authorities to ensure that all relevant considerations are taken into account, no matter what space they occupy"*

"MMO has used best available evidence in the development of marine plans. Where quality assurance processes have highlighted ***weaknesses in evidence quality****, the MMO, ,,, has steered away from prescriptive plan policies".*

"In some cases ***the availability of, or confidence in, the evidence*** *means it is more appropriate for the policy to apply to the marine plan areas as a whole. Consequently, most of the plan policies are indicative, providing a signal towards what is required or to be avoided, rather than being prescriptive".*

"Many of the policies refer to "proposals". It is difficult for the plans to be ***prescriptively comprehensive****, as this would risk omitting some potentially important decisions or types of decision"*.

The discussion at the SA recognizes the problem considering that "*the large majority of the policies in the plan are generic or criteria-based policies* ***without a clear spatial dimension"***.

However, for some cases where a **policy map** is provided, the report emphasizes that the policy applies specifically to **the area defined on the map**. Actually, the spatial planning do not close a preferential area for other activities, but defines a kind of protection against "intruders":

TIDE1 is an example: "*In defined areas of* ***identified tidal stream resource****, (other) proposals should demonstrate, in order of preference: a) that they will not compromise potential future development of a tidal stream project b) how, if there are any adverse impacts on potential tidal stream deployment, they will minimise them c) how, if the adverse impacts cannot be minimised, they will be mitigated d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts".*

The same applies for AGG3 (*Within defined areas of* ***high potential aggregate resource****, (other) "proposals should demonstrate in order of preference: a) that they will not, prevent aggregate extraction…"*) and AQ1 (*Within sustainable aquaculture development sites (identified through research), (other) "proposals should demonstrate in order of preference: a) that they will avoid adverse impacts* ***on future aquaculture development*** *by altering the sea bed or water column in ways which would cause adverse impacts to aquaculture productivity or potential …*)

The spatial constraint is more rigid in the cases where the preferential activity is (or intends to be) installed. For example OG1 – "*(other) Proposals within areas with **existing** oil and gas production should not be authorised except where compatibility with oil and gas production and infrastructure can be satisfactorily demonstrated"* and OG2 "*Proposals for new oil and gas activity should be supported over proposals for other development"*).

Environmental issues

As seen above, SA differs from SEA in that it gives greater consideration to socio-economic issues. The same view is reflected in the plane itself, where spatialization focuses on the presence of the natural resource and the conditions that favor its production. Thus, too, the policies have as their axis the possible relationship between the priority activity and other proposals for the same area.

However, the environmental issue is addressed in an underlying way, as for example in the chapter describing the policies to be adopted. "*Any decisions must be compliant with relevant legislation and regulations; the plan policies complement rather than replace such requirements. In many cases the requirements of such legislation are addressed at the level of an individual application informed by various assessments. Conformity with these plans does not negate a need for Habitats Regulations Assessment and related Appropriate Assessment in accordance with the Habitats Directive and Birds Directive where required. A Water Framework Directive compliance assessment may also be required. Relevant legislation includes, but is not limited to the: Environmental Impact Assessment Directive, Strategic Environmental Assessment Directive, Habitats Directive and the Wild Birds Directive …*"

The environmental issue appears more directly in the definition of ECO1 policies - Cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation; ECO2 - The risk of release of hazardous substances as a secondary effect due to any increased collision risk should be taken account of in proposals that require an authorisation; BIO1 - Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas …; and BIO2 - Where appropriate, proposals for development should incorporate features that enhance biodiversity and geological interests.

In addition, the "Indicative maps" spatialize important topics (Habitats of conservation importance; species (of low or limited mobility) of conservation importance; Habitats directive; and Seabird foraging ranges), which should be considered throughout the presentation and implementation of the proposals.

Apparently, therefore, the planning does move in the direction of spatialization, to the extent possible, given the limited quality of available information and, in particular, that "the large majority of the policies in the plan are generic or criteria-based policies **without a clear spatial dimension**".

ANNEX 2 – HABITATS REGULATIONS ASSESSMENT

This Annex presents the results of the **Appropriate Assessments (AA)** made for the blocks offered in Rounds 24th to 31st.

The Offshore Petroleum Activities (Conservation of Habitats) Regulations implemented the requirements of Articles 6(3) and 6(4) of the Habitats Directive with respect to oil and gas activities in UK territorial waters and on the UK Continental Shelf[79].

As the petroleum licensing aspects of the plan/programme are not directly connected with or necessary for nature conservation management of European (Natura 2000) sites, to comply with its obligations under the relevant regulations, the Department for Business, Energy and Industrial Strategy (BEIS) has to undertake a Habitats Regulations Assessment (HRA).

The SEA has a wide geographical coverage and the potential timing, nature and intensity of activities that could be associated with the adoption of the draft plan/programme is not fully defined. The strategic HRA will therefore be undertaken during each oil and gas licensing Round[80].

The HRA includes four stages: screening for likely significant effects on European sites; AA to determine whether any activity could have an adverse effect on the integrity of a European site; assessment of alternatives; and "Identification of Imperative Reasons of Overiding Public Interest" (IROPI) and compensatoy measures.

The "screening assessment" aims at determining whether licensing of any of the Blocks offered in a round may have a significant effect on a relevant site, either individually or in combination with other plans or projects. The Blocks which are screened in will be subject to the second stage of HRA, the AA, before licensing decisions are taken. The screening assessment report is organised as follows:

- Overview of the plan, including a list and map of the Blocks offered, summary of the licensing process and nature of the activities that could follow;
- Identification of all European sites potentially affected, together with their various interest features;
- Description of the screening assessment process used to identify likely significant effects on relevant European sites;
- The screening assessment including a consideration of in-combination effects;
- Summary of conclusions including list of Blocks from which likely significant effects on relevant European sites could not be discounted at the screening stage and for which further assessment (Appropriate Assessment) is required before licensing decisions are made.

The assessment is based on an indication of the potential work programme for the block and likely hydrocarbon resources if present, along with the environmental characteristics of the relevant sites. The potential work programme is taken as the maximum of any application for that Block; however, past experience, less activity actually takes place than is bid at the licence application stage.

As part of the process, BEIS has consulted with the Joint Nature Conservation Committee (JNCC), Natural England, Scottish Natural Heritage (SNH), Natural Resources Wales (NRW) and the Department of Agriculture, Environment and Rural Affairs (DAERA) on a draft of the screening assessment.

Operations that may cause deterioration or disturbance to relevant features or species are intended to be representative of the types of pressures that act on marine species and habitats from a defined set of activities. They are based on benchmarks of these pressures where the magnitude, extent or duration is qualified or quantified in some way.

It is important to note that many of the pressures associated with hydrocarbon exploration, resultant effects are not inevitable consequences of oil and gas activity since often they can be mitigated through timing, siting or technology (or a combination of these). These options

[79] For other relevant activities in offshore waters this is covered by the Offshore Marine Conservation (Natural Habitats) Regulations 2007. Within territorial waters, the Habitats Directive is transposed into UK law via the Conservation of Habitats and Species Regulations 2010 in England and Wales, the Conservation (Natural Habitats) Regulations 1994 in Scotland, and the Conservation (Natural Habitats) Regulations (Northern Ireland) 1995 in Northern Ireland.

[80] The timetable and nature of any future HRA relating to the renewable leasing component of this plan rests with The Crown Estate - TCE.

should be evaluated by the licensees and documented in the environmental assessments required as part of the activity specific consenting regime.

A consideration of the potential for the activities to result in likely significant effects is made, informed by the evidence base in the scientific literature, relevant BEIS Strategic Environmental Assessments, and recent Environmental Statements for the relevant activities. Based on this consideration, the screening assessment addresses those sources of impact generally considered to have the potential to affect relevant Natura 2000 sites, specifically:

- Physical disturbance and drilling effects (e.g. rig siting, marine discharges, rig/vessel presence and movement)
- Underwater noise
- In-combination effects

Potential accidental events, including spills, are not considered in the HRA screening[81] as they are not part of the work plan. Measures to prevent accidental events, response plans and potential impacts in the receiving environment **would be considered as part of the environmental impact assessment process** for specific projects that could potentially follow licensing when the location, nature and timing of the proposed activities are available to inform a meaningful assessment of such risks**.**

Listed below are the quantitative parameters used for screening, aiming to define boundary distances to infer the existence and significance of impacts related to physical and drilling effects and underwater noise.

With respect to **physical and drilling effects**, any Block should be screened in that is within or impinges on a Natura 2000 site, together with any Block within a buffer of **10km** from a Natura 2000 site where there is a potential interaction between site features and exploration/appraisal activities in the Block.

In the Northern North Sea area, semi-submersible drilling rigs are likely to be used due to water depths (>120m), and therefore there is the potential for seabed disturbance resulting from anchor deployment. This would likely involve 8-10 anchors **extending to a radius of up to 1.5km, and an associated footprint in the order of 0.06km^2**. In the Mid-North Sea High area, water depths make the use of jack-up rigs likely. The majority of these rigs are three or four-legged, with each leg terminating in a spud can of up to 20m diameter. Seabed disturbance associated with jack-up rigs likely within a radius of 500m (taking into account of any additional rig stabilisation 'rock dump' footprint), and an associated disturbance footprint in the order of **0.001km^2**.

The pathways by which exploration activities may have physical disturbance and drilling effects include physical damage to benthic habitats caused by semi-submersible drilling rig anchor placement, dragging and contact of anchor cables and chains with the seabed and physical damage to benthic habitats caused by the placement of jack-up drilling rig spud cans (physical disturbance of the seabed to a maximum distance of **3km** from a semi-submersible rig has been assumed).

Physical loss and change of benthic habitats can occur through rock dump around jack-up legs for rig stabilisation; physical loss of benthic habitats through the discharge of surface hole cuttings around the well and placement of wellhead assembly; smothering by settlement of drill cuttings on seabed following discharge near sea surface; displacement of sensitive receptors by visual/acoustic disturbance from the presence and movement of vessels and aircraft. It is clear that any effects will be local to a particular installation, in the case of oil and gas facilities, well within **500m**.

In contrast to historic oil based mud discharges, effects on seabed fauna of the discharge of cuttings drilled with water based muds (WBM) and of the excess and spent mud itself are usually subtle or undetectable**, although the presence of drilling material at the seabed is often detectable chemically close to the drilling location (<500m).**

The introduction of rock (as well as steel or concrete structures) into an area with a seabed of sand and/or gravel can provide "stepping stones" which might facilitate biological colonisation including by

[81] As will be seen throughout the AA discussion, until the 28th Round the **possible effects of oil spill were considered** as indicative factors of activity impact for the relevant sites. Screening of subsequent rounds came to understand that accidental events and the prevention and mitigation strategy should only be addressed in project level assessments (EIA).

non-indigenous species by allowing species with short lived larvae to spread to areas where previously they were effectively excluded.

With respect to **acoustic disturbance**, a conservative assessment of the potential for marine mammal disturbance of seismic surveys will assume **that firing of airguns will affect individuals within 10km of the source**, resulting in changes in distribution and a reduction of foraging activity but the effect is short-lived. However, the survey would be limited in time (days) and as the vessel travels along transects, ensonification is variable across the area surveyed.

The precautionary criterion of 15km related to acoustic disturbance is maintained here to identify the Blocks applied for to be considered in the assessment; this is to reflect the degree of uncertainty and the limited direct evidence available and to allow for a greater potential for disturbance when large array sizes are used. This is considered a conservative estimate of a maximum distance within which likely significant effects could be expected from the loudest noise sources associated with geological seismic survey activities.

Appropriate Assessment stage

For the blocks screened in, the second stage of the assessment should determine whether it was possible to authorize the plan under Article 6 (3). The next steps will be:

• Considered whether, on the basis of the precautionary principle it could be concluded the integrity of relevant European Sites would not be affected by the plan. This impact prediction involved a consideration of the cumulative and in-combination effects.

• Examined, in relation to elements of the plan where it was not possible to conclude that the integrity of relevant sites would not be affected, whether appropriate mitigation measures could be designed which cancelled or minimised any potential adverse effects identified.

• Produced a draft AA Report and consulted with its statutory advisors and the public.

• Considered whether, in the light of comments received, it was possible to go ahead with the plan.

Therefore, the AA is supposed to assess the potential implications for European Sites of the proposed licensing of blocks rather than considering the implications of specific individual projects. **The award of licences for the blocks may or may not give rise to ensuing development activity, the implications of which is considered in the AA in so far as possible.**

Where relevant such future activities, will themselves be subject to the screening procedure and tests under the Habitats Directive which have been used to guide the AA.

If the Secretary of State cannot be certain on the basis of the precautionary principle that the integrity of a European Site will not be affected by the plan, the Secretary of State must consider whether appropriate mitigation measures will cancel or minimise the adverse effects. This could be by means of conditions in the appropriate consents that are being applied for at the time. Where necessary, the subsequent stages of the Habitats Directive will be applied as necessary and its obligations will be discharged, **which may mean withholding consent**. It is emphasised that any Licence issued does not give blanket permission to any or all of the projects that may flow from it and it does not diminish the required assessment of environmental impacts for separate projects.

Consequently, the aim of the AA is to consider an outcome from the licensing that is reasonably foreseeable in terms of environmental impact, whilst taking into account the precautionary principle.

In almost all circumstances, this is equivalent to considering a reasonably foreseeable maximum degree of activity. Licences are awarded when judged against a number of criteria, including the amount of activity proposed. Once the licence has been awarded, it is possible for the Operator to undertake less or more activity depending upon a number of factors including results from early exploration.

The results of Screenings and Appropriate Assessments are presented below. The assessments considered were those listed in the “Guidance - Offshore Energy Strategic Environmental Assessment (SEA): An overview of the SEA process”[82].

[82] Available at: https://www.gov.uk/guidance/offshore-energy-strategic-environmental-assessment-sea-an-overview-of-the-sea-process

In order to have a broader view of the process, examples of both screening and AA phases are presented only for Rounds 29th and 30th. In addition, for comparative purposes, the AA results for Rounds 25th to 28th and 31st are also considered.

The AA report for 24th Round, although not listed in the Guidance mentioned above, will also be commented on later. The AA of 24th Round has been the only example **with explicit recommendation to exclude blocks from the offer**.

However, as far as wind farms are concerned, the HRA undertaken by the Crown Estate - TCE for projects extension in 2017 also led to an exclusion recommendation[83].

SCREENING AND APPROPRIATE ASSESSMENTS FOR 29th AND 30th ROUNDS

29th Round - Mid-North Sea High and Northern North Sea Blocks Screening Assessment - November 2016 (OESEA3)[84]

In addition to the effects discussed above, related to physical disturbance and drilling effects and underwater noise, the potential effects on mobile species and the In-combination effects were also considered.

Whilst individuals of the mobile species could potentially interact with work programme activities associated with the Initial Term for Blocks other than those already screened in, significant effects on the populations of sites relating to such species, and therefore the conservation status of such sites, are not considered likely. This is due to the combination of the small physical footprint of activities and their transitory nature; the likely scale of potential activity (i.e. number of licences applied for and awarded, and actual activity which follows), and the duration of the initial term (up to 9 years) within which activity could take place; and the likely relative density of relevant features in relation to activities which could take place.

In-combination effects

The screening assessment includes the potential for in-combination effects leading to likely significant effects on European sites resulting from the interaction of exploration/appraisal activities in the Round Blocks with activities resulting from other marine plans, programmes and activities.

The uncertainty over the scale and timing of activities which could follow licensing of 29th Round Blocks and the activities resulting from other plans and programmes is recognised and the 29th Round Blocks were considered in the context of areas of activity and proposals for a range of marine activities/potential activities including: existing oil and gas licences; carbon capture and storage agreement for leases; existing oil and gas infrastructure; marine renewable energy developments and navigation density.

The sources of in-combination effect were regarded to be largely related to physical disturbance and noise, and in the context of those areas being offered for licensing, any such effects were expected to be primarily from other offshore energy, specifically offshore wind in the Mid North Sea High area and

[83] In February 2017 The Crown Estate (TCE) launched an opportunity for existing wind farms to apply for project extensions, with eight project applications received. TCE undertook a plan level Habitats Regulations Assessment (HRA), to assess the possible impact of the proposed windfarm extensions on relevant nature conservation sites of European importance. In August 2019, TCE confirmed that seven of the 2017 extension application projects, representing a total generating capacity of 2.85GW, would progress to the award of development rights.

In relation of an application for Race Bank extension project which proposed extension sits within the Inner Dowsing, Race Bank and North Ridge Special Area of Conservation (SAC), the plan level HRA determined that **it would not be possible to rule out an adverse effect on the integrity of the SAC**. The Race Bank extension project will therefore not progress to the award of leasing rights as part of the 2017 extensions round.

In such a scenario, there is an option to consider pursuing a derogation case under the Habitats Regulations. As a first for the offshore wind sector, this would be a significant undertaking, in conjunction with a broad range of stakeholders, and would cause a delay to the award of rights for the seven other proposed extension projects.TCE has therefore taken the decision not to pursue this route at this time and continue to work with the developers of Race Bank extension and with stakeholders, to consider next steps. The Crown Estate. Offshore wind extension projects 2017, available at: https://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/energy/offshore-wind-extension-projects-2017/

[84] BEIS. Potential Award of Blocks in the 29th Seaward Licensing Round: Screening Assessment. November 2016, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/592409/29th_Round_HRA_Screening_Report_-_Stage_1.pdf

existing oil and gas activity in the northern North Sea area. Aggregate extraction is not presently undertaken within any of the three 29th Seaward Licensing Round areas.

Commercial fishing occurs throughout UK waters. However, it is noted that activity is seasonally and annually variable, and collated data includes most but not all fishing activity. Fishing and particularly bottom trawling has historically contributed to seabed disturbance over extensive areas, and was identified as an ongoing problem in the UK initial assessment for Marine Strategy Framework Directive - MSFD. It was also noted that depending on the nature of future measures (e.g. Marine Protected Areas - MPAs), such effects are likely to be reduced and therefore some improvement in benthic habitats could be expected. A revised approach to the management of commercial fisheries in European sites has sought to implement steps to ensure that they are managed in accordance with the Habitats Directive, and a number of closure areas are either already in place or have been proposed. Such closures may limit the potential for in-combination effects, particularly when considered in addition to mitigation which is available to reduce or avoid effects on sites from exploration activity.

Conclusion

The screening concluded that for the majority of the Blocks, licensing would not have the potential to cause significant effects on Natura 2000 sites, on the understanding that subsequent field activities will be subject to activity specific permitting and HRA (where appropriate) to ensure appropriate mitigation measures are applied to planned operations and the prevention of potential for accidents, and that **activities do not proceed where this would not be in accordance with the relevant permitting regimes**. However, based on the screening results a number of Blocks which are being offered will be subject to a second stage of HRA, Appropriate Assessment, prior to decisions on the grant of such licences.

The screening was undertaken in the period within which applications for Blocks were being accepted, and therefore considered all 1,261 Blocks offered in the three frontier areas of the Mid-North Sea High, Northern North Sea and West of Scotland. **The screening identified 345 whole or part Blocks as requiring further assessment prior to decisions on whether to grant** licences. Following the closing date for 29th Round applications, and the publication of the screening document, those Blocks identified as requiring further assessment were reconsidered against the list of actual applications. It was concluded that of the Blocks screened in, further assessment (AA) **was required for 21 of the Blocks applied for located in the Northern North Sea and Mid-North Sea High areas.**

29th Round - Mid-North Sea High and Northern North Sea Blocks - Appropriate Assessment – March 2017 (OESEA3)[85]

The nature, extent and timescale of development, if any, which may ultimately result from the licensing of 29th Round Blocks is uncertain, and therefore it is regarded that at this stage a meaningful assessment of development level activity (e.g. pipelay, placement of jackets, subsea templates or floating installations) cannot be made. Moreover, once project plans are in place, subsequent **permitting processes relating to exploration, development and decommissioning, would require assessment (including HRA) as appropriate**[86], **allowing the opportunity for further mitigation measures to be identified as necessary, and for permits to be refused if necessary**.

Potential accidental events, including spills, are not considered in the AA as they are not part of the work plan. Measures to prevent accidental events, response plans and potential impacts in the

[85] BEIS. Offshore Oil & Gas Licensing 29th Seaward Round Habitats Regulations Assessment Appropriate Assessment: Mid-North Sea High and Northern North Sea Blocks. March 2017, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/599083/29th_Round_HRA_AA.pdf

[86] In this way the opinion of the Advocate General in ECJ (European Court of Justice) case C-6/04, on the effects on Natura sites, "*must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure"* is addressed.

receiving environment would be considered as part of the environmental impact assessment (EIA) process for specific projects that could follow licensing when the location, nature and timing of the proposed activities are available to inform a meaningful assessment of such risks.

Work programme and activities to be assessed

It should be noted that this assessment is being undertaken during the licence application process and therefore agreed work programmes are not yet available for those Blocks subject to further assessment. The approach used in the AA is to consider a generic work programme for the Initial Term that is a maximum of that likely as part of the Block licence application process, consisting of a single well and 500km of 2D or 3D seismic survey.

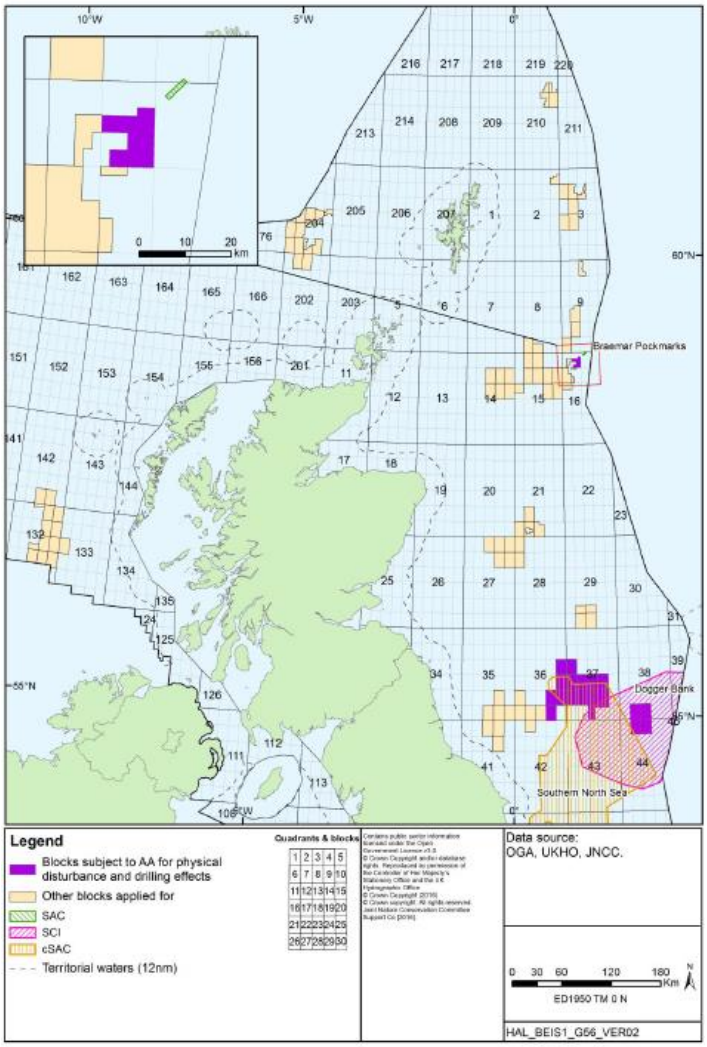


Figure 1 – Sites and Blocks to be subject to further assessment for <u>physical disturbance and drilling</u> effects. 29th Round - Mid-North Sea High and Northern North Sea Blocks - Appropriate Assessment

Physical disturbance and drilling

There is a mandatory requirement to have sufficient recent data to characterise the seabed in areas where activities are due to take place (e.g. rig placement). If required, survey reports must be made available to the relevant statutory bodies on submission of a relevant permit application or Environmental Statement for the operation to be undertaken**, and the identification of sensitive habitats by such survey (including those under the Habitats Directive) may affect BEIS's decision on a project level consent.**

Discharges from offshore oil and gas facilities have been subject to increasingly stringent regulatory controls over recent decades. As a result, oil and other contaminant concentrations in the major streams (drilling wastes and produced water) have been substantially reduced or eliminated (e.g. the discharge of oil based muds and contaminated cuttings is effectively banned). Drilling chemical use and discharge is subject to strict regulatory control through permitting, monitoring and reporting and annual environmental performance reports. The use and discharge of chemicals must be risk assessed as part of the permitting process and the discharge of chemicals which would be expected to have a significant negative impact would not be permitted.

The analyses below are examples of potential physical disturbance and drilling effects related to blocks close to Dogger Bank (sandbanks which are slightly covered by sea water all the time).

Rig siting

The feature is moderately sensitive to physical damage through disturbance or abrasion by the placement of spud cans as part of rig siting. The moderate sensitivity is associated with soft coral and bryozoan, occasionally found in discrete areas of coarser sediments. Blocks 37/19 and 37/22 are 9.6km and 6.4km respectively from the site boundary and **given the assumed distance from a jack-up rig within which effects may occur (500m), no physical damage to the qualifying feature could occur from rig installation in either of the Blocks**. Blocks 37/23 and 37/24 have significant areas outside the site boundaries in which rig siting would be possible, and therefore interaction with sensitive site features could be avoided, thereby negating any adverse effects on site integrity. With respect to the remaining Blocks, the maximum seabed footprint associated with jack-up rig siting ($0.001km^2$) is very small compared to the large site (covering <0.0001%), and its offshore location and relatively shallow depth (15-40m) exposes it to substantial wave energy, particularly during storm events which may cause significant natural disturbance of sediments. Recovery from physical damage of the scale associated with rig placement is expected to be rapid. The small scale and temporary nature of the potential physical damage and the further mitigation measures available (e.g. rig siting to ensure sensitive seabed surface features are avoided), will ensure that site conservation objectives are not undermined.

Drilling discharges

The feature has a low sensitivity to smothering from drilling discharges, and though it is exposed to drill cuttings from existing oil and gas operations, given the limited duration and extent, exposure to this pressure is considered to also be low**. It is assumed that effects relating to drilling discharges occur within 500m of the well location** and therefore no adverse effects on site integrity are expected for Blocks beyond this distance from the site (37/19 and 37/22) or which have significant areas outside the site boundaries in which drilling will be possible (37/23 and 37/24). With respect to the other Blocks, the maximum spatial footprint within which smothering by drilling discharges may occur ($0.8km^2$) is small (representing 0.006% of the total site area) and given the site's exposure to wave energy, redistribution of drilling discharges and recovery from smothering would be rapid. The small scale and temporary nature of potential smothering and low sensitivity of the qualifying feature, and mandatory mitigation requirements with respect to drilling chemical use and discharge will ensure that site conservation objectives are not undermined.

At the project level, discharges would be considered in detail in project-specific EIAs, (where necessary through HRAs) and chemical risk assessments under existing permitting procedures.

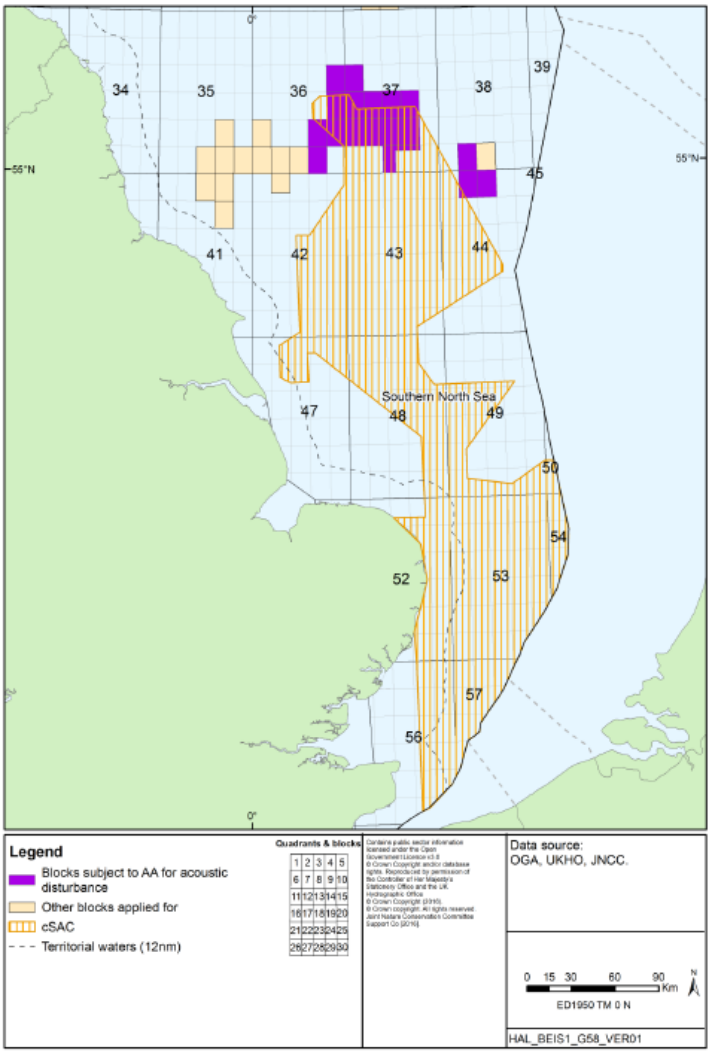


Figure 2: Sites and Blocks to be subject to further assessment for <u>acoustic disturbance</u> effects. 29th Round - Mid-North Sea High and Northern North Sea Blocks - Appropriate Assessment

Acoustic disturbance

Controls are currently in place to cover all significant noise generating activities on the UKCS, including geophysical surveying. All seismic surveys activities require an application for consent under the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 **and cannot proceed without consent**. **These applications are supported by an EIA, which includes a noise assessment**. Applications are made through BEIS's Portal Environmental Tracking System. BEIS **consults the relevant statutory consultees** on each application for advice and a decision on whether to grant consent is only made after careful consideration of their comments. Statutory consultees may request additional information or risk assessment, specific additional conditions to be attached to consent (such as specify timing or other specific mitigation measures), **or advise against consent**.

Although underwater sound generated during any project level activities, specifically deep-geological surveys has the potential to injure and disturb individual harbour porpoises, the actual risk is minimised by the controls currently in place. An adverse effect on site integrity would require disturbance to the qualifying feature and/or to the distribution and viability of the relevant population which may arise from direct mortality or from behavioural changes with implications for long-term ecological viability (e.g. sustained displacement from foraging grounds, reproductive failure).

Potential disturbance of certain species may be avoided by the seasonal timing of noisy activities, and periods of seasonal concern for individual Blocks on offer have been highlighted which licensees should take account of. **Licensees should also be aware that it may influence BEIS's decision whether or not to approve particular activities.**

In-combination effects

Conclusions available evidence for the Mid-North Sea High indicates that past oil and gas activity and discharges has not lead to adverse impacts on the integrity of European sites in the area. Any activities relating to the work programmes, and any subsequent development that may occur if site appraisal is successful, will be judged on its own merits and in the context of wider development in the North Sea (i.e. any potential incremental effects). The current controls on terrestrial and marine industrial activities, including oil and gas operations that could follow licensing, can be expected to prevent significant in-combination effects affecting relevant European sites. **BEIS will assess the potential for in-combination effects whilst considering project specific EIAs and, where appropriate, through HRAs;** this process will ensure that mitigation measures are put in place to ensure that activities, if consented, will not result in adverse effects on integrity of European sites. Therefore, bearing this in mind, it is concluded that the in-combination effects from activities arising from the licensing of Mid North Sea High Blocks with those from existing and planned activities in the Mid North Sea High area will not adversely affect the integrity of relevant European Sites.

Overall conclusion for the 29th Licensing Round

Taking account of the evidence and assessment presented above, the report determines that the licensing through the 29th Licensing Round of the **21 Blocks considered in the AA will not have a significant adverse effect on the integrity of the relevant sites**, and BEIS have no objection to the OGA awarding seaward licences.

Even where a site/interest feature has been screened out, or where a conclusion of no adverse effect on integrity has been reached at plan level**, it is likely that a project level HRA will be necessary** if, for example, new relevant sites have been designated after the plan level assessment; new information emerges about the nature and sensitivities of interest features within sites, new information emerges about effects including in-combination effects; or if plan level assumptions have changed at the project level.

30th Round – Southern North Sea, Central North Sea, West of Shetland and Irish Sea Blocks Screening Assessment - February 2018 (OESEA3)[87]

The screening assessment followed the same procedures as for the 29th Round blocks, including consideration of the same impact sources and proposed distances to consider relevant sites.

However, the report emphasizes that even when a licensee has been awarded a licence on the basis of a "firm commitment" to undertake a specific activity **should not be taken as meaning that the licensee will actually be able to carry out that activity.** This will depend upon the outcome of all relevant **activity specific environmental and other regulatory assessments**.

For the purposes of the screening assessment, were considered:

- The potential disturbance and drilling effects associated with the drilling of an exploration or appraisal well within each Block offered.
- The potential acoustic disturbance effects associated with undertaking a deep geological seismic survey within each Block offered (as well as undertaking site specific seismic operations including rig site survey and Vertical Seismic Profiling).
- The potential for in-combination effects.

[87] Offshore Oil & Gas Licensing 30th Seaward Round Habitats Regulations Assessment Stage 1 – Block and Site Screenings. February 2018, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/705177/30th_Round_HRA_Screening_Report_-_Stage_1.pdf

Again, potential accidental events, including spills, were not considered. As already mentioned for the 29th screening, "measures to prevent accidental events, response plans and potential impacts in the receiving environment would be considered as part of the **environmental impact assessment** process for specific projects that could potentially follow licensing when the location, nature and timing of the proposed activities are available to inform a meaningful assessment of such risks".

Regarding the sound impacts, the report mentions that the potential disturbance of certain qualifying species (or their prey) may be avoided by the seasonal timing of offshore activities, and adds that periods of seasonal concern for individual Blocks on offer should be highlighted with respect to seismic survey and fish spawning which licenses should take account of.

In reference to mobile species, the report reiterates that "individuals of the mobile species could potentially interact with work programme activities associated, significant effects on the populations of sites relating to such species, and therefore the conservation status of such sites, are not considered likely. This is due to the combination of: the small physical footprint of activities and their transitory nature; the likely scale of potential activity, and the duration of the initial term (up to 9 years) within which activity could take place; as well as the likely relative density of relevant features in relation to activities which could take place".

Potential in-combination effects

The sources of in-combination effect are regarded to be largely related to physical disturbance and noise, and in the context of those areas being offered for licensing, any such effects are expected to be primarily from other offshore energy activity, specifically offshore wind in the southern North Sea and Irish Sea. The areas to the west of Shetland have a comparatively low density of activity.

Existing controls on exploration and appraisal operations, and their likely intensity suggest that significant in-combination effects of existing licensed areas and those proposed for licensing in the 30th Seaward Licensing Round on European sites are not likely.

Conclusion

The screening concluded that for the majority of the Blocks, licensing would not have the potential to cause significant effects on Natura 2000 site(s), on the understanding that subsequent offshore activities following licensing will be subject to activity specific assessment and where appropriate an HRA to ensure appropriate mitigation measures are applied to planned operations including measures to prevent potential accidents, and that activities do not proceed where this would not be in accordance with the relevant permitting regimes. However, based on the screening results a number of Blocks which are being offered and relevant sites may be subject to a second stage of HRA, Appropriate Assessment, if licences are applied for and prior to decisions on the grant of such licences.

Following the closing date for 30th Seaward Licensing Round applications, those Blocks identified as requiring further assessment (AA) were reconsidered against the list of actual applications. **It was concluded that further assessment (AA) was required for 61 of the Blocks applied for**. Due to the wide distribution of these Blocks in the UK Continental Shelf, the AAs are contained in four regional reports.

30th Round - Southern North Sea, Central North Sea, West of Shetland and Irish Sea Blocks - Appropriate Assessment – February 2018 (OESEA3)[88]

The methodology adopted was the same as for AA for the 29th Round blocks, considering the effects related to physical disturbance and drilling effects; underwater noise effects and in-combination effects. Similarly to the previous assessment, **potential accidental events, including spills, were not considered in the AA**, as measures to prevent accidental events, response plans and potential impacts in the receiving environment would be considered as part of the environmental impact assessment process for specific projects.

[88] Consultation outcome 30th Seaward Licensing Round Appropriate Assessment, available at: https://www.gov.uk/government/consultations/30th-seaward-licensing-round-appropriate-assessment

The conclusions for the four geographical regions were, respectively:

Southern North Sea

Taking account of the evidence and assessment, the report determines that the licensing through the 30th Licensing Round of the 47 Blocks considered in the AA **will not have a significant adverse effect on the integrity of the relevant sites**, and BEIS have no objection to the OGA awarding seaward licences... **Even where a site/interest feature has been screened out, or where a conclusion of no adverse effect on integrity has been reached at plan level, it is likely that a project level HRA will be necessary** if, for example, new relevant sites have been designated after the plan level assessment; new information emerges about the nature and sensitivities of interest features within sites, new information emerges about effects including in-combination effects; or if plan level assumptions have changed at the project level.

Central North Sea

Taking account of the evidence and assessment, the report determines that the licensing through the 30th Licensing Round of the 3 Blocks considered in the AA **will not have a significant adverse effect on the integrity of the relevant sites**, and BEIS have no objection to the OGA awarding seaward licences (subject to meeting application requirements) covering the Blocks considered.

West of Shetland

Taking account of the evidence and assessment, it has been determined that the licensing through the 30th Licensing Round of the 6 Blocks considered in the AA **will not have a significant adverse effect on the integrity of the relevant sites**, and BEIS have no objection to the OGA awarding seaward licences

Irish Sea

Taking account of the evidence and assessment, the report determines that the licensing through the 30th Licensing Round of the 5 Blocks considered in the AA **will not have a significant adverse effect on the integrity of the relevant sites**, and BEIS have no objection to the OGA awarding seaward licences.

Sixty-one blocks were evaluated for all geographic areas, and no block was recommended to be excluded from the offer.

APPROPRIATE ASSESSMENT FOR 25TH TO 28th ROUNDS AND 31st ROUND

In general, for each round, analyses and conclusions are separated by geographical area in the original reports. Given the similarity of the analyses, only one geographical area was taken as an example for each round.

25th Round HRA – Eastern Irish Sea – Appropriate Assessment - February 2010 (SEA 7)[89]

The screening exercise identified the potential effects of activities that could follow the licensing of three blocks in the Eastern Irish Sea. Activities which may be carried out following the grant of a licence, and which by themselves or in combination with other activities can affect the conservation objectives of relevant European Sites, were discussed under the following broad headings:

• Oil spills (including all liquid phase hydrocarbons)[90]

• Physical disturbance and other effects (e.g. pipeline trenching, marine discharges)

• Underwater noise (in particular, seismic surveys)

[89] DECC. Offshore Oil & Gas Licensing 25th Seaward Round Eastern Irish Sea Blocks 112/13, 112/14 and 113/28b Phase 2 Screening/ Appropriate Assessment February 2010, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/198548/25th_Round_AA_-_Irish_Sea.pdf

[90] As noted above, until the 28th Round, the AA also considered accidental events as an element for the screening exercise of nearby areas to relevant sites. A more detailed description of the implications arising from oil spills for the AA will be given for the 27th Round.

• In-combination effects (e.g. cumulative and synergistic and secondary/indirect effects).

Overall conclusion

The Secretary of State was able to grant consent to the plan/programme under the Habitats Directive and award the licences covering the blocks. This is because there was certainty… that the plan would not adversely affect the integrity of relevant European Sites, **taking account of the mitigation measures** that can be imposed through existing permitting mechanisms on the planning and conduct of activities. These mitigation measures are incorporated in respect of habitat, diadromous fish, bird and marine mammal interest features through the range of legislation and guidance which apply to developer activities which could follow plan adoption. These **mitigation measures include, where necessary, project-specific Appropriate Assessments** based on detailed project proposals which would be undertaken by the competent authority before the granting of a permit/consent. Even where a site/interest feature has been screened out in the plan level assessment, or where a conclusion of no adverse effect on integrity has been reached at plan level, project level assessment will be necessary if, for example, new European/Ramsar sites have been designated after the plan level assessment; new information emerges about the nature and sensitivities of interest features within sites, new information emerges about effects including in-combination effects; or if plan level assumptions have not been met at the project level.

Forty-six blocks were evaluated for all geographic areas, and no block was recommended to be excluded from the offer.

26th Round HRA – Eastern Irish Sea - Appropriate Assessment - November 2011 (OESEA)[91]

The screening exercise identified 10 blocks with the potential for likely significant effects of activities that could follow their licensing on relevant sites. Activities were discussed under the following broad headings:

• Oil spills (including all liquid phase hydrocarbons)

• Physical disturbance and other effects (e.g. pipeline trenching, marine discharges) • Underwater noise (in particular, seismic surveys)

• In-combination effects (e.g. cumulative and synergistic and secondary/indirect effects).

Overall conclusion

The Secretary of State was able to grant consent to the plan/programme under the Habitats Directive and award the licences covering the 10 blocks. This was because there was certainty,…, that implementation of the plan would not adversely affect the integrity of relevant European Sites, t**aking account of the mitigation measures** that can be imposed through existing permitting mechanisms on the planning and conduct of activities. These mitigation measures were incorporated in respect of habitat, diadromous fish, bird and marine mammal interest features through the range of legislation and which apply to developer activities which could follow plan adoption. These **mitigation measures include, where necessary, project-specific Appropriate Assessments** based on detailed project proposals which would be undertaken by the competent authority before the granting of a permit/consent. Even where a site/interest feature has been screened out in the plan level assessment, or where a conclusion of no adverse effect on integrity has been reached at plan level, project level assessment will be necessary if, for example, new European sites have been designated after the plan level assessment; new information emerges about the nature and sensitivities of interest features within sites, new information emerges about effects including in-combination effects; or if plan level assumptions have not been met at the project level.

[91] DECC. Offshore Oil & Gas Licensing 26th Seaward Round Eastern Irish Sea Blocks 113/28, 113/29a, 110/07d & 110/08b Appropriate Assessment, available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/198484/26th_Round_Irish_Sea_Blocks_AA.pdf

One hundred blocks were evaluated for all geographic areas, and no block was recommended to be excluded from the offer.

27th Round - Southern North Sea – Appropriate Assessment - March 2013 (OESEA2)[92]

The report documents the further assessment in relation to 33 Blocks in the southern North Sea.

In carrying out the AA, DECC has:

• Considered, on the basis of the precautionary principle, whether it could be concluded that the integrity of relevant European Sites would not be affected. This impact prediction involved a consideration of the cumulative and in-combination effects.

• Examined, in relation to elements of the plan where it was not possible to conclude that the integrity of relevant sites would not be affected, whether appropriate mitigation measures could be designed which cancelled or minimised any potential adverse effects identified.

• Considered the comments received from statutory advisers and others on the draft AA

• Prior to the grant of any licence all activities which may be carried out following the grant of such a licence, and which by themselves or in combination with other activities can affect the site's conservation objectives, are identified in the light of the best scientific knowledge in the field.

• A licence can only be granted if DECC has made certain that the activities to be carried out under such a licence will not adversely affect the integrity of that site (i.e. cause deterioration to a qualifying habitat or habitat of qualifying species, and/or undermine the conservation objectives of any given site). That is the case where no reasonable scientific doubt remains as to the absence of such effects.

Assessment

The assessment was based on an indication of the proposed work programmes for the Blocks and likely hydrocarbon resources if present, along with the characteristics and specific environmental conditions of the relevant sites. The proposed work programme was taken as the maximum of any application for that Block; however, on past experience, less activity actually takes place than is bid at the licence application stage. Activities which may be carried out following the grant of a licence are discussed under the following broad headings:

• Physical disturbance and other effects (e.g. pipeline trenching, marine discharges)

• Underwater noise (in particular, seismic surveys)

• Oil spills (including all liquid phase hydrocarbons)

• In-combination effects (e.g. cumulative and synergistic and secondary/indirect effects).

Overview of spill effects and context (Southern North Sea)

Oil spills can have potentially adverse environmental effects, and are accordingly controlled by a legal framework aimed at minimising their occurrence, providing for contingency planning, response and clean up, and which enables prosecutions. The potential for oil spills associated with exploration and production, the consequences of accidental spillages, and the prevention, mitigation and response measures implemented have been assessed and reviewed in successive SEAs covering the UKCS area under consideration in the 27th Round, including the recent Offshore Energy SEA 2. Previous SEAs have concluded that given the UK regulatory framework and available mitigation and response, in relation to objective risk criteria (such as existing exposure to risk as a result of shipping), the **incremental risk** associated with exploration and production (E&P) is moderate or low.

[92] DECC. Offshore Oil & Gas Licensing 27th Seaward Round Southern North Sea Blocks 42/5, 43/16, 42/21, 42/22, 42/23, 43/10, 43/12, 43/20f, 43/25, 44/21c, 44/13, 44/16b, 44/16c, 44/18e, 44/19a, 44/23g, 47/3j, 47/3k, 47/8e, 47/22, 47/23, 47/24, 48/4b, 48/10c, 48/18c, 48/23c, 48/24, 48/25c, 49/4b, 49/8b, 49/21d, 53/3a, 53/8 Habitats Regulations Assessment Appropriate Assessment. November 2013

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/261948/27th_Round_Southern_North_Sea_Blocks_AA.pdf

The Report provides a high-level overview of risks, regulation, contingency planning and response capabilities; followed by an assessment of risks presented to relevant European Sites by activities resulting from the proposed licensing of the 33 Blocks in the 27th Round (Southern North Sea).

It should be noted that **at a project level**, DECC requirements for the preparation of Oil Pollution Emergency Plans - OPEPs and Environmental Statement - ES submissions include, amongst other mitigation and response criteria, the **modelling of a worst case blowout scenario considering a specific release location, crude oil type and historic metocean conditions as well an unlikely 30 knot onshore wind, over a release time of 10 days.**

Submerged reefs – With respect to subtidal rock, the lack of substrata that could retain persistent oil contamination means that any impacts are only likely to be due to the acute effects of the dispersed oil, unless chronic oiling seeps down from an intertidal oil source. Generally considered unusual for notable quantities of dispersed oil from spills to reach depths greater than 10m, but there are known cases where this has happened. **Therefore not generally vulnerable to surface oil pollution, except possibly following application of chemical dispersants (generally not permitted in waters shallower than 20m)**. It is not expected that the extent, distribution or functioning of these habitats would be significantly affected, and therefore similarly, those of any species associated with, or relying on the functioning of these habitats, such that conservation objectives would be undermined.

Fish are at greatest risk from contamination by oil spills when the water depth is very shallow. **Below 10m, in open waters, the likelihood that contaminant concentrations will be high enough to affect fish populations is very small, even if chemical dispersants are used to disperse oil.** In shallow or enclosed waters however, high concentrations of freshly dispersed oil may kill some fish and have sublethal effects on others. Juvenile fish, larvae and eggs are most sensitive to the oil toxicity – note that likely hydrocarbons are gas reducing possible spills to that of diesel, for which dispersant would not be used.

The likelihood of a large spill is extremely low (1/1,000-10,000 well years). The majority of the work programmes indicate a drill or drop well. **As the location and design of any proposed well is not known, a detailed assessment of the potential for effects from an accidental spill cannot be made at this time.**

Regulation and mitigation

Under the Regulations, all operators of an offshore installation or oil handling facility must have an OPEP in place. The plans are reviewed by DECC, Maritime and Coastguard Agency - MCA and relevant environmental consultees, such as the relevant Devolved Authority, the Joint Nature Conservation Committee, the relevant inshore statutory nature conservation body, e.g. Natural England, and other relevant organisations. An OPEP will only be approved following consultation and satisfactory operator response to any comments. Approval of an OPEP does not constitute approval of the operations covered by the plan. Operators are responsible for ensuring compliance with all other regulatory requirements. OPEPs set out the arrangements for responding to incidents with the potential to cause marine pollution by oil, with a view to preventing such pollution or reducing or minimising its effect. Additional conditions can be imposed by DECC through block-specific licence conditions.

Offshore, primary responsibility for oil spill response lies with the relevant Operator, although the Secretary of State's Representative may intervene if necessary. The MCA is responsible for a National Contingency Plan[93].

For activities in proximity to sensitive shorelines, the Department's guidance requires that the risk of shoreline contamination be determined through an appropriate risk assessment, and operators with oil spill scenarios that could impact the shoreline must have access to appropriate oil spill response resources suitable for shoreline clean-up operations.

[93] The MCA maintains a contractual arrangement for provision of aerial spraying and surveillance, with aircraft based at Coventry and Inverness. Within two days, aircraft can deliver sufficient dispersant to treat a 16,000 tonne spill within 50 miles of the coast anywhere around the UK. MCA holds 1,400 tonnes of dispersant stockpiled in 14 locations around the UK, in addition to counter-pollution equipment (booms, adsorbents etc.) which can be mobilised within 2-12 hours depending on incident location. DECC is a partner in undertaking regular aerial surveillance operations of offshore installations, as a deterrent measure.

Additional resources are required for installations operating in any Block wholly or partly within 25 miles of the coastline dependent on the hydrocarbon inventory and the oil pollution incident scenarios identified, including:

The presence near the facility at all times of a vessel:

• with the capability of spraying dispersant within 30 minutes of an oil pollution incident notification

• has a stock of dispersant sufficient to deal with an oil pollution incident of 25 tonnes, and if required, have the capability (equipment and capacity) of recovering any oil likely to be lost from the installation under a Tier 1 scenario

• In the event of a Tier 2 incident, Tier 2 resources must be available on scene within half the time taken for the oil to reach shore in 30 knot wind conditions

• Details of resources to deal with a Tier 3 incident (i.e. an oil pollution incident that cannot be controlled by Tier 1 or 2 resources), including sources transport and delivery system

• A Shoreline Protection Strategy Plan.

Oil pollution incidents are classified according to the response levels they are most likely to require and not the volume of oil pollution, unless this is supported by a location specific risk assessment. For example, if a pollution incident requires the use of resources from a regional centre, this would be used to classify the necessary response level, irrespective of its size.

For consistency with the National Contingency Plan, the following Tier definitions apply:

• Tier 1 Local (within the capability of the operator on site);

• Tier 2 Regional (beyond the in-house capability of the operator);

• Tier 3 National (requiring national resources).

Oil spills can have potentially adverse effects, and are controlled in direct proportion to this by a legal framework that minimises their occurrence, provides for contingency planning, response and clean up, and which creates an offence of such spills to enable prosecutions. It is not possible to say that in spite of the regulatory controls and other preventative measures, an oil spill will never occur as a result of 27th Round licensing in the southern North Sea; however, given the nature of the hydrocarbons that may be encountered following licensing, and as oil spills are not intended activities, a risk-based assessment is appropriate.

Following licensing, specific activities require permitting and those considered to present a risk to European Sites would be evaluated by DECC under mandatory contingency planning and HRA procedures which will allow mitigation measures to be defined (including conditions attached to consents/permits or potentially consent/permit refusal). In all cases, rigorous spill prevention, response and other mitigation measures are required of operators and monitored by the regulator for offshore exploration and production.

Given the availability of mitigation measures, DECC considers that exploration and production activities that could follow the licensing of the 33 Blocks, in so far as they may cause oil spills, will not adversely affect the integrity of European Sites.

Overall conclusion

The Secretary of State was able to grant consent to the plan/programme under the Habitats Directive and award the licences covering all the blocks considered. This was because **there was certainty that implementation of the plan would not adversely affect the integrity of relevant European Sites, taking account of the mitigation measures** that can be imposed through existing permitting mechanisms on the planning and conduct of activities.

These mitigation measures are incorporated in respect of habitat, diadromous fish, bird and marine mammal interest features through the range of legislation and which apply to developer activities which could follow plan adoption**. Where necessary, project-specific HRA based on detailed project proposals would be undertaken by the competent authority before the granting of a permit/consent.** The competent authority needs to be satisfied that the proposed activity will not result in adverse effects on integrity of European sites.

Even where a site/interest feature has been screened out in the plan level assessment, or where a conclusion of no adverse effect on integrity has been reached at plan level, project level assessment will be necessary if, for example, new European sites have been designated after the plan level assessment; new information emerges about the nature and sensitivities of interest features within sites, new information emerges about effects including in-combination effects; or if plan level assumptions have not been met at the project level.

The Report provides more detailed information for the Outer Moray Firth area. Quantitative spill trajectory modelling has not been carried out as part of the SEA or AA process. However, the modelings carried out for previous projects are compiled and estimates of time to beach were obtained. The table below exemplifies the type of compilation performed for the outer Moray Firth region[94]:

Table 1 - Review of representative worst case trajectory and stochastic oil spill modelling for Outer Moray Firth exploration wells and developments. 27th Seaward Round Appropriate Assessment - Outer Moray Firth

Block	Water depth (m)	Spill type*	Spill size	Model used & conditions	Time to beach (trajectory modelling)	Likelihood of beaching (stochastic modelling)	Date of model run
13/21a	98	Blowout, 19° API Captain and Alba crude	597 tonnes (*ca.* 635m^{-3}) per day	OSIS III and Oilmap v.3, 30 knot onshore wind	Fraserburgh - 30h Wick - 38h Orkney - 41h	Over a six day period none of the oil would be expected to beach in January and May models.	2000
19/5 and 20/1	82-106	32° API crude	Worse case single well open hole flow rate of 5,000 tonnes (*ca.* 5,814m^{3}) per day	OSIS III, 30 knot onshore winds	Rattray Head - 26h	Scotland <10%	2003
18/5	90	Blowout, 30° API crude	Uncontrolled flow with an open hole flow rate of 1,088 tonnes (*ca.* 1,236m^{3}) per day, flowing for 48h	OSIS 3.1.1, 30 knot onshore winds	NE coast of Scotland - 8h	Scotland 10%	2006
12/21c	30-40	Blowout, 38.8° API Beatrice crude	Uncontrolled flow with an open hole flow rate of 383 tonnes (*ca.* 461m^{3}) per day, flowing for five days	OSIS 3.1.1, 30 knot onshore winds	NE coast of Scotland -14h	Scotland 10% Norway <1%	2008
20/2a, 20/3a and 20/3f	110	40° API crude	6,500 tonnes (*ca.* 7,879m^{-3})	30 knot onshore winds	NE coast of Scotland -39h	-	2010
13/24a, 13/24b and 13/29b; Bleo Holm FPSO 13/28a	95	Blake field crude (30.3 ° API)	350 tonnes (*ca.* 400m^{-3}) per day over a ten day winter period	OSIS	-	Scotland, Norway <1%	2010

Note: API is a measure of oil density relative to water. Lower API values indicate heavier and more persistent oils. Values of ~30-40°API are typical of North Sea/light crude oils.

The compilation refers to 12-year modelling in blocks 12, 13, 18, 19 and 20 for exploration and development projects. Time to beach was summarized in two major time bands: northeast coast of Scotland (8 to 39 h) and Orkney (41 h). Estimates refer to worst-case deterministic scenarios, with constant wind in one direction from worst case scenarios of unconstrained blowouts with no intervention, combined with constant winds from one direction over a significant period of time. The table suggests that beaching from a spill would not occur for at least 8 hours, under a 30 knot onshore wind. However, blocks 12/16a and 18/10 are closer to or impinge upon the coast and beaching is therefore likely to occur more quickly, depending of the location of the well.

However, even from these estimates, given the availability of prevention and mitigation measures which area applied prior to consenting any activity including project specific safety, oil spill risk assessment, response, inspection and other monitoring, DECC considered that the **granting of licences** for the blocks would not adversely affect the integrity of relevant sites. In all cases, rigorous spill prevention, response and other mitigation measures are required of operators and monitored by the regulator for offshore exploration and production.

Sixty-one blocks were evaluated for all geographic areas, and no block was recommended to be excluded from the offer.

[94] DECC. Offshore Oil & Gas Licensing 27th Seaward Round Outer Moray Firth Blocks 12/16a, 13/26b, 18/10, 19/02, 19/03 and 19/10b Habitats Regulations Assessment Appropriate Assessment. November 2013, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/261932/27th_Round_Outer_Moray_Firth_Blocks_AA.pdf

28th Round HRA – Southern North Sea, Moray Firth, Northern & Central North Sea, West of Shetland and Irish Sea and St George's Channel Blocks - Appropriate Assessment – June 2015 (OESEA2)[95]

The screening exercise identified 36 blocks with the potential for likely significant effects of activities that could follow their licensing on relevant sites. Activities were discussed under the following broad headings:

- Physical disturbance and drilling effects
- Underwater noise
- Accidental spills
- Cumulative and in-combination effects

Overall conclusion

The report determined that the plan/programme would not have a significant adverse effect on the integrity of the relevant sites, and recommended the granting of consent by the Secretary of State for the award of licences covering all the Blocks. This is because there was certainty, that implementation of the plan would not adversely affect the integrity of relevant European Sites, taking account of the mitigation measures that can be imposed through existing permitting mechanisms on the planning and conduct of activities. These mitigation measures were incorporated in respect of habitat, diadromous fish, bird and marine mammal interest features through the range of legislation and guidance which apply to developer activities which could follow plan adoption. Where necessary, project-specific HRA based on detailed project proposals would be undertaken by the competent authority before the granting of a permit/consent. The competent authority needs to be satisfied that the proposed activity will not result in adverse effects on integrity of relevant sites.

Ninety-four blocks were evaluated for all geographic areas, and no block was recommended to be excluded from the offer.

31st Round - Mid North Sea High, Moray Firth, Irish Sea and English Channel Blocks - Appropriate Assessment – April 2019 (OESEA3)[96]

The assessment of effects on site integrity has been informed by an evidence base on the environmental effects of oil and gas activities on the UKCS and elsewhere and has utilised a number of assumptions on the nature and scale of potential activities that could follow licensing, along with the characteristics and specific environmental conditions of the relevant sites. Activities which may be carried out following the grant of a licence, and which by themselves or in combination with other activities can affect the conservation objectives of relevant sites are discussed under the following broad headings:

- Physical disturbance and drilling effects
- Underwater noise effects
- In-combination effects

As in previous assessments potential accidental events, including spills, were not considered in the AA as they are not part of the work plan.

Overall conclusions

Mid North Sea High

[95] Consultation outcome 28th Seaward Licensing Round Appropriate Assessments, available at: https://www.gov.uk/government/consultations/28th-seaward-licensing-round-appropriate-assessments

[96] Consultation outcome 31st Seaward Licensing Round Appropriate Assessment, available at: https://www.gov.uk/government/consultations/31st-seaward-licensing-round-appropriate-assessment

Taking account of the evidence and assessment, the report determines that the licensing through the 31st Licensing Round of the 13 Blocks considered in the AA will not have a significant adverse effect on the integrity of the relevant sites

Moray Firth

Taking account of the evidence and assessment, the report determines that the licensing through the 31st Licensing Round of the 15 Blocks considered in the AA will not have a significant adverse effect on the integrity of the relevant sites

Irish Sea

Taking account of the evidence and assessment, the report determines that the licensing through the 31st Licensing Round of the 11 Blocks considered in the AA will not have a significant adverse effect on the integrity of the relevant sites.

Assessment of effects on site integrity

None of the relevant Blocks overlap the site; Block 110/9c lies a minimum of 7km west of the site boundary off the mouth of the Ribble estuary, while Block 110/4 is >10km to the northwest of the site. The cormorant and common scoter qualifying features may use areas outside of the site boundaries as they move between adjacent bays/estuaries and coastal waters; however, their occurrence in these areas and likely interaction with relevant Blocks is considered through their listing as qualifying features of the neighbouring Liverpool Bay SPA and Morecambe Bay and Duddon Estuary SPA. **The licence applications for the relevant Blocks do not propose any new 3D seismic survey within their work programmes.** Consequently, rig site survey, VSP and conductor piling are the relevant sources of impulsive noise, all of which are of a lower amplitude, shorter duration and smaller geographic footprint compared to larger scale 2D or 3D seismic survey.

English Channel

Taking account of the evidence and assessment, the report determines that the licensing through the 31st Licensing Round of the eight Blocks considered in the AA will not have a significant adverse effect on the integrity of the relevant sites

Fifty-seven blocks were evaluated for all geographic areas, and no block was recommended to be excluded from the offer.

24th Offshore Round - Blocks 106/30, 107/21 & 107/22 (Cardigan Bay) - Appropriate Assessment – December 2007 (SEA 6)[97].

This AA has the distinctive feature that it was the only one recommending the exclusion of blocks from the offer. The AA details the expected impacts, considering that for oil spill and other activities the effects on relevant sites would not be significant, but there are uncertainties related to acoustic disturbance.

Figure 3 shows the position of the blocks and the Special Areas of Conservation - SAC in the region.

[97] BERR. Appropriate Assessment with regard to 24th Offshore Oil and Gas Licensing Round Blocks 106/30, 107/21 & 107/22 (Cardigan Bay). December 2007, available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/249215/Cardigan_Bay_24th_Round_Blocks_Appropriate_Assessment.pdf

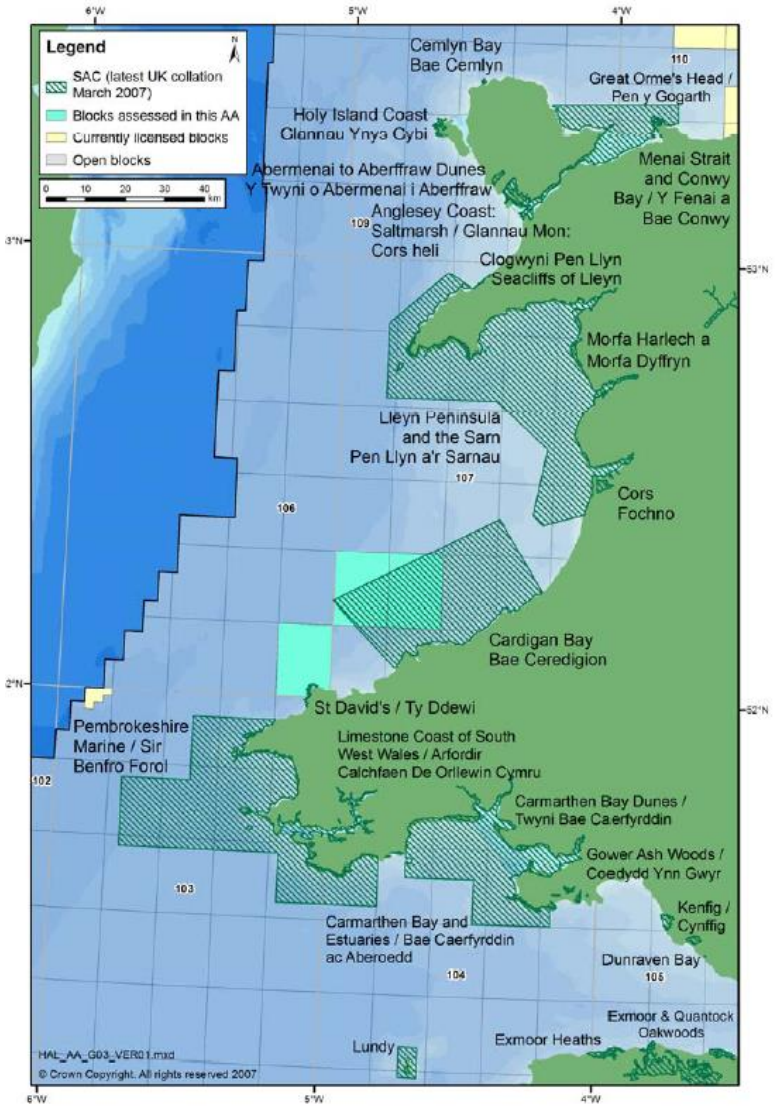


Figure 3 – Blocks and SACs in the region of Cardigan Bay

Oil spills

The incremental risk associated with activities resulting from the proposed licensing (i.e. additional to existing risk; primarily associated with shipping and other maritime activities) is very low. This results from the combination of low probability and low severity (since most spills would be relatively small).

The activities which could reasonably be expected to follow from the proposed licensing would not have a significant effect on the existing risks associated with other activities.

Following licensing, specific activities considered to present a risk to European Sites would be evaluated by the Department under mandatory contingency planning and AA procedures. In all cases, rigorous spill prevention, response and other mitigation measures are implemented for offshore exploration and production.

Given the availability of mitigation measures, the Department considers that O&G activities as far as they may cause oil spills, **will not adversely affect the integrity of European Sites**.

Vulnerability to physical and other damage

The extent and timescale of development which may ultimately result from the 24th Round licensing of blocks 106/30, 107/21 and 107/22 is uncertain. Consequently, this assessment is generic in terms of the quantitative extent of development (e.g. numbers of platforms, lengths of pipelines) considered.

It is concluded that properly controlled (through the existing regulatory mechanisms), the activities that could follow from the licensing of blocks 106/30, 107/21 and 107/22 **will not cause an adverse effect on the integrity of the European Sites** considered in this AA.

Acoustic disturbances

The AA considers the lack of information on the size and distribution of the bottlenose dolphin population in Cardigan Bay. Knowledge about the location of, and seasonal variation in, the areas used by this resident population for breeding and foraging is important to understanding the potential adverse effects and in particular, how any such effects might be mitigated.

The AA general conclusions were: "Given the information which is available at present on the bottlenose dolphin population in Cardigan Bay, it is difficult to characterise and quantify impacts on this population and consider how any such adverse effects might be mitigated. In particular, **the mitigation measures which could be used to offset any potential adverse effects from oil and gas activities on a resident bottlenose dolphin population like that in Cardigan Bay rely on knowledge of the distribution and abundance of the animals**. Mitigation measures could be difficult to apply given current knowledge of dolphin distribution in Cardigan Bay in terms of where they forage and the importance of the coastal strip for both feeding and reproduction".

"Therefore, in view of the information available, the Secretary of State considers that **a precautionary approach to licensing be adopted until more information about the size and distribution of the resident dolphin population** in Cardigan Bay has been collected. **Consequently, there is currently no certainty** within the meaning of the Waddenzee case that activities arising from the licensing of blocks 106/30, 107/21 and 107/22 will not cause an adverse effect on the integrity of the European Sites. Although the blocks should not be licensed at present, this position may be revised in the light of new information on the location of sensitive areas and times, and also on the effects of certain oil and gas activities".

FINAL REMARKS

It is noteworthy that over seven HRAs between 2010 and 2016, there was not a single case of areas excluded from the licensing rounds. Apparently this is due to the peculiarities of the requirements of Articles 6 (3) and 6 (4) of the Habitats Directive, as well as the legal interpretations of the European Court of Justice.

As noted before, the petroleum licensing aspects of the plan/programme are not directly connected with or necessary for nature conservation management of European (Natura 2000) sites; to comply with its obligations under the relevant regulations, BEIS undertakes a Habitats Regulations Assessment (HRA).

In doing so, BEIS has applied the Habitats Directive test (elucidated by the European Court of Justice in the case of Waddenzee (Case C-127/02)) which is: "…*any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects. …where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site. The assessment of that risk must be made in the light inter alia of the characteristics and specific environmental conditions of the site concerned by such a plan or project"*.

Also relevant is the Advocate General's Opinion, which confirms that the effects on Natura sites, "*must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure*".

This leads to the need for a "chain" assessment of the plan's effects on the relevant sites, in practice allowing final impact decisions to be postponed to project level; that is "once project plans are in place, subsequent permitting processes relating to exploration, development and decommissioning, **would require assessment (including HRA) as appropriate, allowing the opportunity for further mitigation measures to be identified as necessary, and for permits to be refused if necessary"**.

Thus it is possible for the regulator to consider that “the **granting of licences** (by itself) for the blocks would not (necessarily) affect the integrity of relevant sites”.

However, this is apparently a “high risk” option for those interested in applying for the blocks due to the "regulatory uncertainty" and consequently the actual viability of exploiting and producing the resource in the awarded area. For example, as mentioned in the 27th Round AA regarding the effects of an oil spill “The likelihood of a large spill is extremely low (1/1,000-10,000 well years)” but “as the location and design of any proposed well is not known, a detailed assessment of the potential for effects from an accidental spill cannot be made at this time”.

As noted throughout the HRAs, there are constant references to decisions that will only occur at the project level, leaving open the possibility of consent for the project to be refused.

Perhaps this also explains the change observed from Round 29th AA on when oil spill (and the need to compile events from previous modelling) were no longer considered in the screening exercise. It seemed to be a recognition that the issue would be considered more adequately in project level assessment. Maybe this explanation seems more reasonable than the statement that “*potential accidental events, including spills, are not considered in the HRA screening as they are not part of the work plan*”.

ANNEX 3 - ACCIDENTAL EVENTS

This Annex summarizes the assessments of accidental event impacts for all SEAs, indicating the methodology employed and its relationship to project-level requirements. Also presented in more detail are the compilation of results from oil drift modelling carried out in the context of impact assessment of projects in the areas of interest, as well as the observed time to beach. Finally, a summary of the main points considered in the Oil Pollution Emergency Plans - OPEPs are presented.

As seen earlier, accidental events are part of the criteria used for evaluating alternatives to the plan or program, along with the possible environmental impacts from noise, physical damage/change to features and habitats, consequences of energy removal, ecological implications from physical presence, physical presence and other users, landscape/seascape, marine discharges, waste, air quality, climatic factors, ancillary development, overall spatial considerations and the potential for cumulative impacts.

Nevertheless, as assessed by OESEA3 "*although the consequences of a major oil spill could be severe, in both ecological and economic terms, the incremental risk associated with the predicted level of activity is moderate or low". The increasing numbers of offshore installations in UK waters, and in particular the number and spatial footprint of large wind farms, will affect the relative risk of vessel collision; however this risk is expected to be mitigated 'inter alia' by siting of developments so that they do not impinge on major commercial navigation routes or significantly increase collision risk… the predicted scale of activity that could follow adoption of the draft plan/programme would not have a significant influence on the cumulative risk*"; and,

"*The incremental risk associated with activities resulting from the proposed licensing is low. This results from the combination of low probability and low severity (since most spills would be small in volume). The overall risks of a major crude oil spill, which would require catastrophic loss of well control, are quantitatively and qualitatively comparable to those considered ALARP (As Low As Reasonably Practicable) under the relevant UK health and safety regulations*".

SEA 1 – 19th Round (2001)[98]

Overall, the wide range in estimated risk quoted in Environmental Statements and elsewhere indicates the difficulty of deriving reliable predictions of potential spill frequency for future exploration and production operations (in part due to the low number of significant spills that have occurred under comparable circumstances). In view of uncertainty over activity levels following the proposed licensing, **it would be misleading to attempt a quantitative assessment of cumulative oil spill risk** associated with licensing in the former White Zone[99].

Oil spill risk is best assessed and managed on an individual project basis. However, from previous exploration activity and numbers of developments west of Shetland, it is reasonable to conclude that the incremental frequency of a major oil spill (>1,000 tonnes) is low and is dominated by tanker offloading incidents. Credible scenarios for hydrocarbon releases on this scale (e.g. blowouts, major process failures, shuttle tanker casualties) involve multiple failures of management and control systems. Minor spills, < 5 tonnes, area more likely, and could result from a wide variety of sources including subsea flowline and flange failures.

Under existing regulations, proposed exploration drilling, production and oil pipeline developments must undertake specific oil spill risk assessments. To date, oil spill risk assessments for exploration wells and oilfield developments west of Shetland and west of Hebrides **have concluded that risk is acceptable, based on the very low historic frequency of spill events involving significant quantities of oil.**

In summary, a large oil spill associated with exploration or development of the possible licence area could result in substantial effects on private or public finance in adjacent coastal areas. However, taking the probability of such an event into consideration, the incremental risk associated with licensing some or all of the former White Zone is low.

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[98] DTI. Report to the Department of Trade and Industry Strategic Environmental Assessment of the Former White Zone Volume 3 – Assessment. August 2000, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/200293/SEA1_Volume_3.pdf

[99] The area between the Shetland Islands and the Faroes was known as the 'White Zone', until resolution of the boundary dispute between Faroe and the UK in 1999.

SEA 2 - 20th Round (2002)[100]

Quantitative spill trajectory modelling has not been carried out as part of SEA 2 process, although it should be noted that modelling has been carried out in Environmental Assessments and Oil Spill Contingency Planning for exploration wells and developments in previously licensed acreage within SEA 2 areas.

Deterministic calculations have been carried out to estimate the time to beach from the closest points to land within SEA 2 areas. These calculations assume that a slick front will move at 3% of wind speed, and have assumed constant 30 knot (15.4 m/s) wind speed. Time to beach has also been calculated for summer and winter average wind speeds recorded from the area. The shortest distance to land from any SEA 2 block is 17km, with a corresponding time to beach of 10h. Other points of closest approach to the UK mainland are from UKCS blocks 13/28 (40km) and 53/01 (22km)..... Throughout most of SEA 2 area, with the exception of inshore parts of the southern area, tidal current velocities are relatively low and oil spill trajectory will be most influenced by wind. Most frequent wind directions vary seasonally and throughout SEA 2 area, but are generally offshore (i.e. away from adjacent UK coastline) with the exception of the southern SEA 2 area in summer, when E / SE winds are most frequently recorded.

It should be noted, however, that dominance by winds from any direction is low and wind (and therefore wind-driven oil spill track) may occur in any direction throughout the year. The closest landfall to any part of SEA 2 area... is accordingly designated as a Special Protection Area. However, probable hydrocarbon reserves in the adjacent SEA 2 area are gas not oil. The risk of a significant spill of persistent oil from E&P sources is therefore low. Foreseeable oil spills which were advected into this area could be managed using chemical dispersion, subject to the agreement of conservation and fisheries agencies. The northern SEA 2 area is within 72km (42h) of major seabird breeding colonies on the east coast of Shetland. .... Overall seabird vulnerability to surface pollution is very high in parts of southern North Sea and in coastal areas to the east of SEA 2 areas. Six blocks in central North Sea also had very high overall vulnerability. Much of the seabird vulnerability is associated with proximity of breeding colonies and post-breeding dispersal of auks and is therefore seasonal. However, vulnerability within SEA 2 areas is very high for at least nine months of the year.

Overall, it was concluded that incremental risk of oil spills associated with exploration and development in SEA 2 area is low, particularly in the southern area where production will almost certainly involve gas. In the event of a spill of persistent oil, and in the absence of an effective response, there are possible effects of coastal oiling around much of the North Sea coastline. Offshore seabirds are also vulnerable, particularly in late summer and autumn. However, a considerable amount of risk assessment work has been carried out for previous exploration and production activities in the area, and understanding of the likely incremental risk is well-developed. **Established risk-reduction and mitigation measures, including operational timing, and spill response contingency measures have been developed which will minimise incremental risks**.

SEA 2 extension Moray Firth - 20th Round (2002)[101]

Based on the same criteria used for SEA 2, minimum times to beach obtained varied from 18 to 75 hours. Within the proposed extension area, overall seabird vulnerability to surface pollution is very high in some Blocks. Much of this vulnerability is associated with post-breeding dispersal of auks in late summer, and is therefore seasonal. The Moray Firth-Aberdeen Bank area is one of 20 areas of the North Sea, the Channel and the Kattegat, which contain concentrations of birds regarded as internationally important.

[100] DTI. Report to the Department of Trade and Industry Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea SEA 2. September 2001, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197798/SEA2_Assessment_Document.pdf

[101] DTI. Report to the Department of Trade and Industry Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea SEA 2. October 2002, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197797/sea2_extension_final.pdf

Following previous licence Rounds, Operators of nearshore blocks have consulted and co-operated with local authorities on contingency planning, and in some cases have developed Coastal Protection Plans; and trained local authority personnel and provided response equipment.

Use of dispersants is a key aspect of oil spill response strategy in the UK, where there are no ecological or fisheries conflicts. In relation to the proposed extension area, the period of highest sensitivity to dispersant application corresponds to the herring spawning season (August – September), which coincides with the period of highest vulnerability of seabirds to surface pollution.

This potential conflict should be considered carefully during **environmental assessment, operational planning and contingency plan preparation** for oil and gas activities in the area, but i**s not considered an over-riding reason not to proceed with licensing – since mitigation measures are feasible and the incremental level of risk is low**.

SEA 3 – 21st Round (2003)[102]

For illustrative purposes, deterministic calculations have been carried out to estimate the time to beach from the most prospective areas within SEA 3 region, where exploration and production activities are most likely; to either the closest landfalls or to adjacent significant coastal sensitivities. These calculations have assumed a constant 30 knot wind speed and that a slick front will move at 3% of wind speed. Time to beach has also been calculated for summer and winter average wind speeds recorded from the area. A time to beach of 24h is calculated from Quadrant 52 to the Wash. The northern SEA 3 area are considerably further offshore, with time to beach in excess of 100h, indicating that beaching of a diesel or low persistence spill is very unlikely. Throughout most of SEA 3 area, with the exception of inshore parts of the southern area, tidal current velocities are relatively low and oil spill trajectory will be most influenced by wind. Most frequent wind directions vary seasonally and throughout SEA 3 area, but are generally offshore (i.e. away from adjacent UK coastline) with the exception of the southern SEA 3 area in summer, when east or southeast winds are most frequently recorded. Estimated time to beach at various points in Belgium, the Netherlands and Denmark range from 105 to 180 hours.

Overall, incremental risk of oil spills associated with exploration and development is very low in SEA 3 area, where production can be expected to involve gas. In the event of a spill of persistent oil from SEA 3 area activities, and without an effective response, oiling of adjacent coasts is possible, although the volumes of such materials potentially spilled or beaching would be small.

Seabirds offshore are vulnerable to even small spills, particularly in late summer and autumn when many auks are flightless. In the event of a large spill of persistent oil, coastal oiling could occur. However, **risk assessments have been carried out for existing activities** in SEA 3 area and contingency measures put in place, which mitigate risks to tolerable levels.

To some extent, all potential sources of effect (i.e. disturbance, emissions and discharges) resulting from oil and gas activity within the southern North Sea are cumulative, in so far as they are incremental to previously existing sources. Sources have therefore been quantified, based on predicted activity scenarios, and placed in the context of existing activities so far as possible throughout the assessment. However, effects are considered cumulative only if the “footprint” of a particular project overlaps with that of adjacent activities or if transient effects are produced sequentially (see “Consideration of potential for cumulative impacts” in the main report)**.**

SEA 4 – 22nd Round (2004)[103]

Specific concerns in relation to oil spills in SEA 4 area include the location of prospective areas upwind from sensitive coastlines, the importance of aquaculture along adjacent coastlines, and the

[102] DTI. Report to the Department of Trade and Industry Strategic Environmental Assessment of Parts of the Central & Southern North Sea SEA 3. August 2002, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197805/SEA3_Assessment_Document_Rev1_W.pdf

[103] DTI. Report to the Department of Trade and Industry Strategic Environmental Assessment Area North and West of Orkney and Shetland. September 2003, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197814/SEA4_assessment.pdf

relative remoteness of the area from stockpiles of oil spill response resources. Seabirds offshore are vulnerable to even small spills, particularly in late summer and autumn when many auks are flightless. In the event of a large spill of persistent oil, coastal oiling could occur. However, although the consequences of major oil spills in the area may clearly be severe, in both ecological and economic terms, **the incremental risk associated with the predicted level of activity is moderate or low**.

Minimum beaching times from some parts of the possible licence area with sustained 30 knot winds, are of the order of 40h and provide sufficient time for appropriate response measures. Coastal oil spill risks would be a key issue in assessment and risk management of proposed developments in SEA 4 area.

Synergistic effects of exploration and production activities with those of other activities in the area are not predicted. A number of potential sources of effects could conceivably be detectable across national boundaries with other European states; however, only oil spills are regarded as having the potential to result in significant negative environmental effects. DTI, as licensing authority and offshore environmental regulator[104], has at its disposal a range of powerful permit based legislation and other environmental control mechanisms, which provide a sound basis for the regulation of future oil and gas activities in SEA 4 area. **Project-specific permitting allows due attention to be given to the protection of environmental sensitivities** (e.g. seasonal seabird vulnerability, and actual or potential conservation sites), other users of the sea and other marine resources. These permits can and do where necessary specify timing, spatial and activity constraints relevant to the sensitivities of the area. **No specific additional controls were identified as being essential**. A number of gaps in information and understanding relevant to potential environmental sensitivities have also been identified, and may be addressed most efficiently through continuation of ongoing co-operative industry and government programmes including broad scale environmental monitoring.

Although the consequences of major oil spills in the area may clearly be severe, in both ecological and economic terms, the incremental risk associated with the predicted level of activity is moderate or low. Existing exposure to risk is “high” or “very high” as a result of shipping around the north of Shetland, Fair Isle Channel and western Orkney and oil spill contingency arrangements have been revised and significantly upgraded since 1999. DTI has regulatory mechanisms in place to require Operators to develop **effective oil spill mitigation measures,** covering organisational aspects and the provision of physical and human resources. **Times to beach, under deterministic trajectory modelling conditions, are sufficient to allow the deployment of response measures where appropriate;** and the probability of surface oiling in coastal waters is low or moderate.

SEA 5 – 23th Round (2005)[105]

Deterministic calculations are carried out to estimate the time to beach assuming constant 30 knot wind speed. Throughout most of SEA 5 area, with the exception of areas close to Orkney and the Pentland Firth, tidal current velocities are moderate and oil spill trajectory will be most influenced by wind. Most frequent wind directions vary seasonally and geographically, but prevailing winds are generally offshore (i.e. away from the adjacent UK coastline). It should be noted, however, that dominance by winds from any direction is low and wind (and therefore wind-driven oil spill track) may occur in any direction throughout the year.

Deterministic calculations can be carried out using proprietary software, or more simply by assuming that a slick front will move at 3% of wind speed giving times to beach in the range 0-122h (assuming distance to shore in the range 0-110 nautical miles). Areas of relatively high prospectivity in SEA 5 area include close to the east Caithness shore and east of Orkney, and to a lesser extent north of the “Banff fault zone”. These areas are most likely to attract exploration activity and potential production, and spill risks are consequently relatively high (although low in absolute terms). A persistent oil spill in these areas could potentially be transported westwards, with consequent risks to north mainland and

[104] The Department for Business, Energy & Industrial Strategy (BEIS), formerly Department of Trade and Industry (DTI); Department for Business, Enterprise and Regulatory Reform (BERR); and Department of Energy and Climate Change (DECC), is the principal environmental regulator of the offshore oil and gas industry.

[105] SEA 5 - Offshore Oil and Gas Licensing. CONSIDERATION OF THE EFFECTS OF LICENSING THE SEA 5 AREA. September 2004, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/195064/SEA5_Section_10.pdf

south Orkney shores. Prospectivity adjacent to the Shetland coast and mainland coastline south of the Moray Firth are lower, and spill risks associated with E&P are correspondingly reduced.

Direct mortality of seabirds in the event of oil spill is undoubtedly the most widely perceived risk associated with the proposed licensing and subsequent activities. It is clear that more prospective SEA 5 areas coincide with coastal and offshore waters characterised as high vulnerability in terms of seabirds, and that there is little scope for mitigation of risk through operational timing.

Harbour seals are found throughout the year on haul-out sites in Orkney, Shetland and along the east coasts of Scotland, and are densely distributed at sea to the east of Shetland and Orkney and off southeast Scotland. More than half the northeast Atlantic population of grey seals are associated with the colonies in Orkney, Shetland, and the east coast of Scotland, and are widely distributed in SEA 5 area throughout the

The overall assessment of oil spill risk associated with SEA 5, in part is based on the existing level of risk associated with offshore production but mainly with commercial shipping. In particular, Shetland and Orkney coasts are exposed to risks associated with high levels of tanker traffic in the Fair Isle Channel and north of Shetland. These routes are close to shore and limited time is available for effective response measures in the case of accidents. Oil spill risks to mainland coasts are dominated by nearshore shipping traffic associated with major ports and terminals. The Firth of Forth and adjacent waters to the south were rated “very high” in terms of oil spill risk and impacts on the environment.

In addition to fishing and aquaculture, coastal industry and activities in adjacent areas to SEA 5 area include tourism and recreation. Both are of considerable economic importance to local economies and are vulnerable to the effects of major oil spills.

Although the consequences of major oil spills in much of SEA 5 area may clearly be severe, in both ecological and economic terms, the incremental risk associated with the predicted level of activity is moderate or low. It is clear that more prospective SEA 5 areas coincide with coastal and offshore waters characterised as high vulnerability in terms of seabirds, and that there is little scope for mitigation of risk through operational timing. **For some locations, times to beach under deterministic trajectory modelling conditions, may not be sufficient to allow the deployment of response measures**. … DTI has regulatory mechanisms in place to require Operators to develop effective oil spill mitigation measures, covering organisational aspects and the provision of physical and human resources; and **to refuse consents for specific activities (including exploration drilling and development) where adequate risk management cannot be provided**. Within SEA 5 area, the long term operation of the Beatrice Field (since 1981) **with no major pollution incidents indicates that nearshore production in relatively sensitive areas can be undertaken with acceptable levels of risk.** It is therefore concluded, subject to regulatory controls outlined above, there are no areas within SEA 5 scope which should be excluded from licensing, and no general timing constraints which can be justified. Risk assessment for specific activities should take particular note of seasonal variations in seabird vulnerability and seal moulting/pupping periods.

SEA 6 – 24th Round (2006)[106]

SEA 6 activity scenarios are low intensity (a forecast maximum of around 12 exploration / appraisal wells, with the socio-economic development scenario involving two new producing fields. This represents a relatively small proportion (<10%) of anticipated UKCS activity and risks of significant accidental events are correspondingly small.

Specific issues associated with SEA 6 include the location of sensitive coastlines, such as the numerous breeding bird colonies of international conservation importance; the presence of significant concentrations of wintering seabirds and coastal waterbirds; the importance of coastal tourism and recreation; and fisheries generally within the area. **It should be noted that the purpose of SEA risk**

[106] SEA 6 – Offshore Oil and Gas Licensing. Consideration of the effects of licensing the SEA 6 Area. October 2005, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194663/SEA_6_Section_9_web.pdf

SEA 6 - Offshore Oil and Gas Licensing. Conclusions and Recommendations. October 2005, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194665/SEA_6_Section_11_web.pdf

assessment is not to anticipate the detailed risk assessment and contingency planning which would be required in advance of any development; but to evaluate the overall contribution to risk associated with possible SEA 6- related activity.

In order to indicate the likely fate and trajectory of oil spills within SEA 6 area, two representative cases are summarised below.

1. Stochastic modelling of representative 22 tonnes (100bbl) spills from Liverpool Bay Asset indicates a relatively high – 10-50% - probability of shoreline oiling associated with proximity of these installations to the coast (this modelling does not take account of evaporation and weathering and therefore overestimates beaching probability). In view of the very short distances (for example, Lennox is approximately 8km from the closest shore), deterministic times to beach are very short (worst case <4h).

2. Deterministic trajectory modelling was undertaken for the Dragon appraisal well in the St George's Channel (block 103/1a) using a scenario involving instantaneous loss of the maximum fuel inventory for the proposed rig – 1,177 tonnes diesel based on 90% full pontoon tanks – with sustained 30 knot winds in various directions corresponding to the closest land. Deterministic modelling indicated, as expected in view of the location's proximity to land (34-39km), relatively short times to beach (12-15h). The modelled proportions of total oil beaching were very low, mainly due to the low persistence of diesel. The quantities of oil remaining on the sea surface at the end of the model runs undertaken for the Environmental Statement - ES were negligible; with evaporated volumes in the range 493-498 m^3 , and dispersed volumes in the range 412-683 m^3; indicating reasonable consistency of predictions, roughly equal evaporation and dispersion, and no formation of stable emulsion.

Minimum beaching times from some parts of SEA 6 area are short and **may not provide sufficient time for at sea response measures**. **Coastal oil spill risks would therefore be a key issue in assessment and risk management of proposed exploration and developments within parts of SEA 6 area**.

SEA 7 – 25th Round (2008)[107]

SEA 7 activity scenarios are low intensity (a forecast maximum of around 7-10 exploration / appraisal wells, with possible one tension-leg platform - TLP, 1-2 FPSO and 1-2 subsea tieback developments. This represents a relatively small proportion (<10%) of anticipated UKCS activity and risks of significant accidental events are correspondingly proportionate.

Specific issues associated with SEA 7 include the location of sensitive coastlines, such as the numerous breeding bird colonies of international conservation importance; the importance of coastal tourism and recreation; and fisheries.

Project specific risk is highly associated with reservoir fluid type and distance from sensitive coastal habitats and locations. The likelihood of E&P activity is highest along the shelf edge from Quadrant 165; these areas are in the approximate range 90-150km west of the Outer Hebrides with a worst-case response window of ca. 30-40h. Slick movement towards the north-east is more likely; with potentially significant consequences for seabird colonies to the north, and for the Orkney coastline. Anticipated reservoir fluids have a high probability of gas.

Historic improvements in spill prevention and mitigation have stabilised the volume of oil spilled from E&P operations on the UKCS at a relatively low level, primarily through identification of root causes of spills and improvements in operational control procedures.

The risk context to the activities resulting from proposed licensing in SEA 7 area includes other hydrocarbon discharges; and spills associated with shipping. In general, SEA 7 area has few hydrocarbon discharges and a low incidence of accidental spills. However, in a national context the risk of oil spills resulting from shipping casualties is high or very high around St Kilda and the Flannans, on the west coast of Lewis and around the Butt of Lewis. This risk, in part is mitigated by the provision of an Emergency Towing Vessel – ETV in the Minches.

[107] SEA 7 - Offshore Oil and Gas Licensing. Appendix 11 – Assessment. March 2007, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194385/SEA_7_Appendix_11_-_Assessment.pdf

In some cases, there is strong seasonality in specific species' sensitivities – in particular in relation to bird populations and breeding/moulting seals. **Existing regulatory controls emphasise the risk management and contingency planning aspects of environmental management, including the timing of operations; and additional controls at an SEA level are not considered necessary**.

As context, it may be noted that overall, **although the acute effects of oil spills can be severe at a local scale, the cumulative effects of around a century of oil spills from shipping – and thirty years of oil and gas development – do not appear to have resulted in wide-scale or chronic ecological effects**. It is therefore concluded that the limited incremental effects of SEA 7 related activity, assuming that effective risk management practices continue to be implemented, will be minimal.

OESEA – 26th Round Oil & Gas (2009)[108]

The SEA covers all UK waters for offshore oil and gas licensing and for offshore gas storage licensing. In such a way OESEA summarises previous SEAs information, presented above, related to risk assessment, including stochastic and deterministic modelling, carried out for Oil Spill Contingency Planning (OSCP).

"The most vulnerable components of the ecosystem to oil spills in offshore and coastal environments are seabirds and marine mammals, due to their close association with the sea surface. Benthic habitats and species may also be sensitive to deposition of oil associated with sedimentation, with mortality of intertidal organisms occurring as a result of direct oiling; while subtidal communities may be affected by dissolved hydrocarbons. Disruption of intertidal communities over a range of timescales has been observed following many major oil spills; typically with disturbance of the balance between algal populations, grazing species and predators on rocky shores. Effects on sediment communities are typically associated with deoxygenation and organic enrichment. In both cases, the effects of chemical dispersants and attempted physical clean-up may be more severe than those of oil".

"**In general, the response policy in the UK for offshore spills is to allow natural dispersion processes to occur, except where chemical dispersion is clearly advantageous (usually to protect birds)**. This contrasts with a generally more interventionist approach in some other jurisdictions, for example in the US where *in-situ* burning of surface oil is considered as advantageous in some circumstances. **The feasibility of containment and recovery in offshore locations is generally considered low in the UK**, although various US studies have considered the feasibility of ship-based and sub-surface collection systems, specifically engineered to enable operations in the vicinity of a blowout, or to collect oil directly from a blowing wellhead. In general, these feasibility studies have not lead to full-scale deployment. In the UK, the Maritime and Coastguard Agency - MCA ETVs have very limited capability for surface oil recovery, and there is currently no capacity for large-scale containment and recovery in the offshore UKCS (or in adjacent national waters, including Norway and Ireland)".

The risk context to the activities resulting from proposed licensing and leasing includes other hydrocarbon discharges; and spills associated with shipping. In general, the UKCS area has few hydrocarbon discharges and a low incidence of accidental spills. However, in a national context, areas of high or very high risk of oil spills resulting from shipping casualties have been identified by MCA and, in part, mitigated by measures including the provision of Emergency Towing Vessels. In some cases, there is strong seasonality in specific species' sensitivities – in particular in relation to bird populations and breeding/moulting seals. Existing regulatory controls emphasise the risk management and contingency planning aspects of environmental management, including the timing of operations; **and additional controls at an SEA level are not considered to be necessary**. Oil spill response planning and capability, by the MCA, the oil industry and local authorities is generally consistent and as effective as practicable. The report concludes that "*It is clear that prevailing weather conditions will rarely facilitate offshore containment and recovery of surface oil (also that the emphasis should be on prevention rather than cure)*".

[108] DECC. Future Leasing for Offshore Wind Farms and Licensing for Offshore Oil & Gas and Gas Storage Environmental Report. January 2009, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194328/OES_Environmental_Report.pdf

OESEA2 - 27th Round (2011) and 28th Round (2014)[109]

The SEA covers all UK waters for offshore oil and gas licensing. In such a way OESEA2 summarises previous SEAs information.

The Energy and Climate Change Committee (2011) report[110] on the implications for UK deepwater drilling of the Deepwater Horizon event was very critical and incisive with respect to oil spill response preparedness, but also considered mitigation practices were well established:

• It was concerned that the offshore oil and gas industry is responding to disasters, rather than anticipating worst-case scenarios and planning for high-consequence, low probability events.

• The environmental impacts of a sub-sea well blowout need to be understood and taken into account when a drilling licence is issued in the UK. The licensing regime must take full account of high consequence, low probability events.

• As part of the drilling-licence process, the Government require companies to consider their responses to high-consequences, low-probability events - such as a blowout. The Government should not automatically accept claims that companies have mitigated away the risk of such worst-case scenarios.

• Oil spill response plans often share procedures for dealing with oil spills. There is some concern that in the past this may have led to a culture of copying-and-pasting rather than the production of site-specific plans which recognise the drilling environment and the risk of high-consequence, low-probability events. The Government should re-examine oil spill response plans to ensure that this is not the case.

• There are serious doubts about the ability of oil spill response equipment to function in the harsh environment of the open Atlantic in the West of Shetland. The Government should ensure that any capping, containment and cleanup systems are designed to take full account of the harsh and challenging environment West of Shetland.

The environmental risks of accidental spill events associated with proposed activities following further rounds of oil & gas licensing are qualitatively similar to those of previous and ongoing activities in the North Sea, Irish Sea and west of Shetland, **and mitigation in the form of risk assessment and contingency arrangements is well established** (although currently under review following the Macondo well spill in the Gulf of Mexico).

Subsea drilling equipment has evolved over the years into reliable systems with multiple redundancy. The subsea drilling pressure control system comprises several inter-related components including the wellhead assembly, BOP stack, choke & kill line system and riser. There have been very few drilling incidents resulting in loss of well control, and historic improvements in spill prevention and mitigation have stabilised the volume of oil spilled from E&P operations on the UKCS at a relatively low level, primarily through identification of root causes of spills and improvements in operational control procedures. The causes of the recent Deepwater Horizon blowout have been identified and a combination of technical, operational and regulatory measures are in place to effectively control the risk of a similar event in UKCS operations.

[109] Offshore Energy SEA 2. Assessment. February 2011, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/195390/OESEA2_ER_with_NTS_Part2.pdf

[110] House of Commons Energy and Climate Change Committee UK Deepwater Drilling— Implications of the Gulf of Mexico Oil Spill: Government Response to the Committee's Second Report of Session 2010–11 Fifth Special Report of Session 2010–11. March 2011, available at: https://publications.parliament.uk/pa/cm201011/cmselect/cmenergy/882/882.pdf

OESEA3 - 29th Round (2016); Supplementary Round (2016); 30th Round (2017); 31st Round (2018) and 32nd Round (2019)[111]

For offshore (seaward) oil and gas licensing, OESEA3 covers all UK waters - UK territorial sea and UK Continental Shelf (UKCS).

The assessment includes a review of Oil Pollution Emergency Plans - OPEP for quadrants in the main oil and gas producing areas. Table 1 below summarizes the time to beach for the different OPEPs considered.

[111] DECC. OESEA3 Environmental Report Future Leasing/Licensing for Offshore Renewable Energy, Offshore Oil & Gas, Hydrocarbon Gas and Carbon Dioxide Storage and Associated Infrastructure. March 2016, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/504827/OESEA3_Environmental_Report_Final.pdf

Table 1 – Minimum time to beach for OPEPs for Regional Seas 1, 2, 6, 8 and 9.

Quadrants	Number of OPEPs reviewed	Spill type & size	Minimum time to beach (hours)	Likelihood of beaching (%)
Regional Sea 1				
12	1	Crude blowout 460m³ per day (5 days)	14 (NE Scotland)	10 (Scotland)
13	2	Crude blowout 400-660m³ per day (10 days)	30 (Fraserburgh)	<1 (Scotland, Norway)
18	1	Crude blowout 1,236m³ per day (2 days)	8 (NE Scotland)	10 (Scotland)
19 & 20	2	Crude blowout 5,814-7,879m³	26-39 (NE Scotland)	<10 (Scotland)
Regional Sea 2				
42	1	Total rig inventory diesel loss 333m³	Disperses within 8	0
44	3	Total rig inventory diesel loss 666-715m³	Disperses within 8	0
44	1	Condensate blowout 17m³ per day (28 days)	Does not beach	0
47	2	Total rig inventory diesel loss 371-715m³	Disperses within 8-9	0
47	1	Condensate blowout 286m³ per day (2 days)	17	7 (England)
49	1	Total rig inventory loss 889m³ diesel, 150t low toxicity oil based mud	Disperses within 8	0
49	1	Condensate blowout 16m³ per day (28 days)	Does not beach	0
Regional Sea 6				
103	1	Total rig inventory diesel loss 1,177m³	Disperses within 8	0-<1 (Wales, Ireland)
110	6	Total rig inventory diesel loss 208-1,075m³	3 for project adjacent to coast	0-50 (England) <5 (Wales)
110	1	Total loss of crude storage 145,242m³	10 (England)	2-94 (England) Welsh 1-30 (Wales) 14 (N Ireland) 3-61 (Scotland) 2 (Ireland) 74 (Isle of Man)
110	2	Crude blowout 347m³ per day (90 days)	18-24 (England)	34-100 (England) Welsh 2-100 (Wales) 26 (N Ireland) 44-96 (Scotland) 10 (Ireland) 100 (Isle of Man)
113	5	Total rig inventory diesel loss 666-1,666m³	Disperses within 8-9	0-0.7
113	1	Condensate blowout 21m3 per day (28 days)	Does not beach	0
Regional Seas 8 & 9				
204	8	Crude blowout, 720-287,280m³ total spill	42-105 (Shetland)	5-60 (Shetland) 1-<5 (Orkney, Faroe, mainland Scotland) <10 (Norway)
205	2	Crude blowout 720-2,254m³ total spill	40 (Shetland)	1-10 (Shetland) 1-42 (Orkney)
206	2	Crude blowout 35,000-287,280m³ total spill	25-36 (Shetland)	3 (Shetland) 0 (Orkney, mainland Scotland, Faroe) 10-60 (Norway)
208	2	Crude blowout 57,652-169,175m³ total spill	50-55 (Shetland)	2-10 (Shetland) 2 (Norway)
213	5	Crude blowout 1,000-1,100,822m³ total spill	35-269 (Shetland)	1-21 (Shetland) 1-10 (Orkney, Faroe, Norway)
214	1	Condensate blowout 318m³ total spill	Disperses within 10	0
217	1	Crude spill 1,400m³ total spill	144 (Faroes) 146 (Shetland)	8

It should be noted that the minimum time to beach estimates are from worst case scenarios of unconstrained blowouts and large diesel spills with no intervention, combined with constant winds from one direction over a significant period of time (deterministic modelling), which is improbable (assumes that a continuous 30 knot onshore wind occurs throughout the spill event[112]).

[112] this type of modelling will no longer be a requirement of the latest OPEP guidance.

Likelihood of significant effects

The incremental risk associated with activities resulting from the proposed licensing (i.e. additional to existing risk; primarily associated with shipping and other maritime activities) is low. This results from the combination of low probability and low severity (since most spills would be small in volume). The overall risks of a major crude oil spill, which would require catastrophic loss of well control, are quantitatively and qualitatively comparable to those considered ALARP (As Low As Reasonably Practicable) under the relevant UK health and safety regulations.

Summary of findings and recommendations

The environmental risks of accidental spill events associated with proposed activities following further rounds of oil & gas licensing are qualitatively similar to those of previous and ongoing activities in the North Sea, Irish Sea and west of Shetland, and mitigation in the form of risk assessment and contingency arrangements is well established.

E&P project-specific risk is highly associated with reservoir fluid type, distance from sensitive coastal habitats and locations, and prevailing winds and currents. The areas of enhanced risk are therefore west Shetland (Regional Sea 8) and to a lesser extent the northern North Sea (Regional Sea 1). Project-specific risk of major incidents in Regional Seas 2, 3, 4 and 6 are moderated by prospective fluid type (primarily condensate or gas) although oil is also present in the Eastern Irish Sea.

Subsea drilling equipment has evolved over the years into reliable systems with multiple redundancy. The subsea drilling pressure control system comprises several inter-related components including the wellhead assembly, BOP stack, choke & kill line system and riser. There have been very few drilling incidents resulting in loss of well control, and historic improvements in spill prevention and mitigation have stabilised the volume of oil spilled from E&P operations on the UKCS at a relatively low level, primarily through identification of root causes of spills and improvements in operational control procedures.

Effective National Contingency Planning, and adequate response resources at a national level, including ETVs, are considered to be important mitigation measures.

In some cases, there is strong seasonality in specific species' sensitivities, in particular in relation to bird populations and breeding/moulting seals. Existing regulatory controls emphasise the risk management and contingency planning aspects of environmental management, including the timing of operations; and additional controls at an SEA level are not considered to be necessary.

Cumulative and transboundary effects

Hydrocarbons from oil spills will be **incremental** to (minor) offshore exploration and operational discharges; however, it is considered very unlikely that oil spill footprints will overlap given the spill frequency associated with predicted activities. There are a range of **cumulative** sources of hydrocarbons to the area. Depending on magnitude, accidental spills represent a minor to major contribution to overall regional inputs of oil. **Synergistic** and **secondary** effects were not identified.

The potential for accidental spills to have transboundary impacts is recognised in **project-level oil spill modelling** which includes assessment of travel times to cross boundaries as well as the likelihood of beaching on different countries. The review of oil spill modelling undertaken for the assessment indicates that potential transboundary impacts were identified for large oil spills in Regional Sea 1 (Norway), Regional Sea 6 (Republic of Ireland, Isle of Man), and in Regional Seas 8 and 9 (Norway, Faroes). The prospectivity of much of Regional Sea 2 (natural gas, also present in the eastern Irish Sea) precludes transboundary impacts as significant oil spill is not likely.

Controls and mitigation

Offshore, primary responsibility for oil spill response lies with the relevant operator and their accredited third party pollution responders, although the Secretary of State's Representative may intervene if necessary. The MCA is responsible for a National Contingency Plan and maintains a contractual arrangement for provision of aerial spraying, with aircraft based at East Midlands and if necessary, Inverness. MCA holds counter-pollution equipment (booms, adsorbents etc.) which can be

mobilised within 2-12 hours depending on incident location, in addition to a stockpile of chemical dispersant.

Oil Pollution Emergency Plans[113] - OPEPs set out the arrangements for responding to incidents with the potential to cause marine pollution by oil, with a view to preventing such pollution and minimising its effect. Additional requirements can be imposed by DECC through block-specific licence conditions. Operators are required to follow international and UK best practice when responding to oil spills and the OPEP must identify appropriate strategies to facilitate a prompt and effective response to a pollution event, including details of how and when they would be employed. These details must include strategies specific to the location which may include:

- Monitoring and surveillance (from installation, vessel, aircraft, satellite)
- Dispersion (natural or chemically/mechanically assisted)
- Containment and recovery (booming and mechanical recovery)
- Source control (well capping and relief well operations)

In addition to loss of well control, risk of oil and diesel loss resulting from collision is considered for drilling activities. A consent to locate a drilling rig is required in advance of drilling which is subject to consultation with relevant stakeholders (e.g. the General Lighthouse Authority, MCA, Ministry of Defence - MoD). Such consent applications require to be supported by a vessel traffic survey and collision risk assessment, and the consent requires the movement and location of the rig to be notified to other users of the sea (e.g. through notices to mariners). A statutory 500m safety zone is established around the rig when in the field, and a standby and/or guard vessel is also located next to the rig during drilling operations to ensure that vessels do not enter the safety zone, and to provide emergency response.

FINAL REMARKS

An important aspect of SEAs is the decision not to elaborate quantitative oil spill trajectory modelling within the scope of the assessments; this is due to the uncertainty as to the actual level of activity in the areas to be licensed. Also was noted the difficulty of deriving reliable predictions of potential spill frequency for future exploration and production operations, in part due to the low number of significant spills that have occurred in UK under comparable circumstances. Alternatively, deterministic calculations were carried out simply by assuming that a slick front will move at 3% of wind speed (assumed constant 30 knot wind speed). Also, estimates of time to beach were compiled from modelling carried out in Environmental Assessments and Oil Spill Contingency Planning for exploration wells and developments in previously licensed blocks.

The incremental risk associated with the predicted level of activity was defined as moderate or low. "*This results from the combination of low probability and low severity (since most spills would be small in volume). The overall risks of a major crude oil spill, which would require catastrophic loss of well control, are quantitatively and qualitatively comparable to those considered ALARP under the relevant UK health and safety regulations*"

In general, the evaluations conclude, provided compliance with current regulatory measures, there would be no reason to exclude areas from offers and even "general timing constraints" or specific additional controls were identified as being essential.

The long history of exploration and production in some areas, with no major pollution incidents indicates **nearshore production in relatively sensitive areas can be undertaken with acceptable levels of risk**.

Based on studies available in the area of interest or simplified deterministic calculations, it was observed that the minimum beaching time, in worst cases in SEA 5 and 6, were short and possibly there would not be sufficient time for at sea response measures ("The OPEP arrangements for any installation located within 40km of the coast should also confirm appropriate shoreline response resources can be available on scene within half the time taken for the oil to beach" – see footnote 116). The evaluation does not propose exclusions or additional restrictive measures, but considers

[113] A summary of OPEP requirements is provided at the end of this document.

"coastal oil spill risks would be a key issue in assessment and risk management of proposed exploration and developments within parts of SEA 6 area".

SEA 5 concludes the oil spill risk is best assessed and managed on an individual project basis and SEA 6 suggests that risk assessment for specific activities should take particular note of "seasonal variations in seabird vulnerability and seal moulting/pupping periods".

According SEA 6, "strategic" risk assessment is not to anticipate the detailed risk assessment and contingency planning which would be required in advance of any development; "but to evaluate the overall contribution to risk associated with possible SEA related activity".

Just as the risk analysis for oil spills would be more appropriately done at the project level, it would also fit, where relevant, to refuse consents when a risk management is lacking: "*DTI has regulatory mechanisms in place to require Operators to develop effective oil spill mitigation measures, covering organisational aspects and the provision of physical and human resources; and to* ***refuse consents for specific activities*** *(including exploration drilling and development) where adequate risk management cannot be provided*)".

These considerations reinforce the assumptions throughout the Environmental Reports that in some cases it is necessary to "transfer" the decision-making about the environmental viability of the proposal to the project phase, and respective risk assessment and EIA approval.

In operational terms, therefore, it is understood quantitative modelling of oil spill in SEA should not be used as a basis for block exclusion or definition of additional constraints; no area was restricted in any SEA or AA (even for those when the effects of potential oil spills were still considered in the assessments).

Existing regulatory requirements for mitigation and minimum times to allow the deployment of response measures were considered sufficient at the strategic level to support the decision not to exclude any area from licensing.

Oil Pollution Emergency Plans - OPEPs[114] important topics

Non-Approval Issues (NAIs)

If the Department identifies the OPEP fails to demonstrate compliance with the OPRC Regulations and this associated Guidance the reasons for non-compliance will be raised as NAIs. All NAIs will be communicated by letter to the Responsible Person. The OPEP will not be approved until such time as all NAIs have been addressed.

Limiting Environmental Risk and Response Arrangements

The OPEP must contain a description of the arrangements to limit environmental risk. This may include relevant references to the safety case and/or by demonstrating that suitably robust systems are in place to train staff and assess competence and that relevant procedures are in place, particularly with regard to emergency response.

The OPEP must identify all relevant pollution response roles and responsibilities. This should sequentially detail actions required from the initiation of the response to its conclusion and should effectively highlight 'who does what and when'. This requirement may be delivered by the use of checklists.

Relief Well Details and Timing

If the drilling of a relief well has been identified as a response option, the OPEP must detail the following:

- Any specific MODU configuration required to drill the relief well (e.g. HP/HT, deep water etc.)

[114] BEIS. Guidance Notes for Preparing Oil Pollution Emergency Plans for Offshore Oil and Gas Installations and Relevant Oil Handling Facilities. October 2017, available at: http://www.hse.gov.uk/osdr/assets/docs/opep-guidance-rev4-oct-2017.pdf

DECC. Guidance Notes for Preparing Oil Pollution Emergency Plans For Offshore Oil & Gas Installations and Relevant Oil Handling Facilities January 2015, available at: http://www.hse.gov.uk/osdr/assets/docs/opep-guidance-version-1.pdf

 Provide details if the limited availability of a suitably configured MODU may cause delays to the relief well operations

A justification must be provided within the OPEP if a relief well is not deemed an appropriate response option.

An estimation of the time required to complete the relief well operation must be included in the OPEP. This is an estimation of time required from the day the relief well operation is mobilised to the day the well is killed.

Well Capping and Timings

If a well capping device has been identified as a source control option, the OPEP must contain the following:

Details of the capping device(s) deemed suitable for use

 Confirmation that the suitability of the capping device(s) has been fully assessed and is compatible with the well infrastructure and is certified for the anticipated well pressures

 Details of the specialist contractor(s) providing the device(s)

 Contact details of the specialist contractor(s)

A justification must be provided within the OPEP if a capping device is not deemed an appropriate source control option.

An estimation of the time required to complete the well capping operation must be included in the OPEP. This is an estimation of time required from the day the capping operation is mobilised to the day the well is successfully capped.

Oil Spill Response

If the worst case spill modelling indicates the oil pollution is likely to beach, the OPEP must provide confirmation that appropriate spill response resources can be mobilised to any beaching location in the UK in sufficient time to allow response measures to be implemented and minimise the impact of any pollution.

Where necessary has conformation been provided that a Shoreline Protection Plan (SPP) has been created and that the Local Authority has been consulted on this plan.

Sensitivities

The OPEP must contain details of relevant environmental sensitivities. These include:

 Seabird vulnerability spanning a calendar year for each block within the scope of the OPEP and all adjoining blocks.

 Fishery sensitivities spawning and nursery grounds spanning a calendar year within the appropriate ICES square.

 Cetacean sensitivities spanning a calendar year in the surrounding area.

Location and name of all UKCS protected areas which may be impacted in the event of a worst case release.

Transboundary Impacts

The Maritime and Coastguard Agency - MCA[115] have responsibility, via various international agreements, to notify Coastal States if pollution is likely to enter their waters. Responsible Persons must therefore assess any potential transboundary impact and describe in the OPEP how the MCA would be informed.

Model Input

 Using a minimum two year time series data-set

[115] As commented before, the MCA is responsible for a National Contingency Plan and maintains a contractual arrangement for provision of aerial spraying, with aircraft based at East Midlands and if necessary, Inverness. MCA holds counter-pollution equipment (booms, adsorbents etc.) which can be mobilised within 2-12 hours depending on incident location, in addition to a stockpile of chemical dispersant.

 A minimum of 100 runs should be performed (a lower number of runs may be acceptable when accompanied by sound scientific or statistical justification)

 The duration of the model period must be appropriate to the scenario (e.g. if modelling an instantaneous release the minimum duration should be 10 days or until the oil impacts coastlines. If modelling an on-going release the minimum duration should be 10 days). The duration of the release period must be justifiable and should consider any discrepancy between the duration of the modelling and the identified time period required to stop the release.

 For production operations or operations extending over a year, modelling must be carried out for each season; Winter (Dec-Feb), Spring (Mar-May), Summer (Jun-Aug) and Autumn (Sept-Nov).

 For temporary operations e.g. drilling/well intervention; the season(s) during which the operation is to be undertaken must be used for modelling purposes. For operations, which could be subject to change, it is recommended that all four seasons are modelled.

 The model results must be displayed to a visible oil thickness as defined in the Bonn Agreement Oil Appearance Code of 0.04µm.

Dispersants

Standing Approval

The Department may grant a waiver from the requirement to seek advice in the form of a 'Standing Approval'. This will only be granted for the use of in-field resources, within an agreed area that is not considered to be environmentally sensitive. The Standing approval process takes into account the appropriateness of the response i.e. that the dispersant use will be likely to reduce the impact of oil pollution and result in least harm to the environment, together with the potential for the oil to be dispersible.

Where Standing Approval is sought, this must be identified in the OPEP submission sheet. If Standing Approval is granted, this will be stated in the approval letter. Standing Approval will be granted, provided the OPEP includes the following:

 Identification of environmentally sensitive areas in which dispersant use would not be appropriate and confirmation that dispersant will not be used in these areas;

 A demonstration, with reference to the modelling outputs and environmental and socio-economic sensitivities data included in the OPEP, that a release of oil is likely to significantly impact birds, marine mammals, or other flora and fauna at the water surface; shorelines, structures and facilities.

Dispersant use where prior approval is required

Irrespective of the approval stated, the use of dispersant under the following circumstances requires additional approval from the Department:

 in, or within 1 nm of, waters of 20 metres depth or less;

 beneath the surface of the sea; or

 if the oil spill treatment product is not being used in accordance with any MMO product approval, or the conditions of that approval.

Shoreline response planning

A Shoreline Protection Plan (SPP) must also be developed for all installations (including pipelines) operating in Blocks wholly or partly within 40 km of the coast and pipelines coming ashore which have a potential for released oil to beach. The OPEP should confirm that an SPP has been developed, but it should not be submitted with the OPEP unless specifically requested by the Department.

The OPEP arrangements for any installation (not pipelines) located within 40 km of the coast should also confirm that:

 an appropriate dispersant can be applied within 30 minutes of a pollution incident; and

 sufficient dispersant stocks are available to treat a minimum oil release of 25 tonnes;

 appropriate shoreline response resources **can be available on scene within half the time taken for the oil to beach**;[116]

The SPP should as a minimum contain:

 procedures for shoreline protection, response initiation, mobilisation and implementation, including resource mobilisation and deployment times;

 arrangements to integrate with local authorities and other incident responders including management of waste, informing relevant third parties, providing advice to the general public and media management. The SPP should also coordinate with the National Contingency Plan – NCP;

 details of environmental sensitivities likely to be impacted as determined by oil spill modelling;

 location of any required pre-positioned resources; and

 relevant contact details for contracted response resources.

Liability

Whilst the indemnity and insurance group of Oil Spill Prevention and Response Advisory Group - OSPRAG[117] concluded that the current Offshore Pollution Liability Association Ltd (OPOL) level of US $250 million of cover is appropriate in the majority of scenarios, in certain limited cases spill clean-up and compensation costs could result in claims above this limit[118].

Guidance issued by Oil & Gas UK (OGUK) outlined a new process by which operators assess the potential cost of well control, pollution remediation and compensation, with a subsequent requirement to demonstrate to DECC financial capability to address these potential consequences. DECC released a guidance note to industry[119] on the demonstration of financial responsibility before consent may be granted for exploration and appraisal wells. DECC require that an operator must demonstrate the cost of well control and the cost of financial remediation and compensation from pollution at the time of OPEP submission, and verify this responsibility by, for instance: insurance, parent company guarantee, reliance on credit/financial strength rating of the operator.

[116] The new version of of the document concerning Oil Pollution Emergency Plans (BEIS. Guidance Notes for Preparing Oil Pollution Emergency Plans for Offshore Oil and Gas Installations and Relevant Oil Handling Facilities. October 2017, available at: http://www.hse.gov.uk/osdr/assets/docs/opep-guidance-rev4-oct-2017.pdf), rephrased the last sentence. Instead of defining a precise time to deliver shoreline response resources, the sentence was changed for "appropriate at sea and shoreline response resources can be available on **scene in sufficient time to allow response measures to be implemented to minimise the impact of any oil pollution"**.

[117] OSPRAG Second Interim Report April 2011, available at: https://oilandgasuk.co.uk/wp-content/uploads/2015/05/EN020.pdf

[118] It should be noted that in the UK there is no legal limit on the liability of companies for the consequences of their actions. Nevertheless, over and above this financial responsibility, the industry also operates through Offshore Pollution Liability Association Ltd (OPOL), a voluntary industry mutual agreement which requires each operator to accept strict liability for pollution damage and reimbursement of third parties (including public authorities) for clean-up and compensation costs up to a pre-determined limit. The first action of the Indemnity and Insurance Review Group was to recommend that the limit be raised from $120 million per occurrence to $250 million per occurrence. This was passed at an OPOL EGM on 18 August and came into effect on 1 October 2010. Initial oil spill modelling work suggests that with the capping device on hand for rapid deployment, this $250 million per occurrence limit will be sufficient to cover the third party costs associated with the majority of spill scenarios, with only a small number of high risk wells having the potential to exceed the limit.

[119] DECC Guidance note to UK offshore oil and gas operators on the demonstration of financial responsibility before consent may be granted for exploration and appraisal wells on the UKCS. December 2012.

ANNEX 4 – SEA CONCLUSIONS (2001 to 2016)

This Annex summarizes and compares the conclusions of the various SEAs in order to improve the understanding of the process and their evolution over the 15 years from SEA 1 to OESEA3.

SEA 1 – 19th Round (2001)

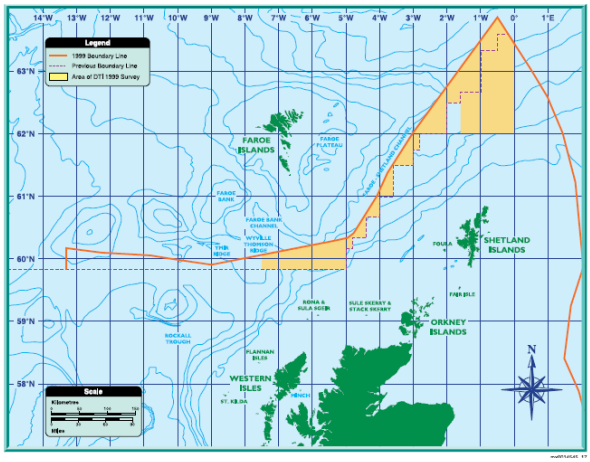

Figure 1 – SEA 1 geographical coverage

The alternatives **to the proposed activity** were:

1. not to offer any blocks for Production Licence award

2. to restrict the area licensed by offering only a proportion of the blocks nominated

3. or to stagger the timing of block offer (or licence award) so that initially there is staged activity in the area

Conclusion (August 2000)

The overall conclusion of this assessment is that, given adequate subsequent control and information gathering, **there are no overriding reasons not to consider the former "White Zone"[120] for oil and gas licensing.**

The area of seabed features known as the Darwin Mounds contain the coral *Lophelia* and should be subject to stringent control measures to prevent direct and indirect effects. The potential for cumulative effects on cetaceans of seismic and operational noise should also be considered prior to project-specific approvals. While the area as a whole is recognised as important for seabirds and cetaceans, on the basis of available information, **no individual areas** of the UK sector of the former White Zone **were identified as being so important that they should not be considered for licensing with proper controls**.

[120] The area between the Shetland Islands and the Faroes was known as the 'White Zone', until resolution of the boundary dispute between Faroe and the UK in 1999.

SEA 2 - 20th Round (2002)

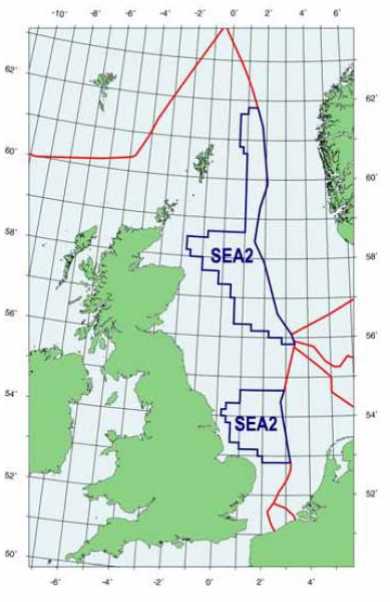

Figure 2 – SEA 2 geographical coverage

Alternatives proposed for the development of the oil and gas resources within the proposed 20th Round areas were identified as:

1. Not to offer any blocks for Production Licence award

2. To restrict the area licensed by offering only a proportion of the blocks nominated

3. To stagger the timing of activity in the area

4. To proceed with the licensing programme as proposed.

Conclusion (September 2001)

While the North Sea as a whole is recognised as highly important for fish, fisheries, seabirds and certain marine mammals, on the basis of available information**,** no individual parts of the proposed 20th Round licence areas were identified **as being so important that they should not be considered for licensing given the activity permitting controls available to the DTI.**

In view of the low probability of a discovery in individual blocks, and of the project-specific control over development effects available through regulatory mechanisms, the benefit of withholding nominated blocks is not considered significant. No localised areas within the SEA 2 area were considered of outstanding environmental sensitivity. Project-specific permitting allows due attention to be given to the protection of environmental sensitivities (such as seasonal seabird vulnerability in the outer Moray Firth and Flamborough front areas, and actual or potential conservation sites), other users of the sea and other marine resources. These permits can and do where necessary specify timing, spatial and activity constraints relevant to the sensitivities of the area.

Post Public Consultation Report (January 2002)[121]

Joint Nature Conservation Committee - JNCC recommended that “no activities that might affect the large pockmarks in Block 15/25 be permitted, pending resolution as to whether or not the structures in these pockmarks are relevant for protection under the Habitats Directive”.

Royal Society for the Protection of Birds - RSPB recommended that a “precautionary approach is taken to the three pockmarks in Block 15/25 and that the remaining portion of this block should not be licensed until further investigations have been made of these features…”

[121] Department of Trade and Industry. Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea SEA 2 SEA 2 Post Public Consultation Report. January 2002, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197795/SEA2_Postconsultationreport.pdf

Also the Worldwide Fund for Nature - WWF considered that "Since pockmark[122] features are covered by the Habitats and Species Directive, it may be prudent to afford particular attention to the conservation value and possible vulnerability of those in Block 15/25".

The SEA team objected, "*the three large pockmarks in block 15/25 have been comparatively well sampled and investigated, and there is believed to be sufficient information on which to base considerations regarding possible SAC status. Given the range of activity controls available to the DTI and mitigation techniques available to companies, in theory the remaining portion of* ***block 15/25 could be licensed without jeopardising the conservation interest of the features.*** *The same considerations apply to other pockmarks both in licensed and potentially licensed areas on the UKCS".*

On the same point RSPB suggested that blocks "with significant features not yet designated as SPAs or SACs e.g. the remainder of Block 15/25 should be withdrawn. Marine Conservation Society – MCS requested, "no licences should be given for blocks which include pockmarks or sandbanks which could be designated as offshore conservation sites, until the conservation status of these features is determined by the statutory nature conservation agencies".

The DTI informed, *"**was giving consideration** to whether parts some blocks should be excluded from the 20th licensing round on the basis of environmental and/or other grounds or whether alternative approaches to the protection of features may be appropriate. This consideration is based on the available existing (and imminent) controls on activities, advice received, and the conclusions of the SEA".*

JNCC also recommend that "no activities which might affect the sandbanks in Blocks 43/13, 43/14, 43/15, 43/18, 43/19, 43/20, 44/11, 44/12, 44/13, 44/14, 44/16, 44/17, 44/18, 47/14, 48/13, 48/15, 48/18, 48/22, 48/23, 49/12 and 49/13 be permitted, pending resolution as to the choice of candidate sites for protection under the Habitats Directive").

DTI considered that "given the range of activity controls available to the DTI and mitigation techniques available to companies, in theory the above blocks could be licensed without jeopardising the conservation interest of the features".

SEA 2 extension Moray Firth - 20th Round (2002)

According to DTI Report "Extension to 2nd Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea"[123], following stakeholder and public consultation on SEA 2, "over 270 unlicensed blocks and part blocks in the SEA 2 area were offered in the 20th Licensing Round (**parts of 4 blocks were not offered for environmental reasons**). The Round resulted in 25 production licences covering 36 whole and part blocks which were awarded in July 2002".

In 2001, the discovery of the Buzzard oil field within the SEA 2 area increased interest in further hydrocarbon exploration in adjacent blocks. However, in the current SEA sequence, blocks in this area would not be addressed until the 5th SEA in two years time. In the interests of facilitating potential synergies in this important area, the DTI wishes to bring forward the consideration for licensing of a limited number of blocks in UKCS Quadrants 19 and 20.

A minor modification to the SEA 2 area was made to cover an additional 14 blocks then offered for licensing in the next (21st) offshore licensing round. The SEA 2 Extension Document describes the assessment of this area.

[122] Deep depressions in the sediments created by escaping gas from beneath the seafloor.

[123] DTI. Report to the Department of Trade and Industry Extension to 2nd Strategic Environmental Assessment of the Mature Areas of the Offshore North Sea Consideration of Issues. October 2002, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197797/sea2_extension_final.pdf

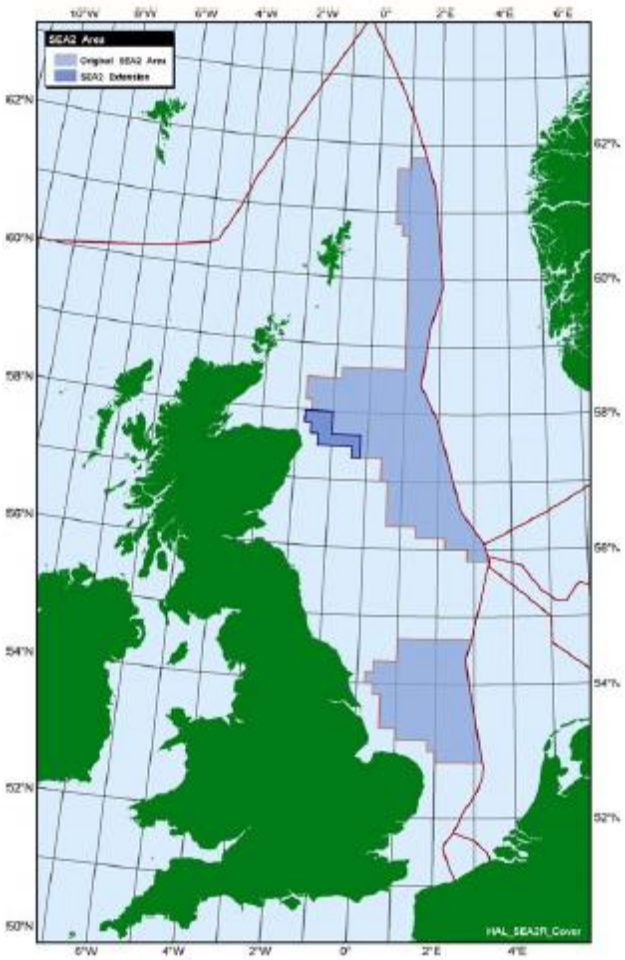

Figure 3 – SEA 2 extension geographical coverage

The alternatives to proceeding with the SEA 2 Extension were to:

1. Never license the blocks

2. Offer the blocks as part of a Licensing Round but **wait until SEA 5 is completed**[124]

3. Offer the blocks as part of the next Licensing Round

The first option of never licensing the blocks would mean potentially substantial (but as yet unquantified) hydrocarbon reserves would effectively be lost to the UK. Waiting until SEA 5 is completed would entail a delay of at least two years and consequently potential synergies (contingent on additional hydrocarbon reserves being found) with the development of facilities for the newly discovered Buzzard oil field could be lost. By including the SEA 2 extension blocks in the 21st Licensing Round, they would potentially be licensed more quickly and ensure the competition that should benefit UK hydrocarbon exploration as a whole.

Conclusion (October 2002)

The review concluded that were the SEA 2 extension blocks to be licensed given the existing/impending controls and mitigations that no significant change to the SEA 2 conclusions is expected. Consequently, from these perspectives there are no overriding reasons not to consider the SEA 2 extension blocks for licensing. However, the blocks are adjacent to the northeast Scottish coast and consequently the potential differences in oil spill and underwater noise risks were evaluated.

Noise

The incremental risks posed by the underwater noise generated by the number of seismic and other

[124] See Map of SEA 5 below.

geophysical surveys likely to be conducted in SEA 2 extension blocks are not regarded as appreciably greater than those anticipated for SEA 2 activities. Existing acoustic disturbance mitigation mechanisms include an application for consent and if required, an Appropriate Assessment of the potential effects on the bottlenose dolphins of the Moray Firth candidate SAC. In view of these and the guidance on periods when fish are most sensitive to seismic survey and the Joint Nature Conservation Committee - JNCC Guidelines, no other mitigation measures are suggested for consideration at the licensing stage. It is noted however, that coordination of seismic surveys in the SEA 2 extension blocks and adjacent areas is desirable to reduce the occurrence of multiple surveys at any one time.

Oil spill

The incremental risk of oil spillage from licensing of the SEA 2 extension blocks is not substantially greater than that predicted for SEA 2, in view of anticipated activity levels and since predicted activities are consistent with previous operations in the region. The blocks are closer to the coastline than the adjacent blocks considered in SEA 2 although wind and tide characteristics would serve to reduce risk of coastal impacts. The coastal sensitivities are recognised as are the seasonal vulnerability of seabirds and fish spawning particularly herring. Potential spill mitigation measures that could be considered at the licensing stage are to place restrictions on the timings of particular activities **e.g. penetration of reservoir formations or well testing to avoid the most sensitive periods.**

The **overall conclusion** was that it is not expected that significant environmental effects would be likely to result from extending the SEA 2 area and offering these blocks for licensing.

SEA 3 – 21st Round (2003)

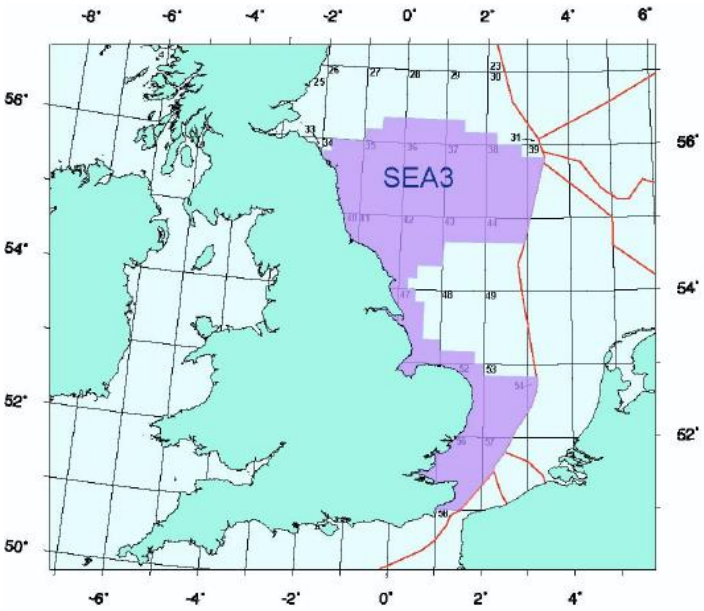

Figure 4 – SEA 3 geographical coverage

The proposed action considered by this SEA is the offer of Production Licences for blocks in parts of the UK sector of the North Sea through a 21st Round of offshore licensing.

Alternatives proposed for the development of the oil and gas resources within the proposed 21st Round area were identified as:

1. Not to offer any blocks for Production Licence award
2. To proceed with the licensing programme as proposed
3. To restrict the area licensed temporally or spatially

Conclusion (August 2002)

After consideration of the nature of the area and the potential effects and benefits of 21st Round licensing, both in isolation and in the context of existing activities in the adjacent area (considered in SEA 2), **it is recommended that the DTI proceed with licensing (Alternative 2)**.

However, according to the report, "this recommendation is predicated on the projections of the likely scale and location of activities that could follow licensing. If geological interpretations change dramatically, for example if the London Brabant Massif is reevaluated as a highly prospective area, **then future licensing decisions** will need to review changes in environmental aspects and understanding, including human uses of the area".

Post Public Consultation Report (January 2003)[125]

According JMP[126] Quadrant 42 is an important seabird. "The area is also the site of a nutrient rich frontal system which attracts marine wildlife to feed. Given that there is evidence that frontal systems in the North Sea are changing, it is important to know about the changes to these systems prior to licensing. The JMP recommend that no licensing be considered in Block 42 until more information available"

DTI considered that "identification of data gaps is a key part of SEA" and it was recognised that *"Long-term variability and trends in hydrographic characteristics, in relation to natural phenomena and climate change and the implications for North Sea ecology" represented a significant gap. Plankton forms the basis of the North Sea food web and has been monitored for almost 70 years ... From this data, changes in abundance and long-term trends can be distinguished. To support SEA process, a report, which describes the plankton community structure in the North Sea and how this has changed over the last few decades, was produced**. **The report suggests that hydro-climatic events have a greater impact on the biota of the North Sea than anthropogenic factors**.*

SEA 4 – 22nd Round (2004)

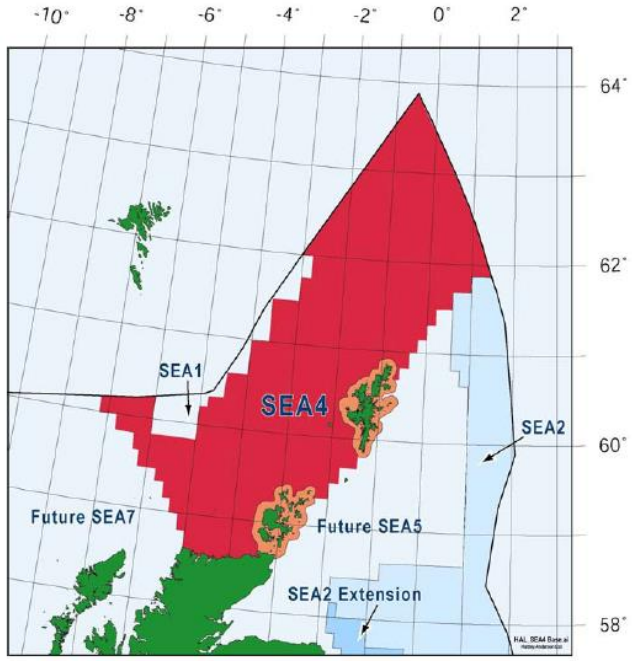

Figure 5 – SEA 4 geographical coverage

[125] DTI. Strategic Environmental Assessment of Parts of the Central & Southern North Sea SEA 3. SEA 3 Post Public Consultation Report Including comments on the Extension to SEA 2. October 2002, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197802/sea3_postconsult.pdf

[126] Joint Marine Programme (JMP) - The Wildlife Trusts and Worldwide Fund for Nature (WWF)

Alternatives proposed for the development of the oil and gas resources within the proposed 22nd Round area were identified as:

1. Not to offer any blocks for Production Licence award

2. To proceed with the licensing programme as proposed

3. To restrict the area licensed temporally or spatially

Conclusion (September 2003)

The conclusion considers the possibility of **adopting alternatives 2 or 3**, the latter specifically in relation to Quadrant 217.

"it is recommended that the DTI proceed with licensing (Alternative 2), or 3 if the blocks in Quadrant 217 which include the Pilot Whale diapirs[127] should be considered for exclusion from licensing until they are better understood (particularly the possible presence of seep chemosynthetic communities) or if licensed, should include explicit controls to avoid potentially damaging activities such as anchoring and cuttings discharge".

"However this recommendation is predicated on the projections of the likely scale and location of activities that could follow licensing. If geological interpretations change dramatically, for example through a major discovery in an area previously evaluated as of low prospective, **then future licensing decisions** will need to review changes in environmental aspects and understanding, including human uses of the area".

Post Public Consultation Report (January 2004)[128]

JNCC, Royal Society for the Protection of Birds - RSPB and Marine Conservation Society - MCS agreed with SEA conclusion to restrict the area licensed temporarily or spatially, and demanded the "exclusion of blocks within Quadrant 217 until further information is available".

Figure 6 below shows the areas of Quadrant 217 were offered, and therefore apparently alternative 2 was the preferred option, with 13 blocks awarded.

[127] The DTI 2002 programme of new deep-water seabed multibeam and sample data acquisition in support of SEA 4 included a blanket survey over a large field of mud mounds in the southern Norwegian Basin mounds, collectively named the Pilot Whale Diapirs. No evidence for fluid escape (or possible associated biological communities) have been found to date. However, there remains a possibility that localised areas of fluid escape may be active in the mud diapir province.

[128] DTI. Strategic Environmental Assessment of the Area North and West of Orkney and Shetland SEA 4 Post Public Consultation Report. January 2004, available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197810/sea4_post_consultation_report.pdf

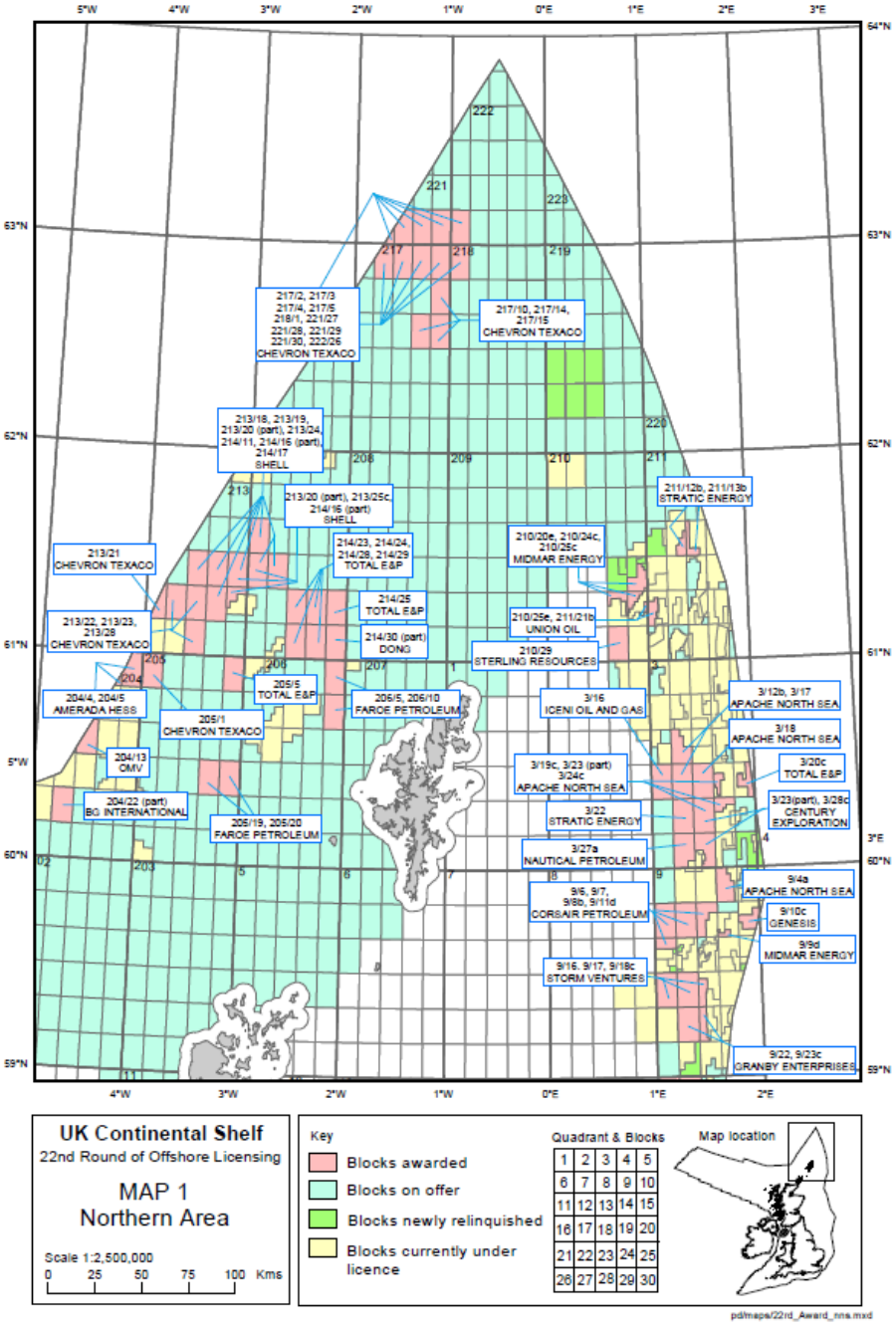

Figure 6 - Areas of Quadrant 217

SEA 5 – 23th Round (2005)

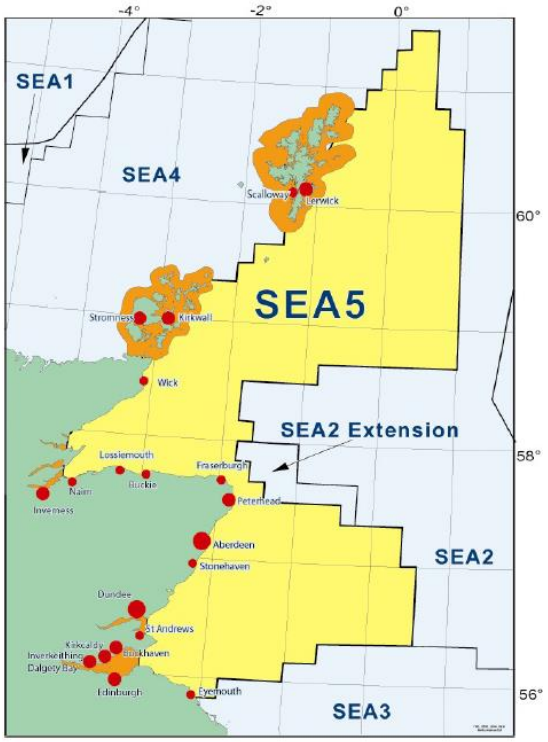

Figure 7 – SEA 5 geographical coverage

The 23rd licensing round planned to follow SEA 5, could include unlicensed blocks within the SEA 1, SEA 2, SEA 3 and SEA 4. Alternatives to the proposed draft plan to offer for licensing the unlicensed blocks within the SEA 5 area and the areas previously subject to SEA in a 23rd licensing round have been identified as:

1. Not to offer any blocks for Production Licence award

2. To proceed with the licensing programme as proposed

3. To restrict the area licensed temporally or spatially

DTI decisions on whether to proceed with the original draft plan in the 23rd round or one of the alternatives **will depend on the outcome of the SEA process and other Government considerations**.

Conclusion (September 2004)

After consideration of the nature of the area and the potential effects and benefits of 23rd round licensing, both in isolation and in the context of existing activities in the adjacent area (as considered in previous SEAs), **it is recommended that the DTI proceed with licensing under Alternative 3**. Within the SEA 5 area, although the national and international importance of various populations and features is recognised, no blocks from the areas with good hydrocarbon prospectivity have been identified for exclusion since individual project consenting is expected to provide adequate spatial and temporal controls**.**

Previous SEAs had identified a few blocks **recommended for exclusion from licensing on environmental grounds or until better information becomes available.** These recommended exclusions remain valid for the consideration of the blocks to be included in the 23rd licensing round. These conclusions are based on the projections of the likely scale and location of activities that could follow licensing, and would need to be revisited if activity levels were substantially greater or technologies changed.

Post Public Consultation Report (January 2005)[129]

MCS suggested, "no blocks within 12 miles of the NE coast of Scotland and East of Shetland and Orkney should be licensed in line with the DTI's renewable policy that no offshore windfarms are licensed within 12 miles of the shore".

According to DTI, *"The SEA for the 2nd round of offshore wind leasing[130], proposed the exclusion of a coastal strip from all three strategic areas assessed. This strip had a minimum width of 8km but extended to 13km in areas of particular sensitivity. This exclusion was based on the potential impact of windfarms of the scale envisaged in the SEA scenarios on the seascape, birds, inshore fishing and recreational activities. The conclusions of the offshore wind SEA do not apply to SEA 5 since the nature and scale of activity scenarios are different and in particular since coastal blocks can potentially be explored/developed from land (but for this to occur, a block would have to be covered by a licence").*

"By way of example exploration of Block 97/14 in Weymouth Bay and production from the Wytch Farm field extension under Poole Bay were both achieved by directional drilling from land. In addition, the DTI can attach restrictions to marine area licences which can include no marine activities in a Block. The SEA 5 assessment recognised the potential sensitivity of much of the coastal area to oil and gas activities, ***but did not find for blanket exclusion of areas*** *since individual project consenting is expected to provide adequate spatial and temporal controls".*

SEA 6 – 24th Round (2006)

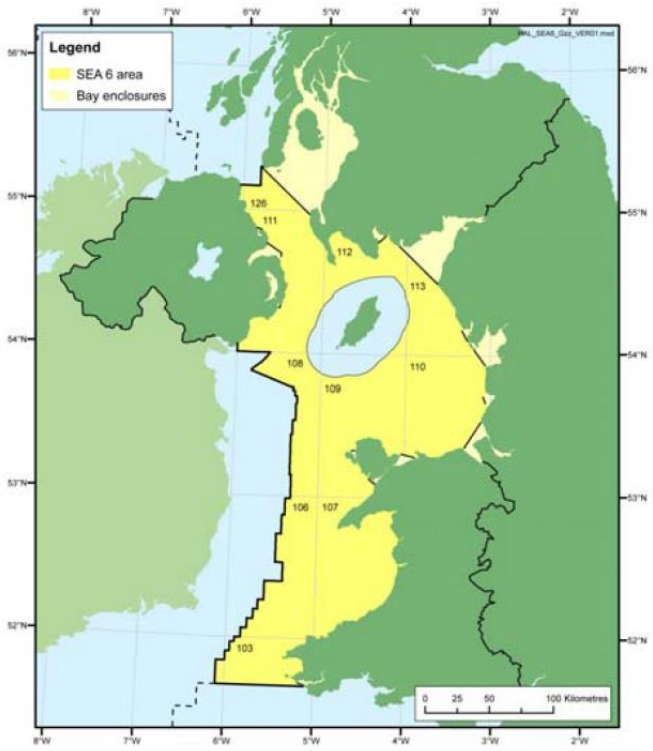

Figure 8 – SEA 6 geographical coverage

The DTI's draft plan is to offer blocks for hydrocarbon exploration and production in a proposed 24th offshore licensing round. Alternatives to the draft plan were identified as:

1. Not to offer any blocks for Production Licence award

[129] DTI. SEA 5 Post Public Consultation Report Strategic Environmental Assessment Oil and Gas Licensing. January 2005, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197821/SEA_5_Post_Consultation_Report.pdf

[130] 2nd round of offshore wind leasing (2003) - three strategic regions off the coasts of England and Wales.

2. To proceed with the licensing programme as proposed

3. To restrict the area licensed temporally or spatially

Conclusion (October 2005)

It is recommended DTI proceed with licensing under Alternative 3. Within the SEA 6 area, although the national and international importance of various populations and features is recognised (together with their statutory designations), **no blocks have been identified for exclusion since individual project consenting is regarded as able to deliver adequate mitigation through spatial, temporal and operational controls.** However, previous SEAs had identified a few blocks recommended for exclusion from licensing on environmental grounds or until better information becomes available. These recommended exclusions remain valid for the consideration of the blocks to be included in the 24th licensing round.

These conclusions are based on the projections of the likely scale and location of activities that could follow licensing, and would need to be revisited if activity levels were substantially greater or technologies changed.

Post Consultation Report (March 2006)[131]

World Wide Fund for Nature - WWF "did not agree with the offer of blocks 15/20c and 15/25d in the SEA 2 area, included as part of the re-offer of areas previously undergone SEA", and as comment on the process of consultation observed that "(it was) difficult to find an instance during the SEA process where NGO concerns have actually prompted an area to be deemed 'off-limits' to development. The UK SEA Stakeholder consultation process seems to lack transparent opportunities to truly influence decision-making"

The SEA team considered that "*Throughout the SEA process, stakeholder inputs have played an important role in determining the direction of the SEA …. Appendix 2 and 3 of the SEA 6 Environment Report summarises information from the assessment and stakeholder workshops respectively (at both workshops efforts were made to draw out areas that should be considered for exclusion from licensing). Appendix 4 summarises scoping responses and indicates where these comments are dealt with in the Environmental Report and/or relevant technical reports.* ***Whether to exclude areas from licensing or to place temporal and/or spatial constraints on activities is one of the challenges faced during SEA****. The general consensus from the assessment workshop was that the sensitivities in the SEA 6 area Blocks could be protected by placing constraints on activities rather than excluding them from licensing. There are a number of areas identified (with stakeholder input) by previous SEAs as candidates for exclusion from licensing which were not offered for licensing, for example the gas pockmarks in Blocks 15/20c and 15/25d".*

[131] DTI. SEA 6 Post Public Consultation Report Rev 1 Strategic Environmental Assessment Oil and Gas Licensing. March 2006, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197727/SEA_6_Post_Consultation_Report_Rev1.pdf

SEA 7 – 25th Round (2008)

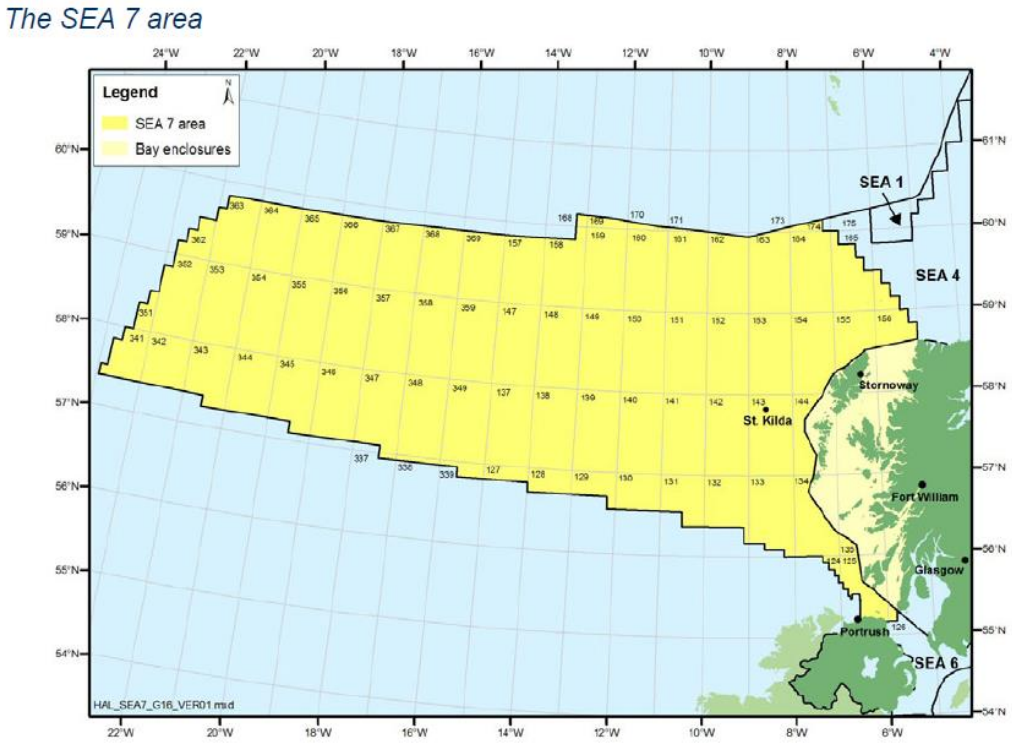

Figure 9 – SEA 7 geographical coverage

Alternatives

SEA 7 addresses all the blocks within the area in terms of the implications of licensing for oil and gas exploration and development. Depending on the outcome of the SEA process and other Governmental considerations, all or a proportion of the unlicensed blocks within the SEA 1 to 7 areas may be offered for licensing in the 25th round.

Alternatives to the draft plan to hold a 25th oil and gas Licensing Round have been agreed as:

1. Not to offer any blocks for Production Licence award

2. To proceed with the licensing programme as proposed

3. To restrict the area licensed temporally or spatially

Conclusions

The conclusion of the SEA is that **alternative 3** to the draft plan, with the area licensed restricted spatially through the exclusion of certain blocks, is the preferred option for a 25th Licensing Round.

The text highlights the importance of the Appropriate Assessment - AA in such a way the process besides considering “the potential of likely resultant activities in the blocks to adversely affect the integrity of Natura 2000 sites”, also “provides a further opportunity for the DTI to draw operator attention to block or local environmental sensitivities and, if viewed as necessary, to place specific temporal, spatial or other conditions on block licences”.

Recommendations

Unlike the previous SEAs the recommendations suggest the areas to be excluded from the 25th Round:

“For the SEA 7 area it is recommended **that blocks west of 14 degrees west should be withheld from licensing** for the present. This is in view of the paucity of information on many potentially vulnerable components of the marine environment, and other considerations”, and “for the previous SEA areas, **the blocks in or overlapping with the boundaries of the Moray Firth and Cardigan Bay SACs should be withheld from licensing** for the present whilst the further assessments (*“Appropriate Assessments”)* initiated following the 24th Licensing Round applications are concluded”.

Post Consultation Report (November 2007)[132]

Whale and Dolphin Conservation Society - WDCS is concerned there are currently insufficient data to reach this conclusion (Alternative 3) and, seeks clarification on **which blocks are to be excluded** and the information used to reach this conclusion. WDCS feels that, where data are lacking, the precautionary principle must be applied and spatio-temporal restrictions must be imposed

According to the SEA team, "*the recommendations of the SEA are strongly in favour of applying the precautionary principle. For example, by withholding blocks west of 14 degrees west due to the paucity of information on vulnerable components of the environment".*

WWF-UK requests to withhold licensing blocks in:

SEA 2: the shallow gas pockmarks in Blocks 15/20c and 15/25d, previously withheld during SEA, now available for licensing;

SEA 5: the bottlenose dolphin SAC in Cardigan Bay (Blocks 106/30, 107/21 and 107/22) currently undergoing Appropriate Assessment (AA);

SEA 6: the bottlenose dolphin SAC in Moray Firth (Block 17/3) also currently undergoing AA.

BERR[133] answered that *"funded research on the nature and sources of the gas supplying the shallow pockmarks in the Blocks 15/20c and 15/20d improved understanding of these particular features which was discussed with the SEA Steering Group and allowed these blocks to be offered for licensing (subject to strict spatial and other controls).*

The blocks were subject of three different AA, in 2007, as follows

Blocks 15/20c and 15/25d – "Taking account of all the matters discussed, the Secretary of State **is able** to grant consent to the plan (as defined) under the Habitats Directive and award the relevant licences because either significant effects on a European Site, either individually or in combination with other plans or projects, can be excluded from the outset (e.g. where the blocks are located far away from any European Sites); or for the other blocks, **there is certainty**, .., the plan will not adversely affect the integrity of relevant European Sites, taking account of the mitigation measures that can be imposed before any activity starts"[134].

Blocks 106/30, 107/21 & 107/22 (Cardigan Bay) – "Taking account of the matters summarised above, the Secretary of State is, for the present, **not able to grant consent** to the plan under the Habitats Directive and award the relevant licences. This is because **there is not certainty**,.., the plan will not adversely affect the integrity of relevant European Sites, taking account of the mitigation measures that can be imposed before any activity starts"[135].

Block 17/3 (Inner Moray Firth) – "Taking account of all the matters discussed, the Secretary of State **is able** to grant consent to the plan under the Habitats Directive and award the relevant licence. This is because **there is certainty**,.., the plan will not adversely affect the integrity of relevant European Sites, taking account of the mitigation measures that can be imposed before any activity starts"[136].

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[132] BERR. SEA 7 Post Public Consultation Report. November 2007, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197722/SEA_7_Post_Consultation_Reprt.pdf

[133] Department of Trade and Industry – DTI was replaced by Department for Innovation, Universities and Skills and Department for Business, Enterprise and Regulatory Reform (BERR).

[134] DTI. Appropriate Assessment with regard to 24th Offshore Oil and Gas Licensing Round. January 2007, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197282/AA_24th_Round_January_2007.pdf

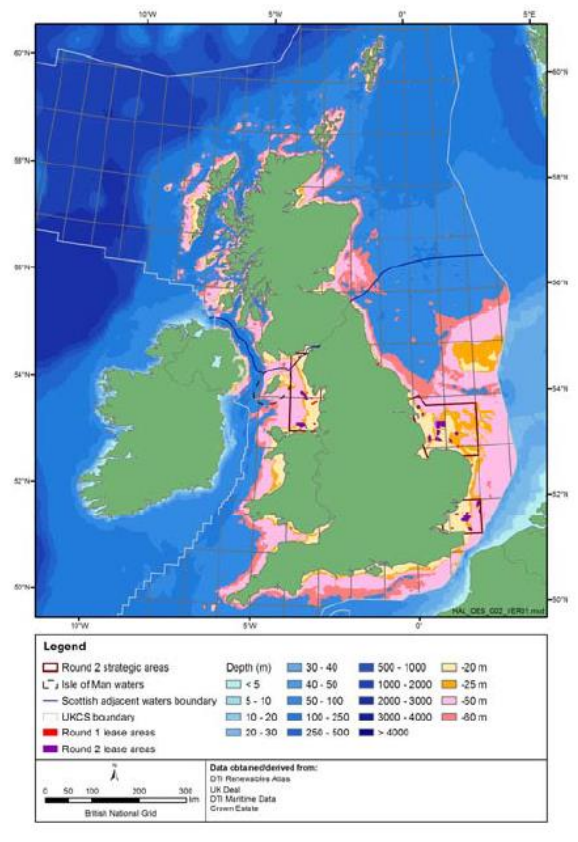
[135] BERR. Appropriate Assessment with regard to 24th Offshore Oil and Gas Licensing Round Blocks 106/30, 107/21 & 107/22 (Cardigan Bay). December 2007, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/249215/Cardigan_Bay_24th_Round_Blocks_Appropriate_Assessment.pdf

[136] BERR. Appropriate Assessment with regard to 24th Offshore Oil and Gas Licensing Round Block 17/3 (Inner Moray Firth). December 2007 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/249214/Inner_Moray_Firth_24th_Round_Block_Appropriate_Assessment.pdf

OESEA – 26th Round Oil & Gas, Round 3 Offshore wind (2009)

For offshore wind leasing, this SEA covers those parts of the UK Renewable Energy Zone and the territorial waters of England and Wales where the water depth is around 60m or less - see Map 2. For offshore (seaward) **oil and gas licensing and for offshore gas storage licensing** this SEA covers all UK waters (SEA 1 to 8 areas) – see Map 3.

Map 2 – Location of shallow waters (<60m)



Map 3 – Past SEA areas (coloured) and Regional Seas (numbered)

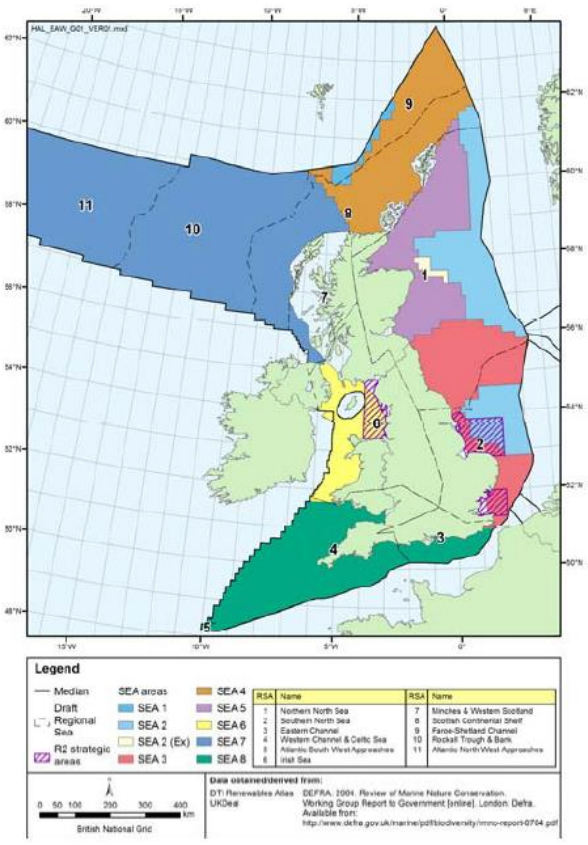


Figure 10 – OESEA geographical coverage (Map 2) and Past SEA Areas and Regional Seas (Map 3)

The following alternatives to the draft plan/programme for future offshore wind leasing, oil and gas licensing and gas storage were assessed in the SEA:

1. Not to offer any areas for leasing/licensing

2. To proceed with a leasing and licensing programme

3. To restrict the areas offered for leasing and licensing temporally or spatially

Conclusions (January 2009)

Alternative 1 would allow no contribution to the UK wider energy and climate change policy objectives; unconstrained development (Alternative 2) poses the risk of significant environmental effects on ecological and other receptors, including European conservation sites. The conclusion of the SEA is that **Alternative 3** to the draft plan/programme **is the preferred option, with the area offered restricted spatially**.

The report considered that **there were no overriding environmental considerations to prevent the achievement of the offshore oil and gas, gas storage and wind elements of the plan/programme**, albeit with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea.

Recommendations

Reflecting the relative sensitivity of multiple receptors in coastal waters, the report recommended **that the bulk of this new generation capacity should be sited well away from the coast**, **generally outside 12 nautical miles (some 22km).** The proposed coastal buffer zone is not intended as an exclusion zone, since there may be scope for further offshore wind development within this area, but as mitigation for the potential environmental effects of development, which may result from this draft plan/programme. The environmental sensitivity of coastal areas is not uniform, and in certain cases new offshore wind farm projects may be acceptable closer to the coast. Conversely, a coastal buffer in excess of 12nm may be justified for some areas/developments. Detailed site-specific information gathering and stakeholder consultation will be required before the acceptability of specific wind farm projects close to the coast can be assessed.

For the area to the west of the Hebrides (covered in SEA 7) it is recommended **that blocks west of 14 degrees west should continue to be withheld from oil and gas licensing for the present. This recommendation also applies to the deepest parts of the Southwest Approaches.** This is in view of the paucity of information on many potentially vulnerable components of the marine environment, and other considerations. Once further information becomes available, the possible licensing/leasing in these areas can be revisited.

Post Public Consultation Report (June 2009)[137]

Campaign for National Parks – CNP mentioned that there would be "a stronger commitment to ensuring that no offshore energy developments are permitted that would harm the visual amenity and public enjoyment of National Park coastlines, including assurances that developments would not be permitted closer than 12nm in coastal areas surrounding National Parks, regardless of the adoption of a 12nm coastal buffer or not".

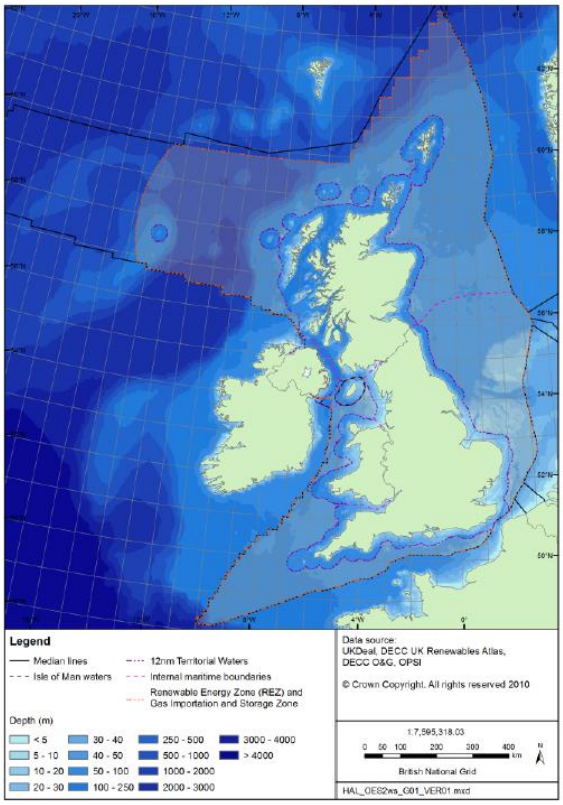
The SEA team considered that *"National Parks are a planning consideration and should be regarded in any development specific investigation. Although the SEA recommends the general siting of wind farms away from the coast, it is the role of the regulator and the planning process (which would include further stakeholder consultation) to come to decisions relating to* ***the siting of individual offshore windfarms and their landfall".***

OESEA2 - Oil & Gas, Offshore wind, wave and tidal, gas and carbon dioxide storage. Wave and tidal, gas and carbon dioxide storage - 27th Round (2011) and 28th Round (2014)

For offshore renewable energy, the SEA considered potential leasing in the UK Renewable Energy Zone (REZ) and the territorial waters of England and Wales but does not include the Scottish Renewable Energy Zone and Northern Irish waters within the 12 nautical mile territorial sea limit – see Map 1. For gas storage and carbon dioxide storage, the SEA considered potential licensing/leasing in UK territorial waters and the UK Gas Importation and Storage Zone. For offshore (seaward) oil and gas licensing, this SEA covers all UK waters (previous SEA 1 to 8 areas) – see Map 2.

[137] DECC. Offshore Energy Strategic Environmental Assessment Post Public Consultation Report. June 2009, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197690/OES_Post_Consultation_Report.pdf

Map 1 – OESEA2 Geographical coverage



Map 2 – Past SEA areas (coloured) and Regional Seas (numbered)

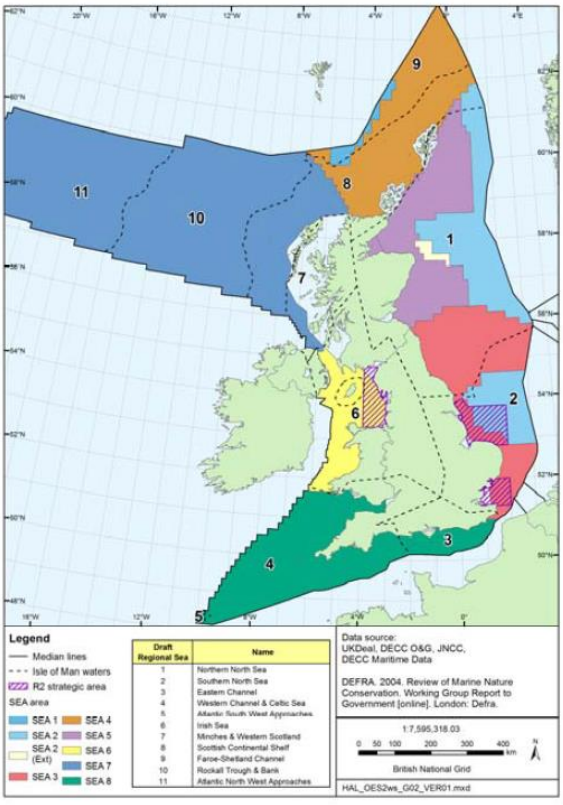


Figure 11 – OESEA2 geographical coverage (Map 1) and Past SEA Areas and Regional Seas (Map 2)

The following alternatives to the draft plan/programme for future offshore wind, wave and tidal leasing, oil and gas licensing and carbon dioxide and gas storage were assessed in the SEA:

1. Not to offer any areas for leasing/licensing

2. To proceed with a leasing and licensing programme

3. To restrict the areas offered for leasing and licensing temporally or spatially

Conclusion (February 2011)

The conclusion of the SEA is that alternative 3 to the draft plan/programme is the preferred option, with the area offered restricted spatially through the exclusion of certain areas together with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea.

According the report “the intensity of existing and projected usage of some areas of UK waters is reaching levels that dictate a coordinated approach to spatial matters and activity consenting, in particular where the installation of structures is required. In the southern North Sea for example, existing gas production and storage infrastructure will be augmented by the massive scale of offshore wind farm development projected by Round 3 leasing as well as potential developments for gas production, hydrocarbon and carbon dioxide gas storage, and renewable energy generation included in the current draft plan/programme”.

Recommendations

Reflecting the previous OESEA and the relative sensitivity of multiple receptors in coastal waters, it is recommended that the bulk of new offshore wind farm generation capacity should be sited away from the coast, generally outside 12 nautical miles (some 22km). The environmental sensitivity of coastal

areas is not uniform, and in certain cases new offshore wind farm projects may be acceptable closer to the coast.

Conversely, siting beyond 12nm may be justified for some areas/developments. As with other developments, detailed site-specific information gathering and stakeholder consultation is required before the acceptability of further wind farm projects close to the coast can be assessed.

In areas of prospective interest to multiple energy technologies (including renewable energies, hydrocarbon production, and hydrocarbon and carbon dioxide gas storage) DECC and The Crown Estate should coordinate licensing and leasing decisions, to facilitate and promote the coexistence of uses where practicable, to minimise potential conflicts and industrial land take of the sea, and the inadvertent "sterilisation" of areas.

For the area to the west of the Hebrides (covered in SEA 7) it is recommended that blocks west of 14 degrees west should continue to be withheld from oil and gas licensing for the present. This recommendation also applies to the deepest parts of the Southwest Approaches.

Regarding the effects of noise on marine mammals particularly from piling and seismic survey, previous SEAs have recommended consideration of the establishment of criteria for determining limits of acceptable cumulative impact, and for subsequent regulation of cumulative impact.

Post Public Consultation Report (August 2011)[138]

Whale and Dolphin Conservation Society - WDCS "It is stated that spatial and temporal restrictions may allow a precautionary approach to be taken. As the assessment does not specify what these restrictions may be, it is impossible to assess if they are acceptable".

The SEA team clarified that "restrictions" refer to the *"area offered being restricted spatially through the exclusion of certain areas together with a range of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea".*

Marine Conservation Society - MCS "Suggests recommendation is made clearer: no blocks within 12 nautical miles of the coast (20km) will be licensed".

The SEA team objected "*There is wide variation in the environmental sensitivity of coastal areas and many areas within 12nm are likely to be acceptable for development. The requirements of the project consenting process will ensure that potential significant impacts on sensitive receptors are identified and mitigated prior to consent".*

Marine Conservation Society - MCS believes this (for the area to the west of the Hebrides it is recommended that blocks west of 14 degrees west should continue to be withheld from oil and gas licensing for the present) should be extended all deep waters below 200m and hence also include the area to the West of the Shetlands and the `white zone` to the south-east of the Faroes".

The SEA team objects *"such a blanket approach to licensing is not supported by the extent of understanding of many UK deepwater areas including west of Shetland available from academic, government, industry and other studies"*.

OESEA3 - Oil & Gas, Offshore wind, wave and tidal, gas and carbon dioxide storage. 29th Round (2016); Supplementary Round (2016); 30th Round (2017); 31st Round (2018); 32nd Round (2019)

For offshore renewable energy this SEA considers potential leasing in the relevant areas of the UK Exclusive Economic Zone (EEZ), and also the territorial waters of England and Wales. For gas storage and carbon dioxide storage, the SEA considers potential licensing/leasing in relevant UK territorial waters and the UK EEZ. For offshore (seaward) oil and gas licensing, this SEA covers all UK waters.

[138] DECC. Offshore Energy Strategic Environmental Assessment 2 (OESEA2) Post Public Consultation Report. August 2011, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197708/OESEA2_Post_Consultation_Report.pdf

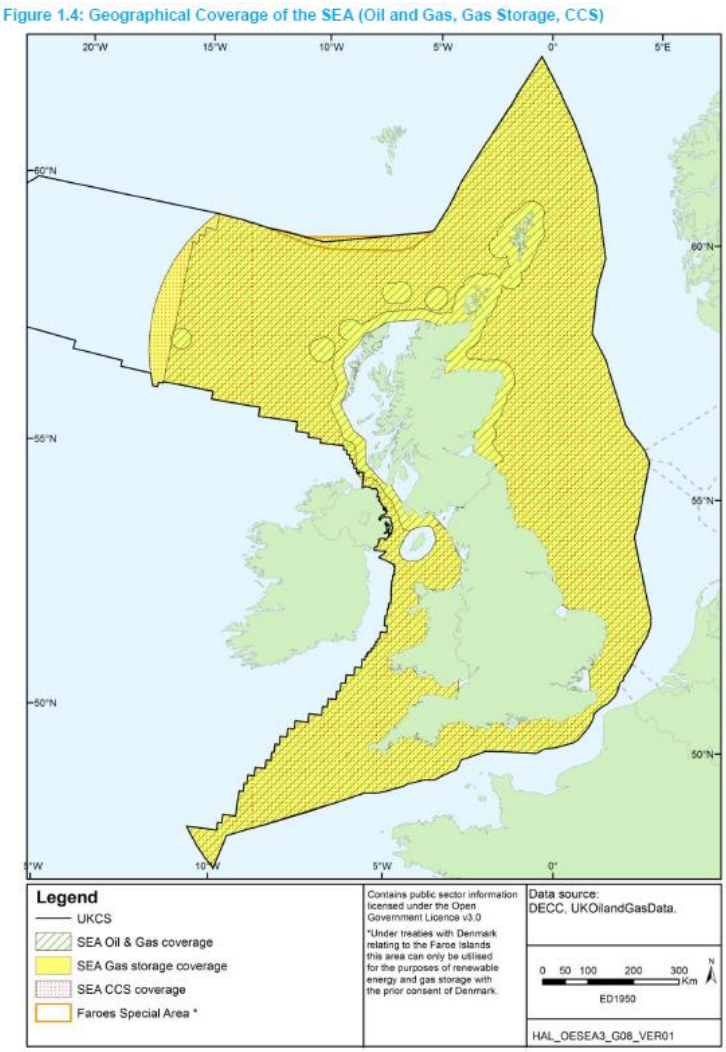


Figure 12 – OESEA3 geographical coverage

The alternatives to the plan/programme were:

1. Not to offer any areas for leasing/licensing

2. To proceed with a leasing and licensing programme

3. To restrict the areas offered for leasing and licensing temporally or spatially

Conclusion

Alternative 3 to the draft plan/programme was the preferred option, (with the area offered restricted spatially through the exclusion of certain areas) together with a number of **mitigation measures** to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea.

The report considered that **prescriptive restriction is difficult to make at this stage,** other than providing the **recommendation that wind farms be sited away from the coast.** Therefore, project level assessment, including cumulative assessment with operational, consented and proposed developments, will be required to inform the potential impact on landscape and seascape character, and the suitability of future developments.

For the area to the west of the Hebrides it is recommended, blocks west of 14 degrees west should continue to be withheld from oil and gas licensing for the present. This recommendation also applies to the deeper parts of the Southwest Approaches, beyond the shelf break, in waters >200m deep.

Recommendations

The importance of territorial waters and adjacent coasts is reflected in numerous, often-overlapping designations to protect their scenic, geological, ecological and cultural features, and designations or use for recreational, shellfishery, fishery, navigational, commercial and other activities. The environmental sensitivity of coastal areas is not uniform and the intensity of designations and uses typically declines further offshore away from the coast. **All activities and developments covered by the draft plan/programme require site-specific information gathering and stakeholder consultation to inform consenting decisions**. …, the particular sensitivity of the coastal zone and must be taken into account during site selection for proposed developments within territorial waters. **Some developments may not be compatible with a particular nearshore location.**

For areas, which contain habitats/species listed in the Habitats Directive Annexes or those for which MCZs and MPAs have been designated, developers should be made aware that **a precautionary approach will be taken and some areas may either not be leased/licensed until adequate information is available, or be subject to strict controls on potential activities.**

Previous SEAs have recommended consideration of the establishment of criteria in relation to underwater noise for determining limits of acceptable cumulative impact and for subsequent regulation of cumulative impact. It is recommended that these efforts are prioritised to allow effective consideration of the cumulative impacts of underwater noise.

Post Public Consultation Report (July 2016)[139]

• **There was a concern that the SEA suggested wind development should not take place in territorial waters.** Actually the SEA team recognizes that some developments may not be compatible with a nearshore location, but the intensity of designations and uses typically declines further offshore away from the coast there is the potential for greater stakeholder interaction and consenting risk for development in these areas, **and therefore the SEA did not definitively exclude any area of potential resource.**

• Some feedback indicated that lessons should be learned in the SEA from consent refusal, specifically in relation to Navitus Bay. **The implication being that since Round 3 and the SEA process had taken place, there was high expectation that the project would receive consent**. The SEA team noted that wind farm leasing Rounds and the SEA process, though connected, are separate processes. **Previous OESEA recommendations indicated that nearshore sites carry a greater consenting risk, reflecting the multiple uses and designations**.

For example, EDF Energy and Energy UK - "The coastal buffer for offshore wind development, introduced in Round 2... must not become a *de facto* exclusion zone. We accept that development within a buffer zone could require a greater burden of proof and the application of more stringent mitigation measures. However, development in shallower water is a more practical and economical option for developers, as it offers cheaper deployment and connection options. This would mean, for example, that more renewable generation capacity can be deployed and at lower cost to the consumer. It will also mean that the Government's decarbonisation targets could be met at lower cost".

The SEA team noted that "the intent of this recommendation in OESEA3 was to highlight the particular sensitivity of coastal waters, it does not imply any notional exclusion for renewables technologies".

FINAL REMARKS

The "reasonable alternatives" considered throughout the SEA process were virtually the same, with few variations in form – "*not to offer any areas for leasing/licensing*"; "to *proceed with a leasing and licensing programme*"; and "*to restrict the areas offered for leasing and licensing temporally or spatially*". Whilst there is merit in consistency and the same pattern of options favor the comparison

[139] DECC. UK Offshore Energy Strategic Environmental Assessment. OESEA3 Post Consultation Report. July 2016, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/536672/OESEA3_Post_Consultation_Report.pdf

between SEAs, there is a risk that simply repeating what has already been done may miss new alternatives.

This issue was recognized by different stakeholders in the Post Consultation Reports. For example, in SEA 2 (2002):

Scottish Environment Protection Agency – SEPA: "The reasons why the 4 alternatives chosen were used or what other alternatives exist are poorly developed".

The SEA team considered that "The alternatives selected for assessment were discussed and agreed by the SEA Steering Group. Given the geological constraints on the nature and potential location of hydrocarbon resources, it is difficult to envisage what other alternatives could validly be developed".

SEA 6 (2006):

WWF, Environment Agency - EA, RSPB: "The alternatives provided in the Environmental Report do not provide an adequate representation of alternatives available, have not been fully specified and an assessment is absent".

The Sea team pointed out that: "*The representation and assessment of realistic alternatives within the SEA process is complex. The alternatives provided in the Environmental Report were discussed within the SEA Steering Group and formed part of the initial scoping consultation for SEA 6. They were considered…reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme…(Article 5.1 of the SEA Directive)". "The assessment itself was based on Alternative 2 (to offer the area for licensing) as this was 'judged to represent the greatest scale of potential interactions and effects'.* ***Mechanisms by which enhanced comparison of alternatives might be achieved will be explored for future SEAs***".

SEA 7 (2008):

WWF – "Again WWF calls for a fundamental change in the approach used in identifying alternatives, including obviating development".

According the SEA team: "*Section 2.4 of the ER considered alternatives to the plan. The SEA Steering Group has been regularly asked to consider and suggest other valid alternatives to the BERR draft plan; to date none have been proposed that have met with consensus agreement. Any consideration of obviation would form part of overall UK government energy policy…*".

Even with the former DTI intention to look for new "mechanisms to enhance comparison of alternatives", this apparently has not happened yet. It is important to note that for the onshore oil and gas licensing the alternatives tend to be more detailed[140].

SEA 1, SEA 2, SEA 2 extension and SEA 3 recommended proceeding with the licensing programme as proposed, "without temporal or spatial restrictions".

SEA 4 left option open, "it is recommended that the DTI proceed with licensing (Alternative 2), or 3 if the blocks in Quadrant 217 should be considered for exclusion from licensing or if licensed, should include explicit controls to avoid potentially damaging activities such as anchoring and cuttings discharge"

SEA 5 was the first strategic assessment explicitly to recommend restricting the areas offered for leasing and licensing temporally or spatially. As the 23rd licensing round planned to follow SEA 5, could include unlicensed blocks within SEA 1, SEA 2, SEA 3 and SEA 4, the conclusion was "previous SEAs had identified a few blocks recommended for exclusion from licensing on environmental grounds or until better information becomes available" and "these recommended exclusions remain valid for the consideration of the blocks to be included in the 23rd licensing round".

[140] 1. Unlimited award of licences (the draft Licensing Plan as proposed) - To place no restriction on the number of licences awarded or the area subsequently covered by licensing blocks, other than necessitated by the requirements of the Petroleum Act 1998 with regard to Petroleum Exploration and Production Licence - PEDLs; 2. Restrictions on the award of licences either by: Reflecting the Government's climate change commitments; or Phasing licence awards, enabling a number of pilot unconventional oil and gas sites first, so as to enable monitoring and assessment of the impacts before committing to a large scale roll-out; or Limiting the area of land available to be licensed in any one round of licensing by establishing a 'ceiling' figure; or Limiting the area available to be licensed to that previously available in the 13th round; or Limiting the areas in which licences can be awarded by establishing and applying locational criteria relating to proximity to sensitive environmental receptors; or 3. No award of licences under this onshore licensing round. P. Davis, Wood PLC, pers. comm. October 2019.

Actually, previous SEAs have not explicitly indicated areas for exclusion. However, apparently some blocks were excluded from the offers (blocks 15/20c and 15/25d)[141] following stakeholder and public consultation on SEA 2 and following Appropriate Assessment with regard to 24th Offshore Oil and Gas Licensing Round (Blocks 106/30, 107/21 & 107/22 - Cardigan Bay).

SEA 6 also recommended adoption of Alternative 3, noting, however, in its coverage region, "no blocks have been identified for exclusion from individual project consenting as considered to be able to deliver adequate mitigation through spatial, temporal and operational controls". Like the previous one, SEA 6 recommended, "exclusions from previous SEAs remain valid for the consideration of the blocks to be included in the 24th licensing round".

SEA 7 was the first evaluation to propose the exclusion of specific blocks ("blocks west of 14 degrees west should be withheld from licensing"), and to mention "blocks in or overlapping with the boundaries of the Moray Firth and Cardigan Bay SACs should be withheld from licensing" until subjected to an AA.

OESEA, OESEA2 and OESEA3 include offshore activities other than oil and gas, as well as expanding the study area to all UK waters. The more comprehensive thematic and geographic scope seems to make alternative 3's recommendation more appropriate - "restricting areas offered for lease and licensing temporarily or spatially", as it apparently offers greater flexibility to regulator further decision. However, none of them indicated specific areas to be excluded, just maintaining restrictions to blocks west of 14 degrees west, as well as "deeper parts of the Southwestern Approaches, beyond the shelf break, in waters> 200m deep".

The comparison of SEAs carried out between 2001 and 2016 shows an apparent pattern regarding the "conclusions" reached, despite the specific features of the evaluated areas. While the first four recommended the continued implementation of the plan, without excluding areas, the subsequent SEAs recommended a possible spatial or temporal restriction to the areas to be offered.

SEA 6 Post Public Consultation Report concludes that "*to exclude areas from licensing or to place temporal and/or spatial constraints on activities is one of the challenges faced during SEA"*[142]; SEA 5 and SEA 7 Environmental Reports admit the preferred option will depend, not only on the outcome of the SEA process, but as well as, on "***other Governmental considerations***"[143].

The assessments also take into account several of the "probable" environmental effects **are not inevitable** consequences of oil and gas exploration and production since they can be mitigated through timing, siting or technology (or a combination of these). Besides that, there is an expectation these options would be evaluated in the environmental assessments required as part of project consenting.

SEAs tend to avoid prescriptive decisions concerning the use of marine space; they seem to opt to strike a balance between business continuity and environmental preservation. This also allows new

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[141] Chapter "Consideration of Effects of Licensing in Areas Covered by Previous DTI SEAS" in SEA 6 mentions "following SEA 2, certain blocks in Quadrant 15 in the central North Sea were not offered for oil & gas licensing as they contained seabed gas pockmark features that were of conservation interest. This recommendation was maintained through subsequent SEAs and licensing rounds in relation to reoffer of these blocks. The Joint Nature Conservation Committee subsequently proposed pockmarks features in several blocks as offshore Special Areas of Conservation. A report on the nature and sources of the gas supplying the pockmarks was commissioned from the British Geological Survey (BGS). On the basis of the BGS report conclusions, the DTI considered offering blocks 15/20c and 15/25d for licence subject to strict spatial and other controls aimed at ensuring protection of the conservation interests they contain". The decision was endorsed by the Appropriate Assessment with regard to 24th Offshore Oil and Gas Licensing Round (January 2007).

[142] DTI. SEA 6 Post Public Consultation Report Rev 1 Strategic Environmental Assessment Oil and Gas Licensing. March 2006, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/197727/SEA_6_Post_Consultation_Report_Rev1.pdf

[143] Possibly areas already compromised for other uses or restricted due to vessel traffic; military activities, etc. "DTI decisions on whether to proceed with the original draft plan in the 23rd round or one of the alternatives will depend on the outcome of the SEA process and other Government considerations". DTI. SEA 5 - Offshore Oil and Gas Licensing. The Draf Plan and Alternatives. September 2004, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/195058/SEA5_Section_4.pdf

"Depending on the outcome of the SEA process and other Government considerations, all or a proportion of the unlicensed blocks within the SEA 1 to 7 areas may be offered for licensing in the 25th round". DTI. Environmental Report 25th Offshore Oil & Gas Licensing Round. Strategic Environmental Assessment. March 2007, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/194378/SEA_7_Environmental_Report.pdf.

technologies or mitigation actions to be included into the proposals, relativizing decisions about what may or may not be accepted.

The existence of mitigation measures favors the transfer of the decision on environmental viability to the project stage, assuming that it would be premature to generalize constraints in strategic decisions.

Even the recommendation for a 12nm buffer for offshore wind development has been softened by considerations, such as “proposal was not intended as an exclusion zone, since there may be scope for further offshore wind development within this area, but as mitigation for the potential environmental effects of development which may result from this draft plan/programme” and “detailed site-specific information gathering and stakeholder consultation will be required before the acceptability of specific wind farm projects close to the coast can be assessed”.