



Department
of Energy &
Climate Change

UK Offshore Energy Strategic Environmental Assessment (UK OESEA3)

Future Leasing/Licensing for Offshore Renewable
Energy, Offshore Oil & Gas and Gas Storage and
Associated Infrastructure

Scoping for Environmental Report

July 2015

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1 Introduction, Purpose and Scope

1.1 Introduction

This UK Offshore Energy Strategic Environmental Assessment (OESEA3) Scoping Document has been prepared as part of the Department of Energy and Climate Change (DECC) Offshore Energy SEA programme. The SEA process aims to help inform licensing and leasing decisions by considering the environmental implications of proposed plans/programmes and the potential activities which could result from their implementation.

Previous SEAs undertaken as part of this programme included UK OESEA in January 2009 and UK OESEA2 in February 2011, which built on a series of previous regional scale SEAs undertaken since 1999. OESEA considered the environmental implications of a draft plan/programme to enable: further seaward rounds of oil and gas licensing, including gas storage in UK waters; and further rounds of offshore wind farm leasing in the UK Renewable Energy Zone (now Exclusive Economic Zone)¹ and the territorial waters of England and Wales to a depth of 60m. During 2010, DECC undertook an exercise to update and extend the scope of the OESEA Environmental Report and issued OESEA2 for consultation for further licensing/leasing for offshore energy including oil and gas, gas storage including carbon capture and storage (CCS) and marine renewables (wind, wave and tidal technologies).

The indicative time horizon (i.e. period of currency) for OESEA2 was 5 years from publication. During this period, as with previous SEAs, DECC has maintained an active SEA research programme; identifying information gaps (some of which were outlined in the last set of SEA Recommendations), commissioning new research where appropriate, and promoting its wider dissemination through a series of research seminars. This has also involved continued engagement with the SEA Steering Group and review of the information base for the SEA, including the environmental baseline, other relevant plans and programmes, and policy and regulation.

DECC are now conducting a new SEA (OESEA3) leading to the production of a new Environmental Report with a view to publication in 2016.

1.2 Purpose

A key purpose of scoping is to identify 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. The purpose of this scoping report is to set out sufficient information on OESEA3 to enable the Consultation Bodies/Authorities and other interested parties to form a view and give feedback on the scope and level of detail of the information which will be included in the SEA Environmental Report.

¹ this part of the plan/programme did not include the territorial waters of Scotland and Northern Ireland.

The scoping process aims 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

The SEA is being conducted in accordance with the *Environmental Assessment of Plans and Programmes Regulations 2004*. These regulations apply to any plan or programme which relates either solely to the whole or any part of England² or to England and any other part of the UK.

The scoping document contains four main parts (1) outlining the nature of the draft plan/programme and its legislative and policy context, (2) its context within a wide array of international, regional, national and local initiatives (including other plans and programmes), (3) an overview of the environmental baseline and how it will be described in the Environmental Report and (4) the approach to assessment and consultation. Consultation questions follow each section and these are summarised at the end of the document. Maps are interspersed throughout the document.

1.3 The Draft Plan/Programme and Scope of the SEA

The DECC draft plan/programme under consideration is broad ranging and variously covers the range of energy related activities in the UK marine environment. The geographical limits of areas mentioned below are graphically represented in Figures 1.1-1.3. The elements of the draft plan/programme are:

Renewable Energy:

1. Wave – future leasing in the relevant parts of the UK Exclusive Economic Zone³ and the territorial waters of England and Wales. The Scottish Renewable Energy Zone⁴ and Northern Irish waters within the 12 nautical mile territorial sea limit are not included. In view of the relatively early stage of technological development, a target generation capacity is not set in the draft plan/programme.
2. Tidal Stream – future leasing in the relevant parts of the UK Exclusive Economic Zone and the territorial and internal waters of England and Wales. The Scottish Renewable Energy Zone and Northern Irish waters within the 12 nautical mile territorial sea limit are not included. In view of the relatively early stage of technological development, a target

² Including the territorial waters of the United Kingdom that are not part of Northern Ireland, Scotland or Wales, and waters in any area for the time being designated under Section 1(7) of the *Continental Shelf Act 1964*.

³ *The Exclusive Economic Zone Order 2013*

⁴ *The Renewable Energy Zone (Designation of Area) (Scottish Ministers) Order 2005*

generation capacity is not set in the draft plan/programme. Similarly, a minimum average tidal current velocity threshold is not proposed.

3. Tidal Range – future leasing in the internal and territorial waters of England and Wales. It is considered unlikely that there will be tidal range developments outside of territorial waters.
4. Offshore Wind – to enable further offshore wind farm leasing in the relevant parts of the UK Exclusive Economic Zone and the territorial waters of England and Wales to contribute the achievement of UK renewable energy targets. The technologies covered will include turbines of up to 50MW capacity and tethered turbines in waters up to 200m. The Scottish Renewable Energy Zone and the territorial waters of Scotland and Northern Ireland are not included in this part of the plan/programme.

Oil & Gas:

5. Exploration and production – further Seaward Rounds of oil and gas licensing of the UK territorial sea and UK Continental Shelf (UKCS). The Oil & Gas Authority are to undertake two regional seismic surveys in 2015 covering areas of the central North Sea (mid North Sea High) and to the west of the Hebrides (eastern part of the Rockall Basin). These areas contain relatively under explored petroleum systems, and the surveys are expected to augment existing data and update current understanding of prospectivity to inform future licensing.
6. Hydrocarbon gas importation and storage – further licensing/leasing for unloading and underground storage of hydrocarbon gas in UK waters (territorial waters and the relevant parts of the UK Exclusive Economic Zone), including in hydrocarbon gas storage in other geological formations/structures including constructed salt caverns, and the offshore unloading of hydrocarbon gas.

Carbon Dioxide:

7. Carbon dioxide (CO₂) transportation and storage – further licensing/leasing for underground storage of carbon dioxide gas in UK waters (the UK Exclusive Economic Zone and relevant territorial waters, excluding the territorial waters of Scotland⁵). OESEA3 would include CO₂ storage in geological formations/structures including depleted reservoirs (and for enhanced oil recovery), aquifers and constructed salt caverns.

For this SEA it is anticipated that renewable energy devices will not be deployed in water depths of more than 200m, with the majority of developments expected to be in water depths of less than 60m. No depth constraints are envisaged for hydrocarbon exploration and production, or hydrocarbon and other gas storage activities.

It should be noted that whilst the geographic remit of OESEA3 does not cover the entirety of the UKCS for some activities, DECC maintain links with the relevant devolved administrations, including in the consultation exercises for this and previous SEAs.

⁵ *The Storage of Carbon Dioxide (Licensing etc.) (Scotland) Regulations 2011, The Storage of Carbon Dioxide (Amendment of the Energy Act 2008 etc.) Regulations 2011*

OESEA3 is expected to have a 5 year time horizon. Several of the technologies covered in the draft plan/programme remain to be deployed at a commercial scale, and are likely to undergo rapid development and change during the currency of the SEA, for instance, in order to assist in achieving medium to long-term targets in relation to UK greenhouse gas emissions. The DECC offshore energy SEA programme is a continuous process, and following the post consultation period, DECC will keep the baseline, information on technologies, effects, or plan/programme status under review.

Figure 1.1: The UKCS, UK Exclusive Economic Zone, Scottish Renewable Energy Zone, Territorial waters and Median Lines

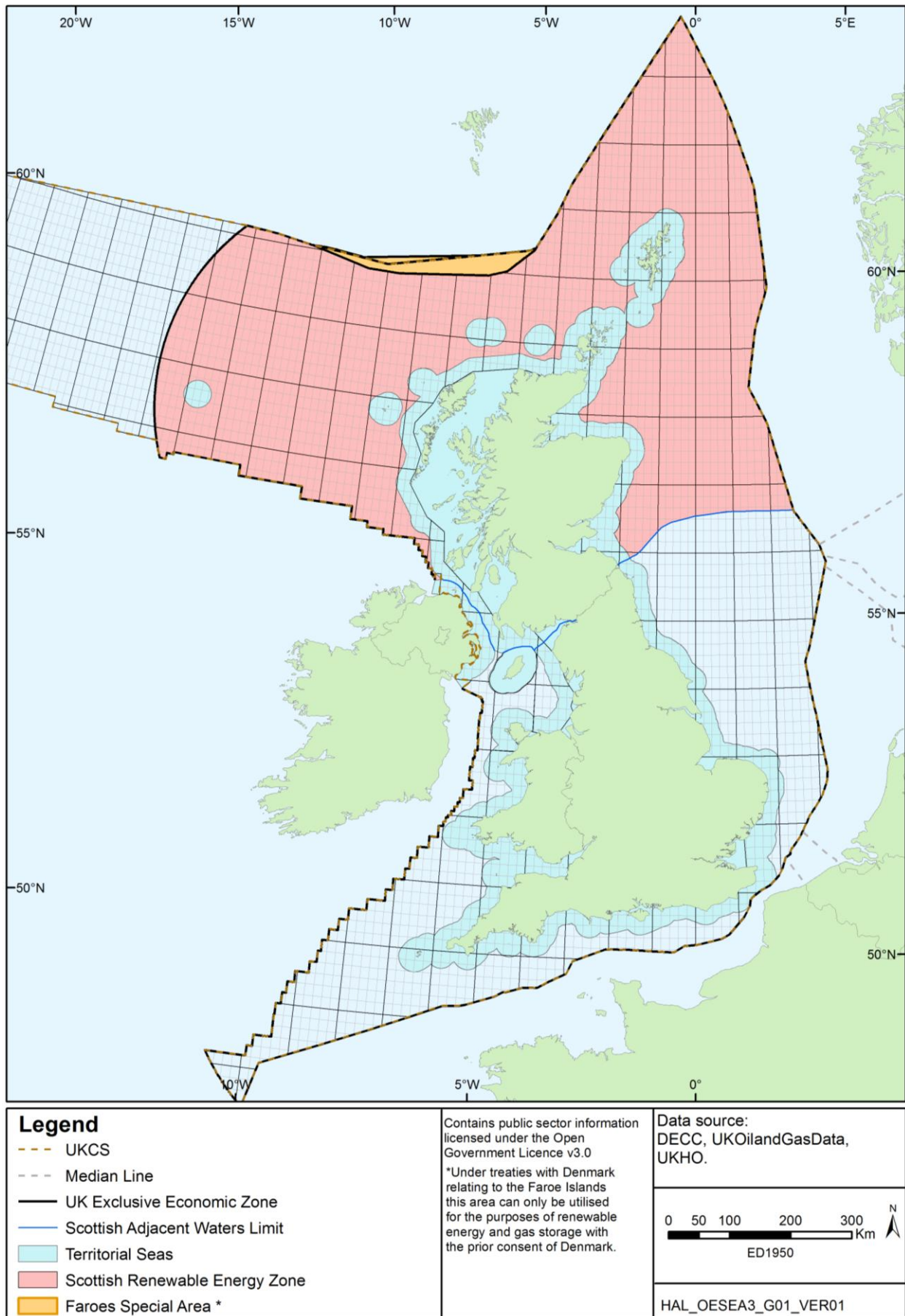


Figure 1.2: Geographical coverage of the SEA (Offshore Renewables)

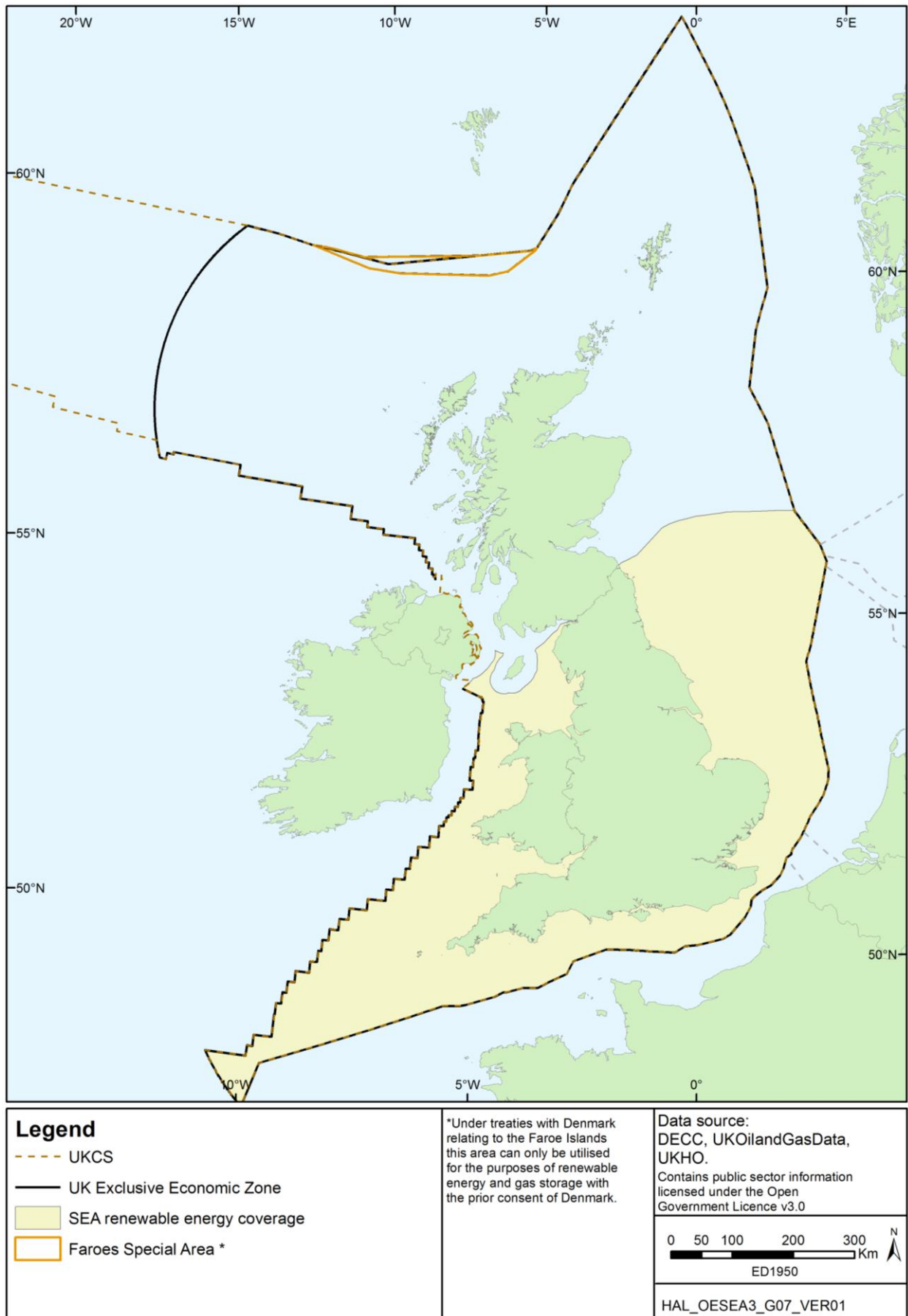
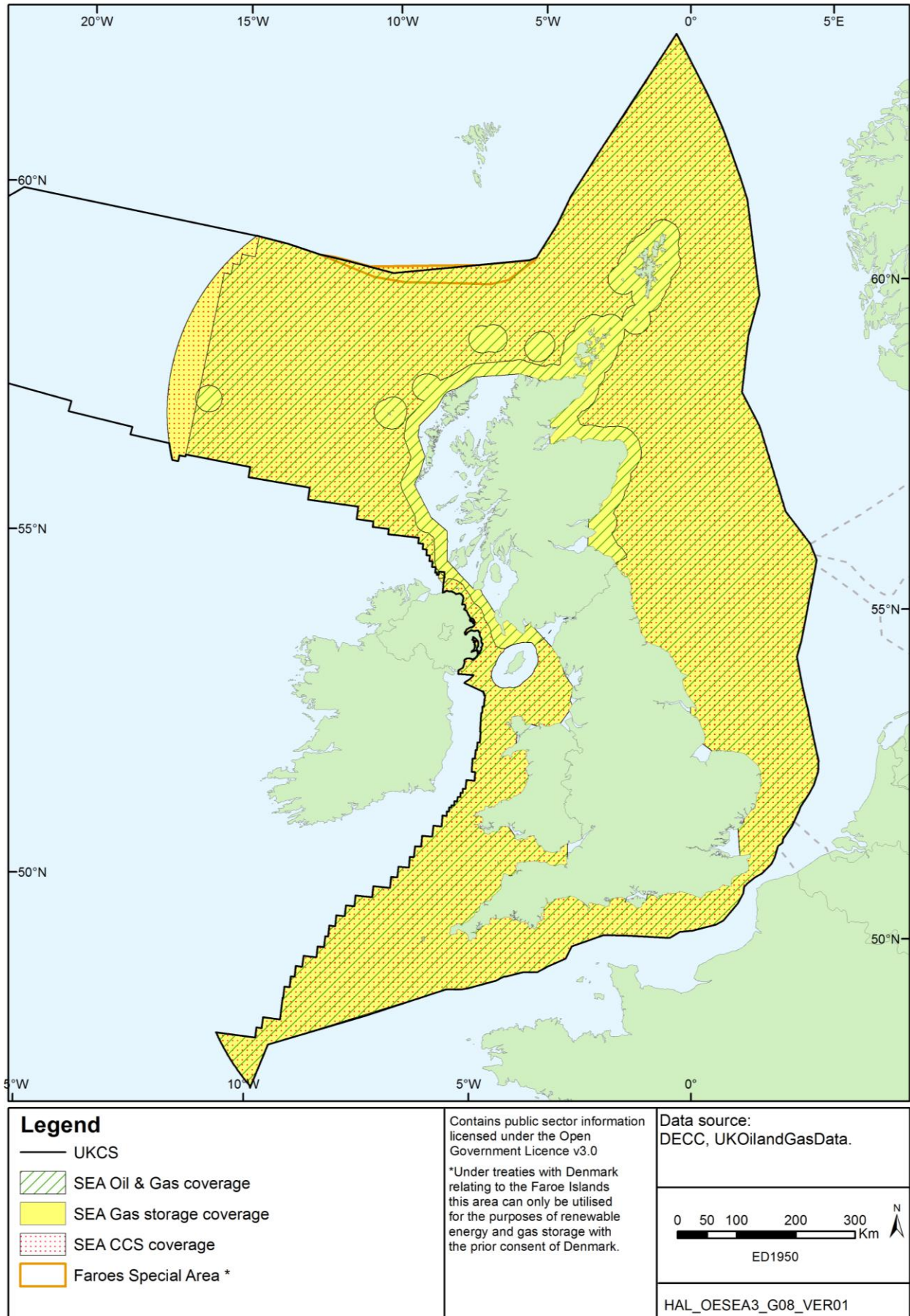


Figure 1.3: Geographical Coverage of the SEA (Oil and Gas, Gas Storage, CCS)



1.4 The Requirement for SEA

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 (commonly called the SEA Directive) was adopted to provide a strategic complement to the Council Directives (85/337/EEC and 97/11/EC) which require Environmental Impact Assessments of specific developments and activities (now codified by Directive 2011/92/EU, and amended by 2014/52/EU). 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.”

A series of Regulations have been established across the United Kingdom to implement the requirements of the Directive. This SEA is being conducted in accordance with the *Environmental Assessment of Plans and Programmes Regulations 2004* (the SEA Regulations), which apply to any relevant plan or programme which relates either solely to the whole or any part of England, or to England and any other part of the United Kingdom.

A required part of SEA is consultation with the consultation bodies and public, together with such neighbouring states as may be potentially significantly affected.

1.5 Policy Context

The UK Government is committed to the reduction of greenhouse gas emissions⁶ by 80% on 1990 levels by 2050, with an interim target of 34% by 2020, as implemented in the *Climate Change Act 2008*. Subsequent Climate Change Act Orders outline carbon budgets for defined time periods, with the most recent (fourth) carbon budget (*The Carbon Budget Order 2011*), containing a target of 50% reduction in emissions on 1990 emissions by 2025. DECC have made a series of energy and emissions projections against UK targets and policies to help inform the requirement to develop new policy to meet carbon budget targets which were most recently updated in 2014. Projections for 2013 to 2022 suggest that the UK will meet its second and third carbon budgets but that there is a shortfall in the fourth carbon budget assuming no new effort (e.g. additional policy), and uncertainty over the long-term policy framework beyond 2020 has been identified by the Committee on Climate Change (CCC) (2015) as a key risk to future progress. The Carbon Plan (2011) sets out how the UK Government intends to achieve this fourth carbon budget, which will include the transition to a low carbon economy while maintaining the security of energy supply⁷. During this transition, which by 2050 is likely to comprise an increasing proportion of renewable energy source, coal, biomass or gas-fired CCS

⁶ These emissions are usually termed carbon dioxide (CO₂) equivalent, and include other notable greenhouse gases such as methane (CH₄) and nitrous oxide (N₂O). Carbon dioxide is the principal greenhouse gas of concern, accounting for 82% of total provisional UK emissions in 2014.

⁷ See the Energy Security Strategy (2012). There is a statutory duty on Ofgem under the *Energy Act 2004* (as amended) to report annually on the availability of electricity and gas, which also meets UK obligations under, for instance Directive 2009/73/EC, the Gas Directive.

power stations and nuclear energy⁸; 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.

In this context, the UK has a target to generate 15% of its energy from renewable sources by 2020, stemming from the EU Renewable Energy Directive (2009/28/EC). Scenarios for achieving this were initially outlined in the 2009 UK Government Renewable Energy Strategy, superseded by the Renewable Energy Roadmap in 2011⁹ (updated 2012), which was produced with advice from the CCC and the renewables industry. Both installed capacity and energy generation have increased significantly in recent years. Provisional 2014 figures indicate that renewable generation was 17.9% of gross electricity consumption, 4.1% above 2013 levels. Overall, the generation of electricity from renewable sources has increased significantly over the past 10 years to approximately 64.7TWh in 2014.

While reliance on fossil fuel sources will continue during the transition (including through CCS), the UK is now a net importer of both oil and gas. Since 2000, UK domestic gas supply has declined at an average rate of 8% per year, with net imports commencing in 2004, and in 2013 UK supply met approximately half of the UK's gas demand. Similarly, UK oil production has been in decline since a peak in 1999, with net imports of oil commencing in 2013. A linked factor in enhancing security of supply is the need for more gas storage capacity, since until recently seasonal fluctuations in UK gas demand were met by varying production rates from UK fields.

Despite these declines, the UK remains the largest producer of oil and gas in the EU, and successive oil and gas licensing rounds attract significant interest – the 27th Round attracted the highest number of applications since licensing began, and the most recent 28th Round attracted the third largest number. Reductions in the recent production and efficiency of the UKCS sector led to the Wood Review in 2013, which set out a number of recommendations that were accepted by DECC, including maximising economic recovery, and the creation of the Oil & Gas Authority (OGA), an executive agency of DECC. The OGA has responsibilities¹⁰ including oil and gas licensing, exploration and production, fields, wells and other infrastructure, and CCS licensing.

The development of CCS is another important element of the Carbon Plan, which is expected to be commercially deployed in the 2020s. In preparation for this, all new fossil fuel power stations of a type covered by the Large Combustion Plant Directive and with a capacity of 300MW or greater are not to be consented unless it can be demonstrated that carbon capture technology can feasibly be retrofitted. The UK Government is running a CCS Commercialisation Programme¹¹ which makes available up to £1 billion of capital funding. Four projects were shortlisted from bids received in October 2012. In March 2013 the government announced two preferred bidders, the White Rose Project and the Peterhead Project, who in December 2013

⁸ See the DECC 2050 Pathways Calculator: <https://www.gov.uk/2050-pathways-analysis>, which shows that it is possible to meet the 80% emissions reduction target in a range of ways, and allows people to explore the combinations of effort which meet the emissions target while matching energy supply and demand.

⁹ Note that the devolved administrations have their own programmes and related targets, which are expanded upon in Section 2.

¹⁰ Note that the legislative transfer of responsibilities to the OGA is presently being drafted through the Energy Bill, introduced to the House of Lords 9th July 2015.

¹¹ <https://www.gov.uk/uk-carbon-capture-and-storage-government-funding-and-support>

and February 2014 respectively were awarded multi-million pound contracts to undertake programmes of detailed engineering, planning and financial work to finalise and de-risk aspects of the proposal ahead of taking final investment decisions, and proceeding to construction.

The draft plan/programme to be covered by OESEA3 is therefore of key importance to the above policy context, and has the potential to significantly contribute to Government targets by enabling future rounds of renewable leasing for offshore wind, wave and tidal devices, and licensing for seaward oil and gas rounds and gas storage including CCS.

1.6 Context to Licensing and Leasing

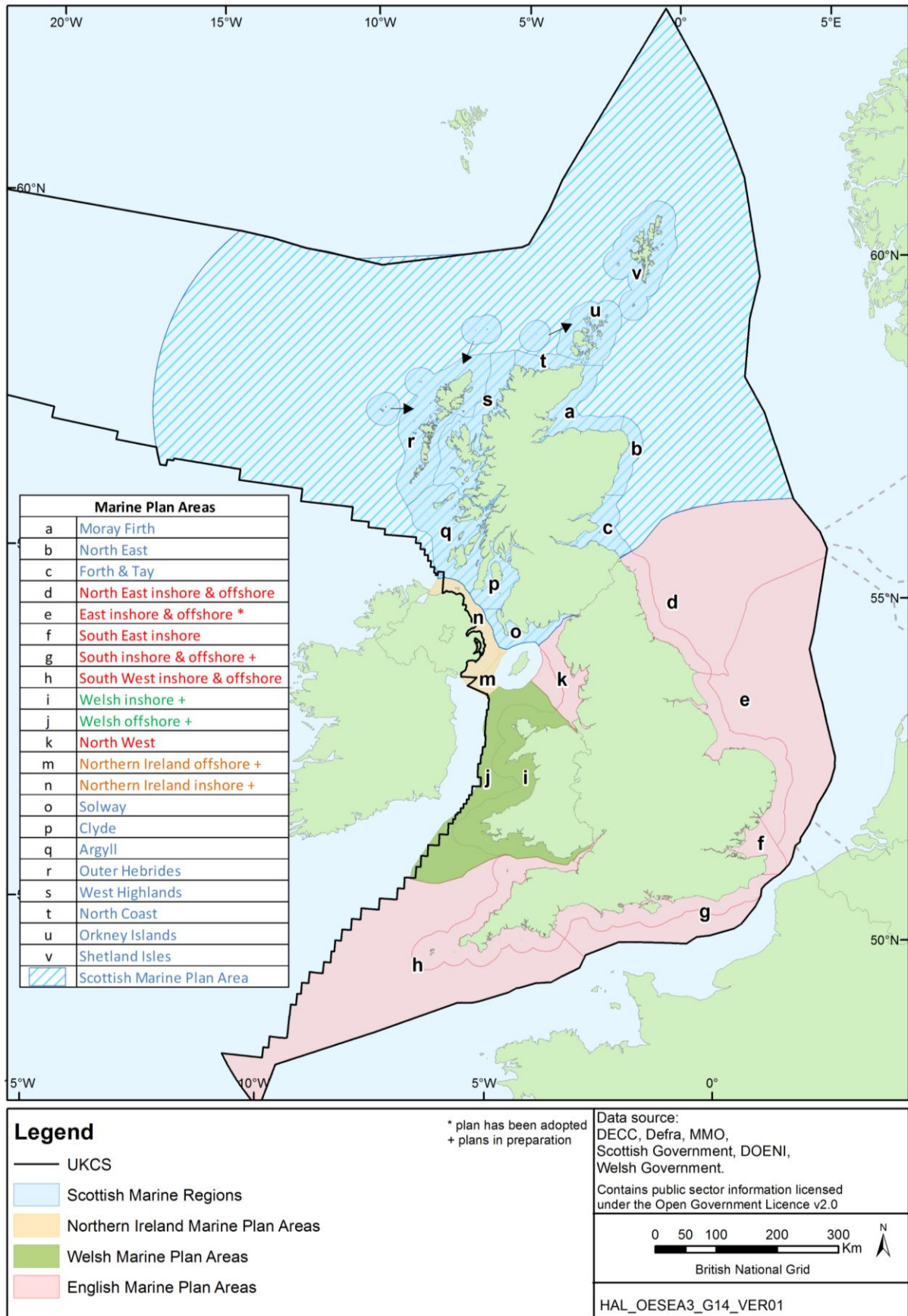
In addition to the overarching UK energy policy context, a range of planning policy is also of relevance to the proposed scope of the draft plan include the Marine Policy Statement (MPS), the East Inshore and Offshore Marine Plans, Scotland's National Marine Plan, and any others which may be adopted during the drafting of the Environmental Report (e.g. for Wales, Northern Ireland and the South Inshore and Offshore Region¹²). Each of the regional and country marine plans should be drafted in keeping with the MPS but informed by regionally specific information, and enforcement and authorisation decisions should be taken in accordance with these regional marine policy documents, or the MPS in advance of their adoption. These planning areas and related policies will be considered during the preparation of the SEA Environmental Report – National and regional marine planning areas are shown in Figure 1.4. Where policies have spatial aspects relevant to the plan, these will either be mapped or cross-referenced as appropriate.

Overarching National Policy Statements for Energy are also relevant, and provide planning policy in relation to nationally significant energy infrastructure projects (NSIPs), as defined in the *Planning Act 2008* – this includes almost all offshore renewable energy projects in England and Wales, and onshore aspects of projects which may have offshore elements (e.g. CCS, gas storage and oil and gas pipelines).

Decision making in relation to licensing/leasing and also subsequent activities which could take place as a result of the adoption of the draft plan/programme, is therefore split between a number of legislative and planning policy remits, and related decision makers.

¹² <https://www.gov.uk/south-inshore-and-south-offshore-marine-plan-areas>

Figure 1.4: Geographical Coverage of the SEA in relation to Marine Spatial Planning Boundaries



Oil & Gas

The exclusive rights to search and bore for and get petroleum in Great Britain, the territorial sea adjacent to the United Kingdom and on the UKCS are vested in the Crown and the *Petroleum Act 1998* (as amended) gives the Secretary of State for Energy and Climate Change the power to grant licences to explore for and exploit these resources. The main type of offshore Licence is the Seaward Production Licence. Offshore licensing for oil and gas exploration and production commenced in 1964 and has progressed through a series of Seaward Licensing Rounds. A Seaward Production Licence may cover the whole or part of a specified Block or a group of Blocks. A Licence grants exclusive rights to the holders “to search and bore for, and get, petroleum” in the area covered by the Licence but does not constitute any form of approval for activities to take place in the Blocks, nor does it confer any exemption from other legal or regulatory requirements.

There are three types of Seaward Production Licences:

- Traditional Production Licences are the standard type of Seaward Production Licences and run for three successive periods or Terms. Each Licence expires automatically at the end of each Term, unless the licensee has made enough progress to earn the chance to move into the next Term. The Initial Term lasts for four years and the Licence will only continue into a Second Term of four years if the agreed Work Programme has been completed and if 50% of the acreage has been relinquished. The Licence will only continue into a Third Term of 18 years if a development plan has been approved, and all the acreage outside that development has been relinquished. OGA at its discretion can offer different term lengths if an applicant makes a strong enough case, for instance where a high pressure high temperature (HPHT) prospect will take longer to plan and explore. In such cases the initial and/or second terms may be extended to six years.
- Frontier Production Licences are a variation of the Traditional Production Licence with longer terms. A Frontier Production Licence has a longer Initial Term (six years as opposed to four) with the objective of allowing companies to screen larger areas. After 3 years, the licensee must relinquish 75% of the licensed acreage. At the end of the Initial Term, the exploration Work Programme must have been completed and the licensee must relinquish 50% of what is left (i.e. leaving one eighth of the original licensed area). A variation on the Frontier Production Licence was introduced prior to the 26th Round. Designed for the particularly harsh West of Scotland environment, it is similar to the existing Frontier Licence but with an initial term of nine years with a Drill-or-Drop decision to be made by the end of the sixth year and (if the licensee chooses to drill) drilling to be completed within the remaining three years of the initial term.
- In the 21st Round (2002) the Department introduced Promote Licences. The general concept of the Promote Licence is that the licensee is given two years after award to attract the technical, environmental and financial capacity to complete an agreed Work Programme. In effect, OGA will defer (not waive) its financial, technical and environmental checks until the preset Check Point. Promote licensees are not allowed to carry out field operations until they have met the full competence criteria. The way this is implemented is that each Promote Licence carries a "Drill-or-Drop" Initial Term Work Programme. The Licence will therefore expire after two years if the

licensee has not made a firm commitment to OGA to complete the Work Programme (e.g. to drill a well). By the same point, it must also have satisfied OGA of its technical, safety, environmental and financial capacity to do so. A Promote licensee cannot pursue activity permitting or undertake operations until they have continued to the second phase of the initial term.

Applicants for licences are required to provide the OGA with a number of submissions in support of their applications, including submissions to enable the Competent Authority¹³ to assess their safety and environmental competence and capability.

Gas Storage

The *Energy Act 2008* (as amended) made provision for the designation of Gas Importation and Storage Zones (now encapsulated and superseded by the Exclusive Economic Zone) and creates a licensing framework for the unloading and storage of combustible gas offshore. The Act prohibits the carrying out of the activities below except in accordance with an Energy Act licence:

- use of a controlled place for the unloading of gas to an installation or pipeline
- use of a controlled place for the storage of gas
- conversion of any natural feature in a controlled place for the purpose of storing gas
- recovery of gas stored in a controlled place
- exploration of a controlled place with a view to gas storage
- establishment or maintenance in a controlled place of an installation for the purposes of the above activities

A “controlled place” is a place in, under or over waters within the UK territorial sea, or within any area extending beyond the territorial sea within the Exclusive Economic Area. Carrying on such an activity without a licence, and in certain cases the breach of the conditions of a licence is a criminal offence, and the Licensing Authority for the issuance and regulation of licences is OGA. Operators will also need to obtain a grant of the appropriate rights (a lease) from The Crown Estate.

This Act also makes provision with respect to the interaction between activities regulated under the *Petroleum Act 1998* and gas storage activities (e.g. that operations to recover gas from a formation are not regarded to be the result of boring for and getting petroleum within the meaning of the Petroleum Act).

The environmental management capacity and track record of applicants is considered by DECC, through written submissions and interviews, before licences are awarded.

¹³ DECC and the Health and Safety Executive (HSE)

Carbon Dioxide Storage

The *Energy Act 2008* (as amended) also provides for a similar licensing regime governing the offshore storage of carbon dioxide and makes it an offence to carry out storage activities without a licence. The regime applies to storage in the offshore area comprising both the UK territorial sea (excluding Scotland), and any area extending beyond the territorial sea within the Exclusive Economic Zone (EEZ). The *Energy Act 2008* (as amended) and related Regulations implement Directive 2009/31/EC in the UK. Licenses specifically cover:

- Storage of carbon dioxide with a view to its permanent disposal
- Conversion of a natural feature (for example, a saline aquifer) for such storage
- Exploration for a carbon dioxide storage site
- Establishment or maintenance of an installation for any of those purposes

The licensing authority for those waters relevant to the Offshore Scheme is the Secretary of State for Energy and Climate Change except in the case of the territorial sea adjacent to Scotland for which Scottish Ministers are the Licensing Authority. The Act also indicates that the use of the seabed or areas under the seabed for these activities would also require a Crown Estate lease. The licensing arrangements for carbon dioxide storage for the area indicated above is contained within *The Storage of Carbon Dioxide (Licensing etc.) Regulations 2010* for England and Wales, and *The Storage of Carbon Dioxide (Licensing etc.) (Scotland) Regulations 2011*.

Offshore Pipelines

The activities listed above may require a subsea pipeline for the purpose of exporting oil and gas, and for the transfer of gas or carbon dioxide to underground storage. In order to place and use/modify a pipeline on the continental shelf a Pipeline Works Authorisation (PWA) or PWA variation is required (as per Part III of the *Petroleum Act 1998*) for both gas, carbon dioxide transport and offshore petroleum production activities, the consent for which is granted by OGA's Pipeline Works Authorisation Unit. Where a pipeline falls within territorial waters (i.e. within 12nm of the coast) a lease will be required for that section of the pipeline from The Crown Estate. Any works which precede the installation of any pipeline (e.g. deposits of rock prior to a PWA being in place), are covered by marine licences under the *Marine and Coastal Access Act 2009*. Any onshore part of a pipeline which extends below the low water mark is subject to the terrestrial planning regime, including the *Planning Act 2008* where appropriate, and is not a subject of this SEA.

Offshore Wind Farms

Under *The Crown Estate Act 1961*, The Crown Estate represents the Crown as landowner of the UK seabed and areas of foreshore, as well as the holder of certain sovereign rights in respect of areas beyond the territorial sea. Such sovereign rights are vested in the Crown by the virtue of the designation of the EEZ, formerly covered by areas including the Gas Importation and Storage Zone (GISZ) or Renewable Energy Zone (REZ) under the *Energy Act 2008* and *Energy Act 2004* respectively. The Crown Estate's permission, in the form of a site option Agreement and Lease, is required for the placement of structures or cables on the seabed, this includes offshore wind farms and their ancillary cables and other marine facilities. Potential offshore wind farm developers also require statutory consents from a number of

Government departments before development can take place. During Rounds 1 and 2 of UK offshore wind farm development, successful applicants were awarded an option for a Lease by The Crown Estate. When all necessary statutory consents are obtained by the developer, The Crown Estate can grant a site lease for a development.

The *Energy Act 2004*, provided for the designation of Renewable Energy Zones from 12nm (nautical miles) out to 200nm (now the UK EEZ and the Scottish Renewable Energy Zone) in which rights under Part V of the UN Convention on the Law of the Sea may be exercised to exploit water or wind energy. For Round 3, The Crown Estate proposed that development would be undertaken within exclusive Zones and exclusivity agreements were signed for nine Round 3 zones, seven of which went on to receive planning applications for development. Similarly (outside of the remit of the Round 3 programme and this plan/programme), The Crown Estate offered exclusivity agreements to companies and consortia for 10 zones in Scottish territorial waters in 2009, three of which have received planning applications to date.

Under the *Planning Act 2008*, the Planning Inspectorate (PINS) assumed responsibility for consent applications for offshore electricity generating stations with a capacity of more than 100MW. Such applications to PINS will be under the Planning Act (which replaces the provisions of the *Electricity Act 1989*) for these developments. While PINS deals with the acceptance and examination of the application and provides a recommendation to the relevant Secretary of State (in this case of Energy and Climate Change), the ultimate decision maker in these cases is the Secretary of State.

The *Marine and Coastal Access Act 2009* provided for the creation of the Marine Management Organisation (MMO). The MMO took over the processing of offshore renewable energy generating station applications in under section 36 of the *Electricity Act 1989* (i.e. those not considered to be nationally significant, >1MW but below 100MW) in English and Welsh territorial waters and the UK EEZ. A single Marine Licence is required for activities formerly covered by the *Coast Protection Act 1949* and *Food and Environment Protection Act 1985* (FEPA). In the Scottish Renewable Energy Zone, Scottish Ministers are responsible for *Electricity Act 1989* consent decisions and FEPA licensing will still apply in their territorial waters. Marine licensing in Scotland is handled by Scottish Ministers through the *Marine (Scotland) Act 2010* and the *Marine and Coastal Access Act 2009*.

Wave and Tidal Devices

The leasing and consenting processes for wave and tidal current renewable energy generating developments are as described above for offshore wind, though tidal range developments consenting requirements may differ from those of offshore wind to reflect the likelihood of their being land-connected. The Crown Estate has not, to date, carried out any wave or tidal energy leasing rounds for English and Welsh waters but has offered leases for test devices or small arrays. In 2009, The Crown Estate launched a wave and tidal leasing round in the Pentland Firth strategic area and six agreements for leases were entered into in 2010, with an associated potential capacity of 1.6GW. As part of the Scottish Government's Saltire Prize, which was open to applications between 2010 and 2015, four competitors gained Crown Estate leases and have either received consent or are in planning. A Northern Ireland SEA for its territorial waters was published in March 2010, and The Crown Estate has been discussing potential opportunities and supporting actions for offshore renewable energy deployment with the Department of Energy, Trade and Industry (DETI). The only operational device in Northern Ireland waters to date was the SeaGen turbine, Strangford Lough.

1.7 Prospectivity and Likely Scale of OESEA3 Related Activity

Though activities for the whole UKCS (for reserved matters) will be considered in the Environmental Report, the potential for areas to be leased/licensed for plan level activities to take place in any given area is spatially controlled to some extent by prospectivity, whether it be the conditions in which hydrocarbons have accumulated over geological time, the presence of geological structures capable of trapping gas or carbon dioxide in the long term, or the location of the best wind, tidal or wave energy resource. The following sections outline the prospective conditions for each of the plan elements, which are followed by a series of maps showing prospectivity against existing or proposed projects which are part of former licensing/leasing of these activities.

Oil & Gas

For commercial hydrocarbon resources to occur, a number of factors and features have to coincide, including:

- The presence of source rocks, with an appreciable organic matter content
- Adequate depth of burial to allow the conversion of the organic matter to oil or gas through the action of temperature and pressure
- The presence of rocks with sufficient porosity to allow the accumulation of oil or gas
- Cap or seal rocks to prevent the oil or gas from escaping from the reservoir rocks
- Migration pathways to permit oil and gas formed in the source rocks to move to reservoir formations

Such conditions typically occur in sedimentary basins and not areas of igneous rock unless these overlay sedimentary rocks as in parts of the Faroe-Shetland Channel. Offshore areas of the UK have been offered for oil and gas licensing in a series of rounds since 1964, with the 28th Round held in 2014. Areas with hydrocarbon prospectivity have been extensively explored over this period and many fields brought into production, mainly in the North and Irish Seas, resulting in an extensive infrastructure which can be utilised by new developments, see Figure 1.5. The southern North Sea and Irish Sea are largely gas provinces, with the central and northern North Sea, and West of Shetland areas being oil provinces.

The main stages of oil and gas activity are:

1. Exploration and appraisal: following successful licensing this involves initial exploratory drilling with well evaluation and testing typically using mobile drilling rigs, possibly preceded by seismic survey (note that purchase and reprocessing of existing seismic data is often used). 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.
2. 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.

3. Production and export operations: involves routine supply, return of wastes to shore, power generation, chemical use, flaring, produced water management/reinjection and reservoir monitoring and maintenance.
4. Decommissioning: including cleaning and removal of facilities, for reuse, recycling or disposal.

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 and an increased proportion of hydrocarbon imports. Recent UKCS oil and gas licensing Rounds (27th and 28th Rounds) have maintained significant 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; consultation with industry and a number of other sources will inform the scale of activity used in the assessment for OESEA3.

Offshore Wind

In UK waters, offshore wind is the most developed renewable energy technology. Rounds 1 and 2 of offshore wind leasing were held in 2000 and 2003 respectively, with Round 3, held in 2009, being significantly larger in terms of the areas offered for leasing. Exclusivity agreements were signed for nine of the Round 3 areas, seven of which have thus far had planning applications submitted to develop areas within each zone. Total offshore wind generation capacity of all currently operational, in construction or consented wind farms is some 15.7GW, with a further 15GW in planning¹⁴. Though not a consideration of this SEA, a number of areas within the territorial waters of Scotland have also been leased and 3 projects have been consented with an installed capacity of approximately 2GW.

Away from the shelter of the coast, the total wind resource over a given year is relatively uniform across very large areas (Figure 1.6), although clearly the occurrence and strength of wind is dependent on a number of meteorological factors. At any point in time, while some areas of the UK may be calm, the wind is likely to be blowing elsewhere. Water depth, distance from areas of high electricity demand, and the availability of connection points to the onshore transmission grid are significant factors in the preferred location of offshore wind developments.

At present most offshore wind farms are using 3.6MW or 5MW turbines, and larger turbines (e.g. 6MW have been proposed for some Round 3 developments to date. Larger turbines (between 10MW and 15MW) are in development and have the potential to be deployed in the lifetime of this draft plan/programme. Similarly, experience and understanding of the effects of the wakes from other turbines is improving, and may lead to greater separation between individual turbines in a wind farm and between wind farms.

The main stages of offshore wind development are:

¹⁴ Correct at March 2015: <https://www.gov.uk/government/statistics/renewable-energy-planning-database-monthly-extract>

1. Site prospecting/selection: including collection of site specific resource and constraint data, and seabed information by geophysical and geotechnical survey.
2. Development: includes selection and construction of foundations (which could be pile driven, gravity base, floating tethered) possibly scour protection, device installation, cable laying including shoreline and other cable/pipeline crossings and armouring, installation of gathering stations/substations and connection to the onshore national electricity transmission system.
3. Generation operations, including maintenance.
4. Decommissioning, including removal of facilities, for reuse, recycling or disposal.

Scenarios for the likely scale of the future offshore wind deployment within the currency of OESEA3 will be generated through consultation with industry and a number of other sources for the purposes of assessment.

Wave & Tidal

Exploitation of wave and tidal energy is not yet fully commercial in UK waters, although several test and demonstrator projects have been deployed or are in development. It is likely that over the coming years as devices reach commercial scale and their viability is demonstrated, larger scale deployment of wave and tidal energy will commence. Work to characterise the wave and tidal resources of UK waters has shown wave resource is broadly concentrated on the Atlantic facing coastline of the UK (Figure 1.7) – notably the Western Isles of Scotland and the South West peninsula (and SW Wales)¹⁵. Tidal stream resource is more geographically constrained – being localised around headlands and through straights between land masses. This produces a number of potential deployment sites within English and Welsh waters (Figure 1.8). A number of areas in Scottish territorial waters have been leased for wave and tidal development, with a further leasing for six new wave and tidal current demonstration zones taking place in 2014, as part of a programme to accelerate technology development. Demonstration sites include the European Marine Energy Centre (Orkney) and Wave Hub (Cornwall). Areas where commercial development may take place in the near future include, the Pentland Firth and Orkney waters (Scotland), Rathlin Island and Torr Head (Northern Ireland) and Anglesey (Wales).

Studies such as the Sustainable Development Commission's "Turning the Tide" have shown potential for extracting power from the tidal range of various estuaries and bays (Figure 1.9) – such as the Severn, Mersey and Solway, for which Feasibility Studies have been undertaken. Though no commercial scale tidal range developments are operating in the UK, there are presently three proposed tidal lagoon developments (Swansea Bay, Newport and Cardiff) which are either in the pre-application stage of planning, or have received consent (Swansea Bay).

The main stages of marine wave and tidal development are:

¹⁵ ABPMer (2008). Atlas of UK Marine Renewable Energy Resources. The Crown Estate (2012). UK Wave and Tidal Key Resource Areas Project.

1. Site prospecting/selection: including collection of site specific resource and constraint data, and seabed information by geophysical and geotechnical survey.
2. Development: includes selection and construction of foundations (which could be pile driven, floating tethered, coastal connected) possibly scour protection, device installation, cable laying including shoreline and other cable/pipeline crossings and armouring, installation of gathering stations/substations and connection to the onshore national electricity transmission system.
3. Generation operations, including maintenance.
4. Decommissioning, including removal of facilities, for reuse, recycling or disposal.

Scenarios for the likely scale of the wave and tidal aspects of the draft plan/programme will be generated through consultation with industry and a number of other sources which may be used to visualise the likely scale of deployment of device arrays within the currency of OESEA3 for the purposes of assessment, and will build upon those scenarios used in OESEA2.

Carbon Dioxide Storage and Hydrocarbon Gas Storage

Prospective areas on the UKCS suitable for storage of CO₂ resulting from CCS operations include depleted offshore oil and gas reservoirs, saline aquifers and constructed salt caverns. Hydrocarbon reservoirs have geological characteristics advantageous to trapping CO₂ over long timescales (e.g. a suitable porosity/permeability and cap rock), and the injection of CO₂ into hydrocarbon reservoirs can also be used to enhance oil recovery. In the longer term these reservoirs can be used exclusively for CCS. The location and size of these reservoirs is relatively well known (see Figure 1.2), having a primarily eastern distribution extending from the northern North Sea and Faroe-Shetland Channel to the Southern North Sea, with some in the east Irish Sea basin.

Saline aquifers have similar characteristics to hydrocarbon reservoirs (i.e. suitably porous/permeable medium with geological constraints on migration) and may also be suited to CO₂ storage. The capacity of saline aquifers is not yet well established for the UKCS, though they have a theoretically large volume – for instance the most prospective southern North Sea formation, the Bunter Sandstone, is estimated to have a capacity of between 2.2Gt and 14.25Gt CO₂ (Holloway *et al.* 2006, Smith *et al.* 2010, Heinemann *et al.* 2012). Salt caverns, unlike hydrocarbon reservoirs or aquifers, are created in thick rock salt (halite) formations through solution mining, where some of the salt is made soluble and discharged allowing space for the storage of hydrocarbon gas or CO₂. There are extensive halite deposits in the southern North Sea and eastern Irish Sea.

CCS demonstrator projects are likely to be located in areas of high CO₂ emissions (e.g. Thames Estuary, Humberside, Merseyside, the Firth of Forth, Teesside and Tyneside), and the UK Government plans to promote their co-location. To date, two projects have been proposed for storage in a depleted hydrocarbon reservoir (Peterhead CCS Project) and a saline aquifer (Yorkshire and Humber CCS Transportation and Storage Project). Both of these projects are in planning (being preferred bidders as part of DECC's commercialisation programme – see above).

Hydrocarbon gas storage in depleted and other hydrocarbon reservoirs and other geological structures is part of the current draft plan/programme, and can be expected to take place in the same areas as existing oil and gas production, or in areas of extensive halite deposits. The

most prospective area for halites with gas storage potential (Smith *et al.* 2005) is the Triassic Preesall formation in the East Irish Sea Basin.

Smith *et al.* (2005) note that “...based solely on geological criteria, large parts of the offshore Wessex Basin, Peel Basin, Solway Firth Basin, Cardigan Bay Basin and Forth Approaches Basin could also support such facilities. However, these areas currently have no infrastructure, and some have very few wells within the salt depositional area. Without knowing the economic viability of the various elements of the facility, the future competition with onshore facilities, and the total import of gas by this method, it is difficult to assess whether facilities could also be developed in such areas remote from existing infrastructure.” Most other deposits in the UKCS are too thin or buried at too great a depth to be viable, though some salt diapirs that rise to shallow depths may be prospective in the Central and Southern North Seas.

The main stages of natural gas offloading and storage, and carbon dioxide transport and storage, are:

1. Exploration/appraisal: potentially including seismic survey exploration/appraisal drilling and reservoir/geological formation evaluation.
2. Development for natural gas offloading and storage:
 - a. depleted hydrocarbon reservoir: includes 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
 - b. salt caverns: includes the drilling of wells, construction of storage caverns by dissolution, installation of storage facilities, with new import/export pipelines, and potentially offloading facilities
3. Development for carbon dioxide transport and storage: includes installation of injection facilities, generally with construction of import pipelines, and the drilling of injection wells and potentially aquifer water production wells.
4. Operational phase of natural gas offloading and storage: 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, and maintenance.
5. Operational phase of carbon dioxide transport and storage: 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.
6. Decommissioning, including cleaning and removal of facilities.

In the context of current UK Government support for CCS and related European and UK funding competitions, it is considered likely that at least those existing proposed developments will take place during the currency of the SEA, with the potential for other, similar developments to be proposed in the SEA lifetime. The potential scale of gas storage and CCS activity likely in the

currency of SEA will be generated through consultation with industry and a number of other sources.

Figure 1.5: Current offshore oil and gas fields, infrastructure, onshore terminals, and licensed Blocks, and CCS agreements for lease

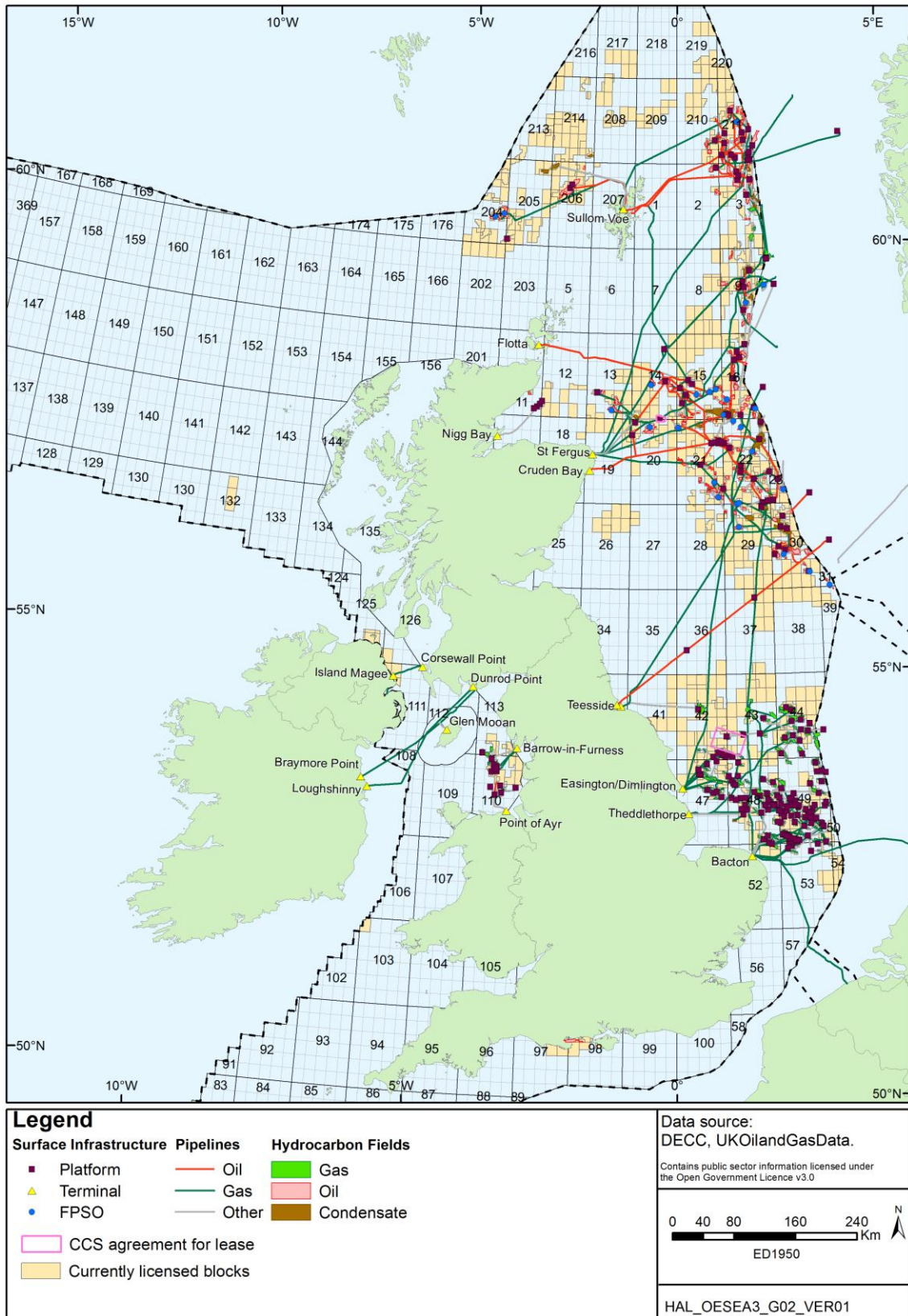


Figure 1.6: Annual mean wind power density and wind farm status

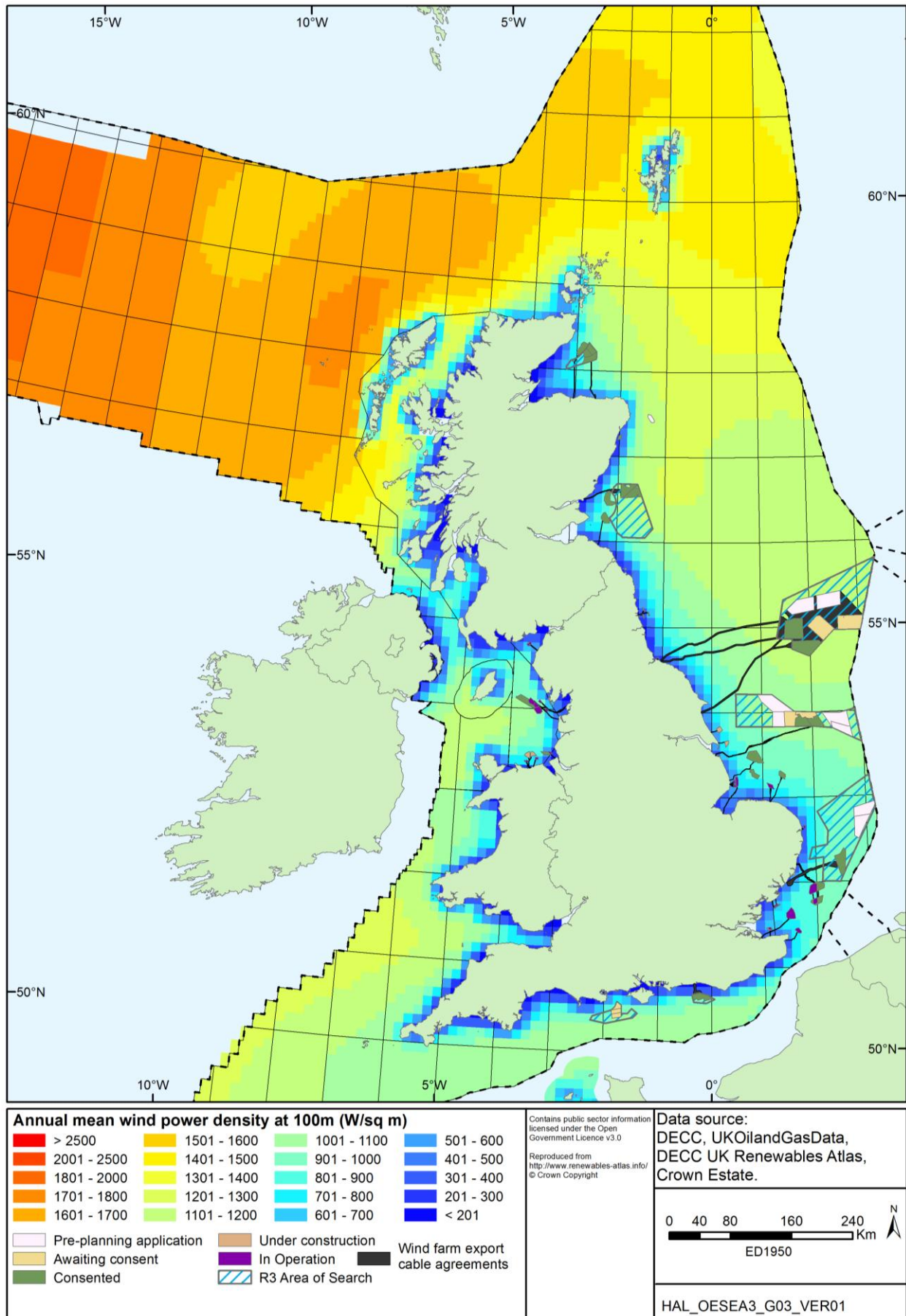


Figure 1.7: Annual mean wave power and current wave leasing areas and status

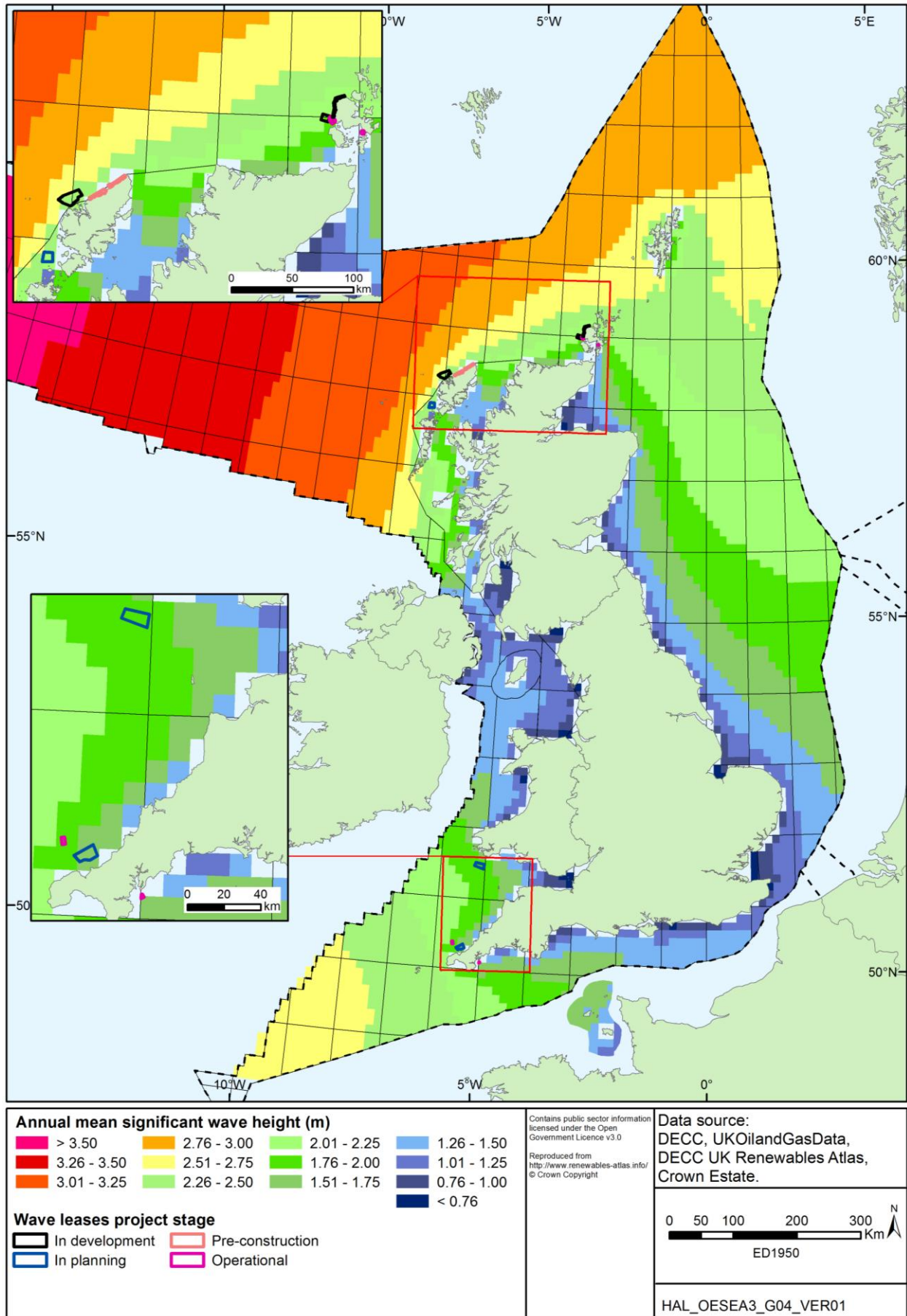


Figure 1.8: Annual mean tidal power and current tidal stream leasing areas and status

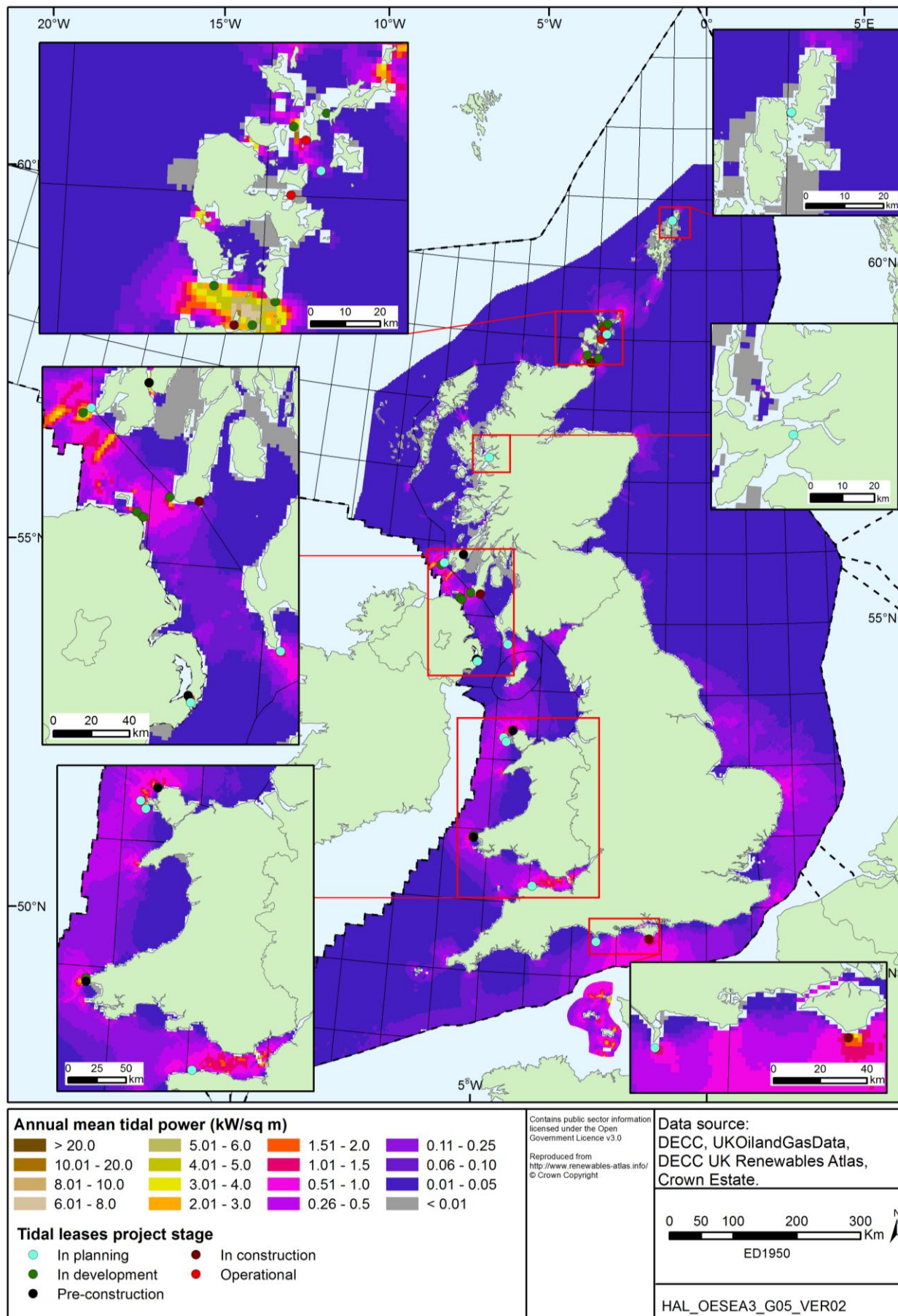
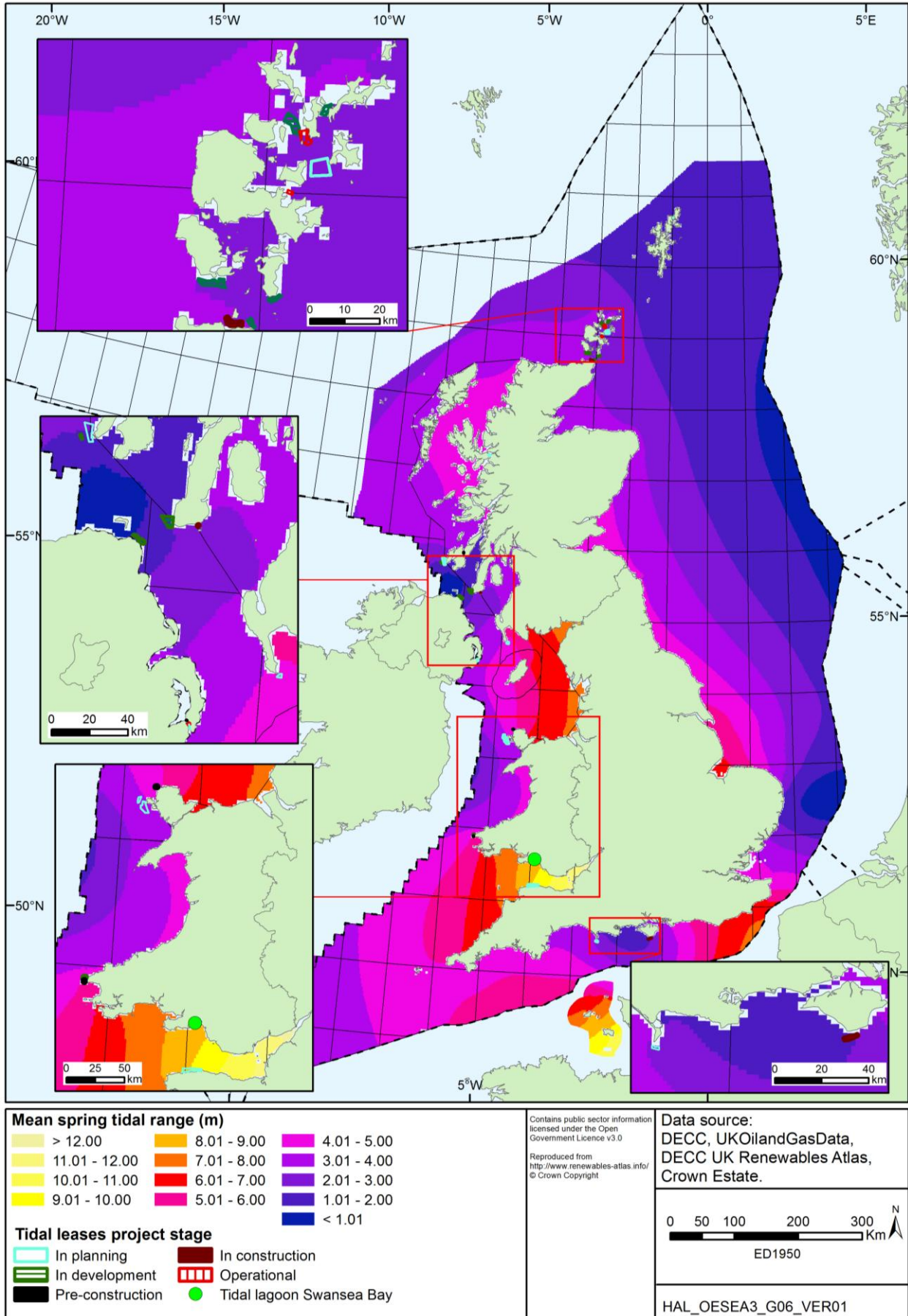


Figure 1.9: Mean spring tidal range and current tidal range leasing areas and status



2 Other Relevant Plans and Programmes

The Environmental Assessment of Plans and Programmes Regulations 2004 (Schedules 1 and 2) require that within a SEA Environmental Report consideration is given to:

“an outline of the contents and main objectives of the plan or programme, and of its relationship with other relevant plans and programmes” and that consideration is given to the degree to which the *“plan or programme influences other plans and programmes including those in a hierarchy”*

and;

“the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation”.

The following sections outline the main relevant initiatives (including plans and programmes, and environmental protection measures) and statutory measures established at international, European Community, UK and UK constituent country level, which are relevant to this plan/programme for those topics listed below. The initiatives are arranged by SEA topic area¹⁶, as will be the environmental baseline of this SEA. Where legislation is listed, these are the most pertinent acts/bills/regulations etc. and should not be regarded to be part of a definitive list.

The outputs of a number of initiatives provide baseline information in terms of the status of certain areas within the SEA topics and their trajectory (e.g. monitoring and reporting outcomes), and a number of plans or programmes are ongoing and due to provide further outputs during preparation of the Environmental Report. These are highlighted in Section 3.2.

Consultation Question

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

¹⁶ As given in Annex I(f) of the SEA Directive.

Biodiversity, Habitats, Flora & Fauna	
International	<p>Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)</p> <p>Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971, 1982)</p> <p>United Nations Convention on Biodiversity (the Rio Convention, 1992)</p> <p>Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention, 1979)</p> <p>The International Council for the Exploration of the Sea (ICES) Code of Practice for the Introduction and Transfer of Marine Organisms</p> <p>International Convention for the control of ships ballast water and sediments ((adopted 2004, ratified in 30 States in 2005)</p> <p>Strategic Plan for Biodiversity 2011-2020 (UNEP/CBD/COP/DEC/X/2) and the Aichi Biodiversity Targets (UNEP/CBD/COP/10/9)</p>
Regional	<p>Convention for the Protection of the Marine Environment of the North East Atlantic (the OSPAR Convention, 1992)</p> <p>OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas, and OSPAR Recommendation 2010/2 on amending Recommendation 2003/3 on a network of Marine Protected Areas</p> <p>OSPAR Agreement 2005-6 on the Agreement on Background Concentrations for Contaminants in Seawater, Biota and Sediment</p> <p>OSPAR List of Threatened and/or Declining Species and Habitats.</p> <p>Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention, 1979)</p> <p>Agreement on the Conservation of Small Cetaceans of the Baltic North East Atlantic, Irish and North Seas (1994)</p> <p>Convention for the Conservation of Salmon in the North Atlantic Ocean (1983)</p> <p>Council of Europe Strategy on Invasive Alien Species (2003)</p> <p>OSPAR Quality Status Report 2010</p>
Europe	<p>Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora</p> <p>Directive 2009/147/EC on the Conservation of Wild Birds</p> <p>Directive 2004/35/EC on environmental liability (and amendments through 2006/21/EC, 2009/31/EC and 2013/30/EU)</p> <p>The WFD with respect to achieving good ecological status in transitional and coastal waters.</p> <p>Marine Strategy Framework Directive 2008/56/EC</p> <p>Council of Europe Strategy on Invasive Alien Species (2003)</p> <p>EU Biodiversity Communication (2006)</p> <p>Action Plan: Halting the loss of biodiversity by 2010 and beyond (2006)</p> <p>Proposal for the seventh EU Environment Action Programme to 2020, "Living well, within the limits of our planet". (adopted 2013)</p> <p>Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)</p>
UK	<p><i>National Parks and Access to the Countryside Act 1949</i></p> <p><i>The Wildlife and Countryside Act 1981</i> (as amended - note there are a number of amending Regulations specific to devolved administrations)</p> <p><i>Natural Environment and Rural Communities Act 2006</i></p> <p><i>The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007</i> (as amended)</p> <p><i>The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001</i> (as amended)</p> <p><i>The Conservation of Habitats and Species Regulations 2010</i></p> <p><i>Marine and Coastal Access Act 2009</i></p> <p><i>The Marine Strategy Regulations 2010</i> (as amended)</p> <p>Safeguarding our Seas: A strategy for the conservation and sustainable development of our marine environment (2002)</p> <p>Review of Marine Nature Conservation (Defra 1999 onwards) and response, Safeguarding Sea Life (2005)</p> <p>Our Seas - a shared resource. High Level Marine Objectives (2009)</p> <p>Charting Progress 2 - An Assessment of the State of UK Seas (2010)</p> <p>Marine Policy Statement (2011)</p> <p>UK Government Sustainable Development Strategy: Securing the Future (2005)</p> <p>Mainstreaming sustainable development: The Government's vision and what this means in practice (2011) and progress reporting (2013)</p> <p>UK National Ecosystem Assessment (2011) and follow on (2014)</p> <p>Marine Strategy Part 1: UK Initial Assessment and Good Environmental Status (2012)</p> <p>Marine Strategy Part 2: UK Marine Monitoring Programmes (2014)</p> <p>Marine Strategy Framework Directive (MSFD) Proposals for UK Programme of Measures (2015)</p> <p>The UK Post-2010 Biodiversity Framework (2012)</p> <p>Invasive non-native species framework strategy for Great Britain (2008, under review)</p> <p>Habitats Directive Implementation Review (2012-2013) and the work of the Marine Evidence Group (established 2012)</p> <p>NERC Marine Environmental Mapping Programme (MAREMAP)</p>

Countryside and Rights of Way Act 2000 - England and Wales
The Eels (England and Wales) Regulations 2009
The Conservation of Habitats and Species Regulations 2010 (as amended) - England and Wales
 National Policy Statements for Energy (2011): - England and Wales
 Overarching National Policy Statement for Energy (EN-1)
 National Policy Statement for Renewable Energy Infrastructure (EN-3)
 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
 The National Planning Policy Framework (2012) - England
 East Inshore and Offshore Marine Plans (2014) - England
 South Inshore and Offshore Marine Plans (ongoing) - England
 Biodiversity 2020: A strategy for England's wildlife and ecosystem services (2011) and progress update (2013)
 The Natural Environment White Paper. The natural choice: securing the value of nature (2011) and implementation updates (2011-2014) - England
 The Marine Conservation Zone Project - England
 Marine Aggregate Levy Sustainability Fund (MALSF) Regional Environmental Characterisations including : South Coast, Thames, East Coast and the Humber areas.

Environment Bill White Paper (2013-2014) - Wales
 Technical Advice Note 5: Nature Conservation and Planning 2013 - Wales
 Planning Policy Wales Edition 7 (2014)
 Wales Biodiversity Framework (2010)
 Environment Strategy for Wales (2006) and annual progress reporting (2012)
 One Wales, One Planet: Sustainable Development Scheme of the Welsh Assembly Government (2009)
 The Living Wales Programme (2010-2013)
 Sustainable development for Welsh seas: Our approach to marine planning in Wales (2011)
 Welsh National Marine Plan (ongoing)
 Marine Conservation Zone Project Wales (ongoing)

The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) - Scotland
Nature Conservation (Scotland) Act 2004
The Environmental Liability (Scotland) Regulations 2009 (as amended)
Marine (Scotland) Act 2010
 Planning Series Circular 6/2013: Development Planning (2013) - Scotland
 Scottish Planning Policy (2014) and the National Planning Framework for Scotland 3 (2014)
 Scotland's National Marine Plan (2015)
 A Follow up to Seas the Opportunity: A Strategy for the Long Term Sustainability of Scotland's Coasts and Seas (2007)
 Scotland's Biodiversity: It's In Your Hands (2004) and 2020 Challenge for Scotland's Biodiversity (2013)
 The Scottish MPA Project (ongoing)

Nature Conservation and Amenity Lands (Northern Ireland) Order 1985
Wildlife (Northern Ireland) Order 1985
Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995 (as amended)
The Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 (as amended)
Marine Act (Northern Ireland) 2013
 Planning Policy Statement 2: Natural Heritage (2013) - Northern Ireland
 Strategic Planning Policy Statement For Northern Ireland (2015)
 Northern Ireland Biodiversity Strategy (2002)
 MCZ Project Northern Ireland (ongoing)
 The Marine Plan for Northern Ireland (ongoing)

Key Objectives and Targets

Article 3 of the Habitats Directive 92/43/EEC provides for the creation of a coherent ecological network of European sites (Natura 2000) made up of Special Areas of Conservation (SACs), which are set up to conserve those species listed in Annex I and habitats listed in Annex II of the directive; and those sites designated as Special Protection Areas (SPAs) for bird species under Annex I (rare or vulnerable) and II (migratory) of the Wild Birds Directive 2009/147/EC.

The Conservation of Species and Habitats Regulations 2010 consolidates the Conservation (Natural Habitats, &c.) Regulations 1994 in England and Wales, and also implements certain aspects of the *Marine and Coastal Access Act 2009*, principally the transfer of certain licensing functions from Natural England to the MMO, and the recognition of Marine Enforcement Officers to be able to use powers under the *Marine and Coastal Access Act 2009* and to enforce offences under the Habitats Regulations, within England, Wales and Scotland (for reserved matters) and their respective territorial seas. Devolved administrations implement the Habitats Directive through *The Conservation (Natural Habitats, &c.) Regulations 1994* (as amended) in Scotland, and *The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995* (as amended) in Northern Ireland. The Wild Birds Directive is also implemented through the above Regulations, and also through the *Wildlife & Countryside Act 1981* (as amended), the *Wildlife (Northern Ireland) Order 1985* and the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985* (as amended). *The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended) apply the Habitats Directive and the Birds Directive beyond territorial waters (beyond 12nm). These Regulations together provide for the designation and protection of European sites and the protection of European Species in the UK and UK waters. It should be noted that modification to the 2007 Regulations by the *Energy Act 2008 (Consequential Modifications) (Offshore Environmental Protection) Order 2010* are such that *The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* cover Habitats Regulations Assessment requirements of activities authorised under the *Petroleum Act 1998*, Part 1 of the *Energy Act 2008* (Gas Importation and Storage), or any Energy Act licence (e.g. oil and gas exploration and production, carbon dioxide appraisal and storage and gas storage, offshore pipelines).

Under *The Conservation of Species and Habitats Regulations 2010*, Regulation 35 (or 28 and 33 for the Northern Ireland and Scottish Regulations respectively) requires that the conservation bodies (e.g. Natural England, Joint Nature Conservation Committee (JNCC), Natural Resources Wales (NRW), SNH, Northern Ireland Environment Agency (NIEA)) produce advice on the conservation objectives for marine sites and activities likely to cause deterioration/disturbance to qualifying site habitats and/or species. Such advice has been previously produced by each body, and conservation advice packages are currently being reviewed or produced for a range of MPAs by Natural England under both Regulation 35 (Natura 2000) and the *Marine and Coastal Access Act 2009* (for Marine Conservation Zones, see below).

Following the publication of the Natural Environment White Paper, *The Natural Choice: securing the value of nature* (2011), a review was undertaken of the implementation of the Wild Habitats and Birds Directives, which identified four areas for change: Facilitating nationally significant infrastructure projects, improving implementation processes and streamlining guidance, improving the quality, quantity and sharing of data, and Improving the customer experience. A summary of measures was set out to achieve this (see page 4 of the Report of the Habitats and Wild Birds Directives Implementation Review), and progress was reported in 2013 which indicated that most of the measures listed in the review had been implemented. The white

paper and review, like the National Planning Policy Framework, are consistent with the UK Government's wider approach to Sustainable Development¹⁷.

The Wildlife and Countryside Act 1981 (as amended) is one of the principal pieces of legislation relating to nature conservation in Great Britain. Although protection under the Act generally includes adjacent territorial waters (12nm), for certain species protection is limited to 6nm from coastal baselines¹⁸ due to the interaction with the Common Fisheries Policy and for the designation of Marine Nature Reserves out to 3nm. The Act is supplemented by various other pieces of legislation including the *Countryside and Rights of Way Act 2000* (in England and Wales) and the *Nature Conservation (Scotland) Act 2004* (in Scotland). In Northern Ireland, the main legislation is contained in the *Wildlife (Northern Ireland) Order 1985* (as amended) and *The Environment (Northern Ireland) Order 2002*. This legislation provides for the protection of species and the designation of nationally important sites known as Sites of Special Scientific Interest (SSSI) in England, Wales and Scotland and as Areas of Special Scientific Interest (ASSI) in Northern Ireland. Many SSSIs and ASSIs are also designated as European Sites. SSSI sites have until present extended only to Mean Low Water (e.g. intertidal areas), though the *Marine and Coastal Access Act 2009* (see below for further details) has allowed for all new SSSIs to extend below this line should features extend into the intertidal area.

Directive 2004/35/EC on environmental liability (and amendments through 2006/21/EC, 2009/31/EC and 2013/30/EU) with regard to the prevention and remedying of environmental damage (primarily transposed through the *Environmental Damage (Prevention and Remediation) Regulations 2015* – separate regulations apply in the devolved administrations) applies to environmental damage caused to *inter alia* species and habitats protected at the community level, i.e. those covered under the Birds and Habitats Directives. Amendments made via Directive 2013/30/EU on the safety of offshore oil and gas operations, makes these Regulations relevant to certain offshore activities.

The Marine Strategy Framework Directive (MSFD, transposed by *The Marine Strategy Regulations 2010*) establishes a framework within which Member States must take measures to achieve or maintain good environmental status (GES) in the marine environment by the year 2020. Annex I of the MSFD contains eleven qualitative descriptors for determining GES. While they are relevant to a range of SEA topic areas, these are reproduced below as they are variously referred to in later sections:

1. Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
2. Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
3. Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.

¹⁷ Mainstreaming Sustainable Development

¹⁸ *The Territorial Sea (Baseline) Order 2014*

4. All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
5. Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
6. Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
7. Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.
8. Concentrations of contaminants are at levels not giving rise to pollution effects.
9. Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
10. Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
11. Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

As part of the implementation of the MSFD, the UK Government released Marine Strategy Part 1: UK Initial Assessment and Good Environmental Status (2012). The report includes an initial assessment of UK seas, primarily derived from work undertaken for Charting Progress 2, an outline of the characteristics of GES for each MSFD descriptor as defined for the UK, and targets and indicators which may be used to achieve and monitor progress towards GES. The Marine Strategy Part 2, published in 2014, provides a description of the UK's marine monitoring programmes to support the targets and indicators set out for each of the eleven MSFD descriptors, and the UK's proposed programme of measures to maintain or achieve GES was subject to consultation in early 2015.

Included in MSFD measures to achieve GES is the establishment of a cohesive network of Marine Protected Areas which is intended to build on the areas already protected as European marine sites under the Birds and Habitats Directives. Sites established under The *Marine and Coastal Access Act 2009*, and Acts of the devolved administrations, will aid the completion of such a network of MPAs, which is also a requirement of other commitments regarding MPAs under international conventions such as the Convention on Biological Diversity. These sites which may be designated both within territorial and offshore waters are known as Marine Conservation Zones (MCZs) in England, Wales and Northern Ireland, and Marine Protected Areas (MPAs) in Scotland, administered at the local level in each UK constituent country.

The MCZ project in England and Wales was initially delivered through four regional projects administered by Natural England and the JNCC, covering the South-West (Finding Sanctuary), Irish Sea (Irish Sea Conservation Zones), North Sea (Net Gain) and Eastern Channel (Balanced Seas). The sites were selected based on representative habitat and species features (termed Features of Conservation Importance, FOCI), subject to consultation with a range of relevant stakeholders, and to several rounds of consideration by the Science Advisory Panel (SAP) prior to recommended sites being submitted in 2011. The result was the identification of 127

recommended MCZs and Reference Areas (sites within which strict environmental protection measures essentially made then had constraints of activities). Formal advice was then given to Government in July 2012 by JNCC and Natural England, with 27 sites being designated in 2013 following consultation. Some sites were not designated in this first tranche due to a lack of robust evidence to support the presence or nature of certain FOCl, or their potential impact on activities such as renewable energy cable landfall. Subsequently, an additional 23 sites were proposed in a second tranche consultation in 2015 (expected to be finalised in 2016), with additional features proposed for 10 of the sites designated in the first tranche. A number of other sites (e.g. Compass Rose, Celtic Deep) were withheld based on evidence limitations. A third tranche of designations is expected to be consulted on in 2016. The location of these sites and the features for which they have been selected will be mapped and described in the OESEA3 Environmental Report.

Scottish territorial and offshore waters, and the territorial waters of Wales and Northern Ireland, are subject to their own programmes of MCZ/MPA identification and designation. In Wales, the Welsh Assembly Government (WAG) is running the Wales MCZ Project, which is advised by a Steering Group and a Technical Advisory Group. The former consists of WAG, NRW, the Welsh Local Government Association and other relevant bodies in Wales, with the latter having a broader array of advisers including the JNCC and Centre for Environment, Fisheries and Aquaculture Science (Cefas). The Welsh Assembly Government intends to use the new MCZ powers to supplement the existing network of marine protected areas (e.g. offshore SACs) with a limited number of highly protected sites. A consultation on 10 proposed sites was undertaken in 2012, however none of the proposed sites have yet been put forward for designation. In UK offshore waters adjacent to Scotland, MPAs are being identified through a Scottish Marine Protected Area Project under the *Marine and Coastal Access Act 2009*, with those in Scottish Territorial Waters through the *Marine (Scotland) Act 2010*. The Scottish MPA project identified proposals for 33 MPAs and 4 MPA search locations yet to be fully assessed which were consulted on in 2013. 30 of the sites were designated in 2014 under Marine Protected Area Orders. The location of these sites and the features for which they have been selected will be mapped and described in the OESEA3 Environmental Report.

The Department of Environment (Northern Ireland) published, *A draft Strategy for Marine Protected Areas in the Northern Ireland Inshore Region*, for consultation in May 2013. The strategy outlines the approach in Northern Ireland to the creation of MCZs in their territorial waters, which will be designated under the *Marine Act (Northern Ireland) 2013*. Strangford Lough was the first MCZ in Northern Ireland, replacing its former designation as a Marine Nature Reserve under the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985*. It is expected that proposed MCZs will be ready for consultation in December 2015, with designation in December 2016.

The High Level Marine Objectives agreed by the UK Government and Devolved Administrations set out an approach to the sustainable use of UK seas, including the recognition that healthy marine habitats and ecosystems, species and biodiversity should be maintained and where appropriate recovered. These objectives underpin the MPS, and the next stage of marine planning (regional Marine Plans) is presently underway, with the first two plans (East Inshore and East Offshore) adopted in 2014, and the second set (South Inshore and South Offshore) presently underway. These plans are to implement policies consistent with the MPS while considering individual regional characteristics.

A number of potential impacts on the natural environment from energy developments relevant to OESEA3 are identified in the MPS. More widely and in relation to all marine activities, high level environmental considerations are provided by reaffirming the conservation responsibilities

of the UK Government which are to be taken account of in the preparation of Marine Plans (presently ongoing). This includes the commitment to establishing a UK network of MPAs incorporating the new MCZ designation under the *Marine and Coastal Access Act 2009* (see above) and existing and future marine sites including SACs and SPAs.

Northern Ireland are to develop their own National marine plan under the *Marine and Coastal Access Act 2009* for offshore waters, with inshore marine planning to be covered by the *Marine Act (Northern Ireland) 2013*. Other devolved administrations have similarly published (Scotland's National Marine Plan, 2015) or are drafting (Welsh National Marine Plan) their own National plans.

To date the vast majority of designated conservation sites in the UK have been terrestrial or terrestrial with marine components, with very few being entirely marine in nature. More recently a number of offshore sites have been designated as a Site of Community Importance (SCIs) (e.g. Dogger Bank), with others in the process of being designated (e.g. Pobie Bank cSAC, Solan Bank cSAC), and work is underway to identify and extend a number of marine SPAs (e.g. Flamborough and Filey Coast pSPA, range of draft SPAs in Scottish territorial waters). These sites, and those sites to arise from the designation of MCZs and Scottish MPAs, provide the basis for extending the network of national and European sites into offshore waters and the creation of an ecologically coherent network in the marine environment.

The UK Biodiversity Action Plan (UKBAP) provides a national strategy for the conservation of biological diversity and the sustainable use of biological resources as required under Article 6 of the Rio Convention. A number of species (1,150) and habitats (65) have been identified as being priorities for conservation action in the UK, and these include a number of marine components, for instance 28 BAP habitats are marine. Though the plans for these species and habitats have no statutory status, they are given some legal basis in the *Countryside and Rights of Way Act 2000* and the *Natural Environment and Rural Communities Act 2006* (e.g. list of species of principal importance designated under Sections 41 and 42 of the Act).

In 2010 the EU published guidance on the development of wind farms in accordance with EU nature legislation, specifically Natura 2000 aimed at (including others) planners, developers and consultants. In addition to planning guidance and policy background, the document identifies potential impacts arising from both onshore and offshore wind farms on birds, bats and aquatic species (e.g. cetaceans), and how strategic planning can help to avoid or minimise environmental conflicts.

Additionally, study programmes to support regional assessments of long-term effects of oil and gas developments (on behalf of Oil and Gas UK and the UK Government/Industry Environmental Monitoring Committee); and studies to support assessment and monitoring of specific offshore or nearshore energy projects (e.g. those associated with the SeaGen development in Strangford Lough, monitoring of offshore wind under (formerly) FEPA and marine licence conditions) have also contributed to knowledge in this topic area.

National Policy Statements were published in 2011 and were aimed at providing a policy steer for Nationally Significant Infrastructure Projects (NSIPs) as detailed in the *Planning Act 2008*. Those which are of close relevance to OESEA3 are:

- Overarching National Policy Statement for Energy (EN-1)
- National Policy Statement for Renewable Energy Infrastructure (EN-3)

- National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

Each National Policy Statement was subject to an Appraisal of Sustainability (AoS) incorporating Strategic Environmental Assessment and Habitats Regulations Assessment (HRA). The Overarching National Policy Statement for Energy (EN-1) contains policy in relation to, amongst other considerations, generic biodiversity impacts; whereas the energy specific policy statements contain more detailed considerations, although still at a high policy level. Each National Policy Statement contains considerations relevant to potential impacts on the natural environment, including that within the remit of the draft plan/programme, such as birds, marine mammals, fish and intertidal habitats. Decisions made by the relevant authority with regards to NSIPs must also be taken with regard to the MPS and any relevant Marine Plan.

In addition to threats posed from marine development and climate change, the marine environment has recently been subject to a number of introduced species which have led to a series of localised changes in community composition. The introduction of alien non-native species is considered one of the greatest threats to loss to biodiversity, can cause economic and ecological damage (Cook *et al.* 2013), and may be accentuated by predicted climate change. A number of national and international initiatives exist aiming to recommend and introduce safeguards to limit the transport of invasive species, including the GloBallast Partnership Programme and the Invasive Non-native Species Strategy for Great Britain (currently under review).

Implications for SEA

The SEA should consider the implications of the draft plan/programme and its alternatives in relation to the current location of nationally and internationally important sites and the species, or habitats for which they are designated, and any sites which are currently being considered for designation. Additionally, the SEA should consider the wider UKCS baseline based on presently available evidence, establish its trajectory, any environment issues, and information gaps. The SEA must consider the potential implications of the draft plan/programme on attaining good ecological/environmental status of both marine and coastal/estuarine waters under the Water Framework Directive (WFD) and MSFD, in the context of the wider range of legislative and other measures in place or available to help avoid any likely significant effects.

2.1 Geology, Substrates and Coastal Processes

Geology, Substrates & Coastal Processes	
International	The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the London Convention) and 1996 Protocol Thereto (amendment on the storage of CO ₂ in geological formations came into force 10 February 2007).
Regional	OSPAR Recommendation 2003/3 on a Network of Marine Protected Areas OSPAR Agreement 2005-6 on the Agreement on Background Concentrations for Contaminants in Seawater, Biota and Sediment OSPAR Recommendation 2006/5 on a management regime for offshore cuttings piles OSPAR Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations
EU	EC Habitats Directive 92/43/EEC (1992) Water Framework Directive 2000/60/EC (consolidated version) Directive 2007/60/EC on the assessment and management of flood risks Communication from the Commission Report to the European Parliament and the Council: An evaluation of Integrated Coastal Zone Management (ICZM) in Europe 2007. COM(2007)308 final Marine Strategy Framework Directive 2008/56/EC Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide
UK	<i>The Wildlife and Countryside Act 1981</i> <i>Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)</i> <i>Marine and Coastal Access Act 2009</i> <i>The Marine Strategy Regulations 2010</i> <i>The Storage of Carbon Dioxide (Licensing etc.) Regulations 2010</i> <i>The Energy Act 2008 (Consequential Modifications) (Offshore Environmental Protection) Order 2010</i> <i>The Energy Act 2011</i> The UK Marine Policy Statement (2011) Geological Conservation Review (GCR) Local Geological Sites, including Regionally important Geological and Geomorphological Sites (RIGS) Marine Conservation Zones (and equivalent designations under the devolved administrations) Defra Consultation on Coastal Change Policy (2009), Coastal Change Pathfinder and Review (2012) National Coastal Erosion Risk Mapping Project (ongoing) CCS Roadmap: Supporting deployment of Carbon Capture and Storage in the UK (2012) - also see Next Steps in CCS: Policy Scoping Document (2015) - England and Wales The MCA Civil Hydrography Programme NERC Marine Environmental Mapping Programme (MAREMAP) Marine Strategy Part 1: UK Initial Assessment and Good Environmental Status (2012) Marine Strategy Part 2: UK Marine Monitoring Programmes (2014) Marine Strategy Framework Directive (MSFD) Proposals for UK Programme of Measures (2015)

Coast Protection Act 1949 (as amended) - England and Wales
Countryside and Rights of Way Act 2000 - England and Wales
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
The Conservation of Habitats and Species Regulations 2010 - England and Wales
 Marine Mineral Guidance Note 1: Guidance on the Extraction of Sand, Gravel and Other Minerals from the English Seabed (2002)
 National Policy Statements for Energy (2011): - England and Wales
 Overarching National Policy Statement for Energy (EN-1)
 National Policy Statement for Renewable Energy Infrastructure (EN-3)
 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
 National Planning Policy Framework (2012) - England
 East Inshore and Offshore Marine Plans (2014) - England
 South Inshore and Offshore Marine Plans (ongoing) - England
 A Strategy for Promoting an Integrated Approach to the Management of Coastal Areas in England
 Making space for water: Taking forward a new Government strategy for flood and coastal erosion risk management in England (2008)
 National flood and coastal erosion risk management strategy for England (2011)
 Shoreline Management Plans - England and Wales
 Marine Aggregate Levy Sustainability Fund (MALSF) Regional Environmental Characterisations including : South Coast, Thames, East Coast and the Humber areas.
 The Marine Conservation Zone Project - England (ongoing)

Making the Most of Wales' Coast. The Integrated Coastal Zone Management Strategy for Wales (2007) - under review as part of national marine planning for Wales (expected 2015)
 Technical Advice Note 5: Nature Conservation and Planning (2009) - Wales
 Technical Advice Note 14: Coastal Planning (1998) - Wales
 Technical Advice Note 15: Development and Flood Risk (2004) - Wales
 Interim Marine Aggregates Dredging Policy (2004) - Wales
 Marine Conservation Zone Project Wales (ongoing)
 Welsh National Marine Plan (ongoing)

Marine (Scotland) Act 2010
The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) - Scotland
Water Environment and Water Services (Scotland) Act 2003 (as amended)
The Storage of Carbon Dioxide (Licensing etc.) (Scotland) Regulations 2011 (as amended)
 The Scottish Coastal Forum and Local Coastal Partnerships (established 1996)
 A Follow up to Seas the Opportunity: A Strategy for the Long Term Sustainability of Scotland's Coasts and Seas (2007)
 Scottish Planning Policy (2014) and the National Planning Framework for Scotland 3 (2014)
 Scotland's National Marine Plan (2015)
 The Scottish MPA Project (ongoing)

Marine (Northern Ireland) Act 2013
The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003
 Earth Science Conservation Review (Northern Ireland)
 An Integrated Coastal Zone Management Strategy for Northern Ireland 2006-2026 (2006)
 Planning Policy Statement 15: Planning and Flood Risk (2006) - Northern Ireland
 MCZ Project Northern Ireland (ongoing)
 The Marine Plan for Northern Ireland (ongoing)

Key Objectives and Targets

The Geological Conservation Review (GCR), launched in 1977, identifies the most important (nationally and internationally) terrestrial geological sites in Britain. GCR sites are chosen such that they satisfy the legal requirements of SSSI designations for geology and physiography, and therefore they often geographically coincide with notified Earth Science-SSSIs (e.g. in Scotland 77% of sites are designated in such a way) or those which are awaiting notification. The *Marine and Coastal Access Act 2009* also amends the *Wildlife and Countryside Act 1981* in such a way that SSSI notifications can be made in England and Wales below the Mean Low Water Mark (MLWM) under certain statutory conditions, set out in the Act (e.g. the flora, fauna or features

leading to the notification of the SSSI are also present in the subtidal area to which SSSI protection is to extend). The Act also provides powers to remove SSSI notifications where they coincide with new MCZs in England and Wales. Locally important sites are recognised through the Regionally Important Geological and Geomorphological Sites (RIGS) programme, though only SSSI features have any form of statutory protection.

In the marine environment, many geological features are gaining protection through designations for which they are a qualifying habitat feature (e.g. SACs designated under the Conservation of *Habitats and Species Regulations 2010*). The *Marine and Coastal Access Act 2009*, *Marine (Scotland) Act 2010* and *Marine Act (Northern Ireland) 2013* provide a means for the conservation of specific “features of geological and geomorphological interest” through the designation of MCZs or MPAs. The number of sites subject to consultation by the relevant conservation bodies have been summarised above in relation to Biodiversity, Habitats, Flora and Fauna. The location of these sites and features for which they are to be designated will be mapped and discussed in the Environmental Report.

At the coast, natural denudation processes are leading to shoreline retreat and increased flood risk in many cases, which may be accentuated by projected climate and associated environmental change, which is projected to include increased storminess and sea-level rise (see Climate & Meteorology, below), and is recognised in national climate change adaptation programmes. Integrated Coastal Zone Management and appropriate planning policy aims to help manage and mitigate the problems associated with *inter alia* coastal erosion and flood risk. The *Flood and Water Management Act 2010* (England and Wales), the *Flood Risk Management (Scotland) Act 2009* and *The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009* make provisions for the creation of flood risk (and in the case of England and Wales, coastal erosion) management strategies/plans. In addition to these, terrestrial and marine planning policy for England (including in relation to NSIPs) and the devolved administrations provides policy and guidance for developers and authorities on how to manage development at the coast, incorporating aspects relating to climate change (such as increased sea-levels) and the prohibition of unnecessary or inappropriate development in areas subject to erosion and coastal flooding (e.g. the creation of Coastal Change Management Areas). Shoreline Management Plans (In England and Wales) are already taking a longer term view by identifying sustainable management approaches of relevance for up to the next 100 years. Each SMP provides policy recommendations for coastal areas which may advise Holding the Line (HTL), through the maintenance of present defences or where monitoring and assessment provide evidence that new defences would be beneficial; No Active Intervention (NAI), where defences are not maintained and Managed Realignment (MR) or Retreat (R), where defences are removed and/or moved inland to allow for natural coastal denudation. Policies are provided in each SMP over three ‘epochs’, 2009-2025, 2025-2055 and 2055-2105.

The WFD seeks to achieve good ecological status for coastal and estuarine water bodies. River Basin Management Plans (RBMPs) completed for England and the devolved administrations (presently being updated and consulted upon) are one of the principal means that the WFD has been implemented in the UK and will be used in combination with other plans including SMPs to achieve a fully integrated approach to coastal management. RBMPs identify relevant morphological and hydrodynamic issues and the measures to manage such issues. Similarly, the MSFD seeks to achieve GES in the marine environment, which incorporates geomorphological conditions. These objectives, aligned with the published and forthcoming Marine Plans should provide a holistic consideration of the geological aspects of the marine and terrestrial environment across the intertidal and coastal areas of the UK.

Internationally, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the London Convention) and 1996 protocol provide environmental law for

the permanent storage of CO₂ in geological formations. The amendments to the 1996 protocol, which entered into force on 10th February 2007, state that, “carbon dioxide streams may only be considered for dumping, if: disposal is into a sub-seabed geological formation; they consist overwhelmingly of carbon dioxide (they may contain incidental associated substances derived from the source material and the capture and sequestration processes used); and no wastes or other matter are added for the purpose of disposing of them.” OSPAR Decision 2007/02 on the Storage of Carbon Dioxide Streams in Geological Formations, states that all contracting parties should not allow storage of CO₂ in geological formations without authorisation or regulation from their competent authorities. The decision also indicates what any permit or approval should, at least, contain. Directive 2009/31/EC establishes a European level legal framework for the environmentally safe storage of CO₂ by member states in their EEZ and Continental Shelf. The basis for this Directive is that CCS can provide a bridging technology whereby carbon emissions can be attenuated while renewable technologies and associated technologies provide a more sustainable energy source. The Directive also sets out a number of requirements of member states in the selection of geological stores and a permitting and monitoring regime.

At the UK level, the *Energy Act 2008* (as amended) provides a legislative basis permitting carbon storage on the UKCS, implemented by the Secretary of State for Energy and Climate Change, or Scottish Ministers in their Territorial Waters via *The Storage of Carbon Dioxide (Licensing etc.) Regulations 2010* and *The Storage of Carbon Dioxide (Licensing etc.) (Scotland) Regulations 2011*. The storage of carbon dioxide in geological formations is likely to take place in the UK within the next 10 years at least at a demonstrator level. Suitable formations may consist of saline aquifers, halite deposits or depleted hydrocarbon reservoirs. The UK Government CCS Commercialisation competition makes £1 billion capital funding available to support the design, construction and operation of the UK’s first commercial-scale CCS projects. Two preferred bidders were identified (Peterhead Project, Aberdeenshire and the White Rose project, Yorkshire) and DECC announced its intention in December 2013 to provide funding to support Front End Engineering Design (FEED) of the White Rose and Peterhead CCS Projects, and a final investment decision from DECC is due in 2016. Of these two projects, the White Rose project also secured up to €300m (approximately £238m) through the European Commission NER300 funding call in 2013. It is expected that after 2020 the technology will be economically and technologically proven. In preparation for this, all new fossil fuel power stations of a type covered by the Large Combustion Plant Directive and with a capacity of 300MWe or greater, are not to be consented unless it can be demonstrated that they are Carbon Capture Ready¹⁹. CCS projects are likely to be located in areas of high CO₂ emissions (e.g. Thames Estuary, Humberside, Merseyside, the Firth of Forth, Teesside and Tyneside), and the UK Government plans to promote their co-location. The *Energy Act 2011* makes a number of amendments to the *Energy Act 2008* with regards to the conversion of installations and pipelines for CCS demonstration along with a number of other provisions, including details relating to compulsory acquisition for CCS pipelines over land.

Implications for SEA

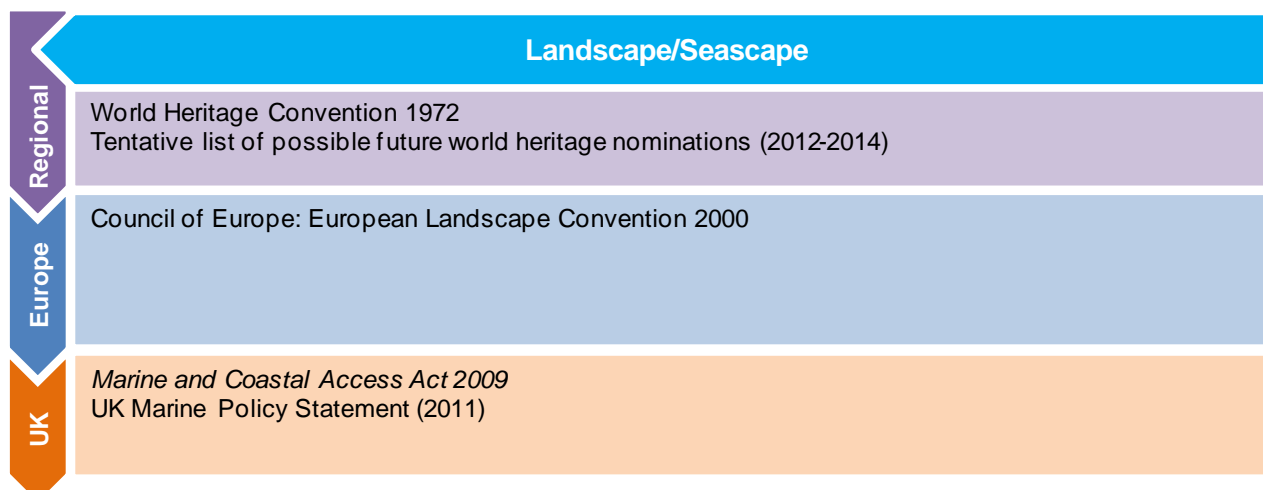
Activities which arise from adoption of the plan/programme should, through national (including devolved) planning policy and environmental regulation, avoid any impact on geological features of conservation interest including coastal GCRs and geological SSSIs. MCZs may be designated for features of geological and geomorphological interest, including by extending

¹⁹ DECC (2009). Carbon Capture Readiness (CCR). A guidance note for Section 36 Electricity Act 1989 consent applications. Also see, Carbon capture and storage – Commons Library Standard Note SN/SC/5086, 3rd May 2013.

earth science SSSIs to below the low water mark, with coastal Geological Conservation Review sites also available for consideration. A number of MCZs designations include geological characteristics which provide intertidal and subtidal habitats. The SEA will maintain awareness of proposals to designate offshore geological or geomorphological sites. It is noted that for many of those sites for which further consideration is required, reasons include that of potential socio-economic costs, including that to the renewable energy sector (e.g. for Holderness Offshore). UK RBMPs and Shoreline Management Plans, have provided an ecological and morphological baseline for UK estuaries and coasts which may be influenced by plan/programme activities, for instance the use of tidal range technologies could have implications for both estuarine morphology and ecology and the achievement of good ecological status. In addition to these surficial geological features, the CCS Directive makes provision for the appropriate use of geological formations for the storage of carbon dioxide, including under the seabed.

These will be considered in the OESEA3 environmental report, and will also be important considerations at a development specific level.

2.2 Landscape/Seascape



National Parks and Access to the Countryside Act 1949 - England and Wales
Environment Act 1995 - England and Wales
Countryside and Rights of Way Act 2000 - England and Wales
 National Policy Statements for Energy (2011): - England and Wales
 Overarching National Policy Statement for Energy (EN-1)
 National Policy Statement for Renewable Energy Infrastructure (EN-3)
 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
 The National Planning Policy Framework (2012) - England
 East Inshore and Offshore Marine Plans (2014) - England
 South Inshore and Offshore Marine Plans (ongoing) - England
 Seascape Character Assessments associated with the above Marine Plans
 The European Landscape Convention – The English Heritage Action Plan for Implementation (2009)
 European Landscape Convention: guidelines for managing landscapes (2010)
 The National Character Areas of England (updates ongoing)
 England Coast Path: improving public access to the coast (ongoing)
 English Heritage Historic Landscape and Seascape Characterisation (ongoing)
 National Heritage Protection Plan 2011-2015 (2011)

Seascape Assessment for Wales (2009)
 LANDMAP Wales (introduced 1997, revised 2003)
 Cadw/ICOMOS Register of Landscapes of Outstanding Historic Interest or Special Historic Interest
 Technical Advice Note 12: Design (Wales) (2009)
 Landscape Character Map for Wales (2009)
 National Seascape Character Assessment pilot and Guidance for Wales (2011)
 Sustainable development for Welsh seas: Our approach to marine planning in Wales (2011)
 Planning Policy Wales Edition 7 (2014)
 National marine plan for Wales (expected 2015)

Planning etc. (Scotland) Act 2006
Marine (Scotland) Act 2010
The Town and Country Planning (National Scenic Areas) (Scotland) Designation Directions 2010
 Natural Heritage Futures: A National Assessment of Scotland's Landscapes (2002, updated 2009)
 SNH's Landscape policy framework (2005)
 Scottish Planning Policy (2014) and the National Planning Framework for Scotland 3 (2014)
 Scotland's National Marine Plan (2015)

The Nature Conservation and Amenity Lands (Northern Ireland) Order 1985
Marine (Northern Ireland) Act 2013
 Planning Policy Statement 1: General Principles (1998) - Northern Ireland
 Landscape Character Areas of Northern Ireland (2006)
 Planning Policy Statement 18: Renewable Energy and Wind Energy Development in Northern Ireland's Landscapes (2009), and supplementary guidance on Wind Energy (2010)
 Northern Ireland's Landscape Charter (2014)
 Northern Ireland Regional Seascape Character Assessment (2014)
 The Marine Plan for Northern Ireland (ongoing)

Key Objectives and Targets

The European Landscape Convention and associated initiatives are presently targeting a move away from focussing on aesthetically "outstanding" areas to adopt a general focus which looks at the quality and sustainability of all landscapes. This is reflected in the National Character Area network in England (presently being reviewed), more local Landscape/Historic Character Assessment, and the analogous Landscape Character Map for Wales and that for Northern Ireland.

The MPS arising from the *Marine and Coastal Access Act 2009* was issued in March 2011. The MPS states that all coastal landscapes should be considered in the preparation of the next phase of marine spatial planning (Marine Plans), not just those which are protected through

designations, which is broadly complementary to the tenets of the European Landscape Convention (see policy SOC3 in the East inshore and Offshore Marine Plans). The East Inshore and Offshore marine planning process involved the commissioning of a methodological pilot study for seascape assessment, which was developed by Natural England and formalised in, *An approach to Seascape Character Assessment*, published in 2012. It is anticipated that this methodological approach will be replicated for the other marine plan areas as they are undertaken, and the assessment for the south marine plan areas has, amongst other sources and best practice, paid attention to this guidance.

In addition to direct considerations of landscape, the MPS and the *Marine and Coastal Access Act 2009* provide a legal and policy framework for the construction of a new national coastal trail in England and amenity land associated with this route which the public is free to use. The scheme for the implementation of this part of the Act in England and its methodology was drafted by Natural England and approved in 2010. Work is in progress on a number of stretches of coastal path, with future stretches planned up to 2019. The *Marine (Scotland) Act 2010* makes no similar provisions though both Scotland and Wales are planning their own equivalent trails. The Welsh route opened in 2012, with improvements and additional routes planned in the coming years. Though these coastal and national trails may not have a significant impact on seascape, it is possible that they will encourage more people to visit the coast for recreation and hence enhance the number of visitors (visual receptors) subject to views which could be altered by elements of the plan.

Planning policies, for instance The National Planning Policy Framework and the Energy National Policy Statements (e.g. EN-1 and EN-3), exact the highest degree of protection to "most valued" sites (i.e. statutory designated areas such as Areas of Outstanding Natural Beauty (AONBs)), but do not propose that development should be precluded within them where project design would not conflict with the interests and features for which the sites are designated. More generally, they state that all developments should be well designed and in keeping with the scale and character (modern and historic) of the local area. Linked to this topic is that of the historic environment (e.g. listed buildings, UNESCO world heritage sites, scheduled monuments), where their setting is considered to be relevant to their designation or appreciation²⁰, guidance for which has previously been produced by English Heritage in 2011 (presently under review).

Where developments fall within the visual range of receptors (i.e. people of all sorts, resident and transient) on the coast, or are intervisible from other viewing locations at sea, for instance from recreational or commercial vessels, their character, form, aspect, spatial extent and type of movement all influence how the seascape is experienced. In association with Round 3 of offshore wind farm leasing and the use of turbines of greater size and in greater number than those used previously, a number of studies and guidance documents were produced which relate to the assessment of seascapes in relation to offshore wind farms, but which have findings that may be more widely applicable to other marine energy devices which have surface infrastructure. Studies were undertaken by Wales and Scotland in relation to the potential impact of offshore wind, wave and tidal devices as standalone reports or as part of SEA.

²⁰ For instance, "essential setting" and "significant views" are identified in Wales in relation to registered Historic Parks and Gardens.

Implications for SEA

Activities that may arise from the draft plan/programme could introduce a number of new, possibly conflicting visual elements to the landscape/seascape of the UK. It will be important at the project level, and in the drafting of further regional and national Marine Plans, to account for the degree of change in visual character that this could represent. With the exception of offshore wind, (for which the most recent Round 3 developments are proposed to occur further offshore) most activities such as carbon dioxide storage, wave and tidal energy are likely to be represented by demonstration phase or pre-commercial devices or developments in the currency of this SEA. The visual impacts of these, particularly due to their small vertical aspect, is likely to be negligible compared to offshore wind, but development specific assessments will be required as, at present, a high number of generic device types have been postulated.

2.3 Water Environment

Water Environment	
International	<p>IMO International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78)</p> <p>International Convention for the Control and Management of Ships' Ballast Water and Sediments (adopted 2004, still to enter into force)</p> <p>International Convention on Oil Pollution Preparedness, Response and Co-operation (1990)</p> <p>Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972, as amended) 1996 protocol - revision to convention (2006) and amendments to 1996 protocol</p>
Regional	<p>Convention for the Protection of the Marine Environment of the North East Atlantic (the OSPAR Convention 1992)</p> <p>OSPAR Decision 2000/3 on the use of organic-phase drilling fluids (OPF) and the discharge of OPF-contaminated cuttings</p> <p>OSPAR Decision 2000/2 on a harmonised mandatory control system for the use and reduction of the discharge of offshore chemicals (as amended by decision 2005/1)</p> <p>OSPAR Recommendation 2000/5 on a Harmonised Offshore Chemical Notification Format (HOCNF), as amended by OSPAR Recommendation 2005/3 and 2008/2</p> <p>OSPAR Recommendation 2001/1 for the Management of Produced Water from Offshore Installations as amended by Recommendation 2006/4</p> <p>OSPAR Recommendation 2003/1 on the Strategy for the Joint Assessment and Monitoring Programme</p> <p>OSPAR Recommendation 2005/2 on Environmental Goals for the Discharge by the Offshore Industry of Chemicals that are, or Contain Added Substances, Listed in the OSPAR 2004 List of Chemicals for Priority Action</p> <p>OSPAR Recommendation 2006/3 on Environmental Goals for the Discharge by the Offshore Industry of Chemicals that are, or which Contain Substances Identified as Candidates for Substitution</p> <p>OSPAR Decision 2007/1 to Prohibit the Storage of Carbon Dioxide Streams in the Water Column or on the Sea-bed</p> <p>OSPAR Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations</p> <p>The North-East Atlantic Environment Strategy (OSPAR Agreement 2010-3)</p> <ul style="list-style-type: none"> OSPAR Biological Diversity and Ecosystems Strategy OSPAR Hazardous Substances Strategy OSPAR Offshore Oil and Gas Strategy OSPAR Radioactive Substances Strategy <p>OSPAR Co-ordinated Environmental Monitoring Programme (ongoing)</p> <p>OSPAR Quality Status Reports (QSRs) of the North Atlantic and its sub-regions (2000 & 2010)</p>

EU

Urban Waste Water Treatment Directive 91/271/EC
 Nitrates Directive 91/676/EC
 Water Framework Directive 2000/60/EC
 Directive 2004/35/EC on environmental liability (and amendments through 2006/21/EC, 2009/31/EC and 2013/30/EU)
 Bathing Water Directive 2006/7/EC
 Directive 2007/60/EC on the assessment and management of flood risks
 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
 Integrated Pollution Prevention Control Directive (2008/1/EC)
 Marine Strategy Framework Directive 2008/56/EC
 Priority Substances Directive 2008/105/EC
 Environmental Impact Assessment Directive (2011/92/EU - codified version) and amending Directive 2014/52/EU

UK

Water Resources Act 1991 (as amended)
The Offshore Chemicals Regulations 2002 (as amended)
UK Marine and Coastal Access Act 2009
The Marine Strategy Regulations 2010
 Marine Policy Statement (2011)
 Charting Progress 2 (2010)
 River Basin Management Plans for respective administrations, including those which are cross-border (presently being updated)
 Safeguarding our seas: A strategy for the conservation and sustainable development of our marine environment (Defra 2002)
 Our Seas – a shared resource. High level marine objectives (2009)
 Marine Strategy Part 1: UK Initial Assessment and Good Environmental Status (2012)
 Marine Strategy Part 2: UK Marine Monitoring Programmes (2014)
 Marine Strategy Framework Directive (MSFD) Proposals for UK Programme of Measures (2015)
 UK Climate Change Risk Assessment (2012)
 National contingency plan for marine pollution from shipping and offshore installations (2012 - presently being updated)

Local

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003
The Flood Risk Regulations 2009 - England and Wales
Flood and Water Management Act 2010 - England and Wales
Environmental Damage (Prevention and Remediation) Regulations 2009 (as amended) - England
 Flooding in England: A National Assessment of Flood Risk (2009)
 National flood and coastal erosion risk management strategy for England (2011)
 National Policy Statements for Energy (2011): - England and Wales
 Overarching National Policy Statement for Energy (EN-1)
 National Policy Statement for Renewable Energy Infrastructure (EN-3)
 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
 National Policy Statement for Ports (2012) - England
 The National Planning Policy Framework and separate flood risk technical guidance (2012) - England
 East Inshore and Offshore Marine Plans (2014) - England
 South Inshore and Offshore Marine Plans (ongoing) - England
 Marine Pollution Contingency Plan (2014) - England and Wales
 Shoreline Management Plans - England and Wales

The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009
 Technical Advice Note 15: Development and Flood Risk (2004, updated advice maps 2015) - Wales
 Making the Most of Wales' Coast: Integrated Coastal Zone Management Strategy (2007 - under review as part of national marine planning)
 National Strategy for Flood and Coastal Erosion Risk Management (2011) - Wales
 Welsh National Marine Plan (ongoing)

Water Environment and Water Services (Scotland) Act 2003
The Water Environment (Controlled Activities) (Scotland) Regulations 2005
Flood Risk Management (Scotland) Act 2009
The Environmental Liability (Scotland) Regulations 2009 (as amended)
Marine (Scotland) Act 2010
 A Follow up to Seas the Opportunity: A Strategy for the Long Term Sustainability of Scotland's Coasts and Seas (2007)
 National Flood Risk Assessment - Scotland
 Scottish Planning Policy (2014) and the National Planning Framework for Scotland 3 (2014)
 Scotland's National Marine Plan (2015)

The Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2003
The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009
The Environmental Liability (Prevention and Remediation) Regulations (Northern Ireland) 2009 (as amended)
Marine Act (Northern Ireland) 2013
 An Integrated Coastal Zone Strategy for Northern Ireland 2006-2026 (2006)
 The Marine Plan for Northern Ireland (ongoing)
 PPS 15 Planning and Flood Risk (2013) - Northern Ireland

Key Objectives and Targets

The International Convention for the Prevention of Pollution from Ships (MARPOL) addresses pollution from ships and in part from oil production platforms arising from oil, noxious liquids carried in bulk, harmful substances in packaged form, sewage and garbage (Annexes I-V) and in subsequent amendments. MARPOL covers pollution events arising from both operational and accidental causes.

At a regional level, the OSPAR Convention for the protection of the marine environment of the North East Atlantic has the aim of preventing pollution and to protect the marine environment from detrimental effects of human activity. The OSPAR Convention defines pollution as the introduction by man, directly or indirectly, of substances or energy into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate uses of the sea. The 16 parties to this convention (which includes the UK) are asked to observe the *precautionary principle* and the *polluter pays principle* to meet their obligations. In 1998 Annex V was adopted, specifically aimed at biodiversity and ecosystem protection to cover non-polluting human activities that can adversely affect the sea. OSPAR has several long-term strategies under the heading of its, North-East Atlantic Environment Strategy, aimed at improving the marine environment with regard to certain topics, these include:

- Biological Diversity and Ecosystems Strategy – concerned with non-polluting human activity that can have adverse effects on the marine environment. A key element of this strategy is the establishment of a network of Marine Protected Areas.
- Eutrophication Strategy – sets the objective to combat eutrophication in the OSPAR maritime area, in order to achieve and maintain by 2010 a healthy marine environment where eutrophication does not occur.
- Hazardous Substances Strategy – sets the objective of preventing pollution of the maritime area by continuously reducing discharges, emissions and losses of hazardous substances, with the ultimate aim of achieving concentrations in the marine environment near background values for naturally occurring substances and

close to zero for man-made synthetic substances, with the target of the cessation of discharges, emissions and losses of hazardous substances by the year 2020.

- Offshore Oil and Gas Strategy – to prevent and eliminate pollution from offshore sources and to protect the OSPAR maritime area against the adverse effects of offshore activities so as to safeguard human health and conserve the marine ecosystems, and where practicable restore affected areas.
- Radioactive Substances Strategy – aims to reduce discharges, emissions and losses of material such that concentrations in the marine environment above historic levels are close to zero by 2020.

The culmination of a number of information gathering and assessment initiatives are presented in the OSPAR Quality Status Reports (QSR) (2001, 2010), which provide significant information on the current state of the UK and neighbouring seas, and the activities which affect them. Key aspects of the QSR cover biodiversity, eutrophication, hazardous substances, offshore oil and gas industry and radioactive substances. At a national level, Charting Progress 2, a Defra initiative published in July 2010, provides an updated assessment of the state of UK seas since Charting Progress was first published in 2005. Supporting technical reports on healthy and biologically diverse seas, ocean processes, clean and safe seas, and productive seas provide relevant information on the current baseline and issues affecting the water environment, and provide the basis of Marine Strategy Part 1: UK Initial Assessment and Good Environmental Status (2012).

A number of European level directives have been implemented nationally which aim to protect the terrestrial and marine environments, and these include the Urban Wastewater Treatment Directive, the Nitrates Directive, the WFD and MSFD. The WFD seeks to achieve “good ecological and chemical status/potential” for a range of terrestrial, transitional (i.e. estuarine) and coastal waters out to 1nm (or 3nm in Scottish waters) by 2015. As much marine pollution is generated from terrestrial activities, the control of certain substances entering coastal waters from riverine sources and other direct discharges is important in the control of marine pollution. The Nitrates Directive and Urban Wastewater Treatment Directive seek to protect the environment from the adverse effects of nitrogen from agricultural sources and sewage discharges respectively in this regard, and the most hazardous other chemicals are covered under the Priority Substances Directive.

In a similar approach to the WFD, the MSFD seeks to achieve “good environmental status” in Europe’s seas by 2020. The UK transposition of the MSFD is primarily through *The Marine Strategy Regulations 2010*. These require the development of the five elements of the marine strategy: (1) the assessment of marine waters; (2) the determination of the characteristics of good environmental status for those waters; (3) the establishment of environmental targets and indicators; (4) the establishment of a monitoring programme; (5) the publication of a programme of measures. Qualitative descriptors for determining good environmental status are listed in Annex I of the MSFD and those of relevance to the water environment include:

- Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
- Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.

- Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
- Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage (transposed through the *Environmental Damage (Prevention and Remediation) Regulations 2009* (as amended) – separate regulations apply in the devolved administrations) is applicable to *inter alia* the aquatic environment covered by the WFD. The Directive, based on the polluter pays principle, establishes a framework to prevent and remedy environmental damage at a reasonable cost to society. The directive applies strict liability to those operators of inherently hazardous activities listed in Annex III of the Directive which includes those subject to Integrated Pollution Prevention and Control (IPPC), and fault based liability for other activities.

The MPS underpins UK marine spatial planning which is being implemented under the *Marine and Coastal Access Act 2009*. The first regional marine plans (East Inshore and Offshore) were adopted in 2014 with the second plans (South Inshore and Offshore) due for consultation in 2015. National marine plans of the devolved administrations have either been published (Scotland, 2015) or are in preparation (Northern Ireland and Wales). These plan policies, though regionally specific, are to be consistent with national scale policy included in the MPS. With regards to water environment, the MPS indicates that marine plan authorities (e.g. the MMO, Scottish Ministers) must contribute to or align with delivery of the policies and objectives of relevant RBMPs and the MSFD.

Climate change is likely to have a pervasive effect on all aspects of the coastal and marine environment including flooding, coastal erosion, water quality and resources. Output from the UK Climate Impacts Programme (UKCIP) reflects both past conditions derived from historical record and projections of future climate change across a range of terrestrial and marine variables, allowing for a measure of the uncertainty in future climate projections. The latest output (UKCP09) has significantly enhanced its consideration of marine and coastal environments from previous assessments and a specific marine and coastal projections report (co-authored by the Marine Climate Change Impacts Partnership (MCCIP)) includes projections of changes in air-temperature over the sea, future sea-level rise, sea temperature, salinity, stratification and circulation, storm surge and wave climate. Changes to the information base (e.g. as presented in the IPCC AR5) are likely to mean that enhanced projections of future terrestrial and marine climate change will become available for the UK within the currency of OESEA3.

Implications for SEA

The SEA must consider the above international and national scale measures to reduce operational and accidental discharges at sea and from the terrestrial environment in relation to the possible impacts of the draft plan/programme (e.g. operational and accidental discharges from oil and gas exploration and production and transportation and storage of CO₂). The SEA should consider any potential to affect the attainment of good environmental status under the MSFD through, for instance, altering hydrographical conditions (e.g. wave, tidal stream and range devices) and also introducing significant levels of noise (e.g. seismic survey and pile driving). The SEA should have regard to the most recent monitoring and progress reports (e.g. Charting Progress 2, OSPAR QSR 2010) in its baseline compilation and assessment.

2.4 Air Quality

Air Quality	
International	<p>Marine Pollution Convention, MARPOL 73/78 (the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978)</p> <p>Geneva Convention on Long Range Transboundary Air Pollution (1979)</p> <p>Vienna Convention for the protection of the ozone layer (1985)</p> <p>Montreal Protocol on substances that deplete the ozone layer (1987) and subsequent updates and adjustments</p> <p>Stockholm Convention on Persistent Organic Pollutants (2001)</p> <p>UNEP Global Mercury Partnership and Proposed Treaty</p> <p>2008 amendment of MARPOL on a revised Annex VI dealing with the reduction in the emission of sulphur from shipping, enacted in 2010</p> <p>Consolidated text of the amended Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (2012)</p>
Regional	<p>The Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR) 1998</p> <p>The UNECE Convention on Long Range Transboundary Air Pollution (1999, amended in 2012)</p>
EU	<p>Directive 2001/81/EC on National Emissions Ceilings for certain pollutants</p> <p>Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air</p> <p>Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage</p> <p>Directive 2005/33/EC amending Directive 1999/32/EC as regards the sulphur content of marine fuels</p> <p>Directive 2008/50/EC on ambient air quality and cleaner air for Europe (2008)</p> <p>Regulation 1005/2009 on substances that deplete the ozone layer amended by Regulation 744/2010 on substances that deplete the ozone layer, with regard to the critical uses of halons</p> <p>The Clean Air Policy Package (2013) building on the EU Thematic Strategy on Air Quality (2005)</p> <p>Directive 2008/1/EC concerning integrated pollution prevention and control (codified version)</p> <p>EU Seventh Environmental Action Plan to 2020 (2013)</p> <p>Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) and Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants</p> <p>Directive 2012/33/EU amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels</p> <p>Regulation 517/2014 on fluorinated greenhouse gases</p>
UK	<p><i>Clean Air Act 1993 (as amended)</i></p> <p><i>Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001 (as amended)</i></p> <p><i>National Emission Ceilings Regulations 2002</i></p> <p><i>The Merchant Shipping (Prevention of air pollution from ships) Regulations 2008 (as amended)</i></p> <p><i>The Pollution Prevention and Control (Designation of the Industrial Emissions Directive) (Offshore) Order 2013</i></p> <p><i>The Fluorinated Greenhouse Gas Regulations 2015</i></p> <p><i>Greenhouse Gas Emissions Trading Scheme Regulations 2012</i></p> <p><i>The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)</i></p> <p><i>Air Pollution: Action in a Changing Climate (Defra 2010)</i></p>
Local	<p><i>Air Quality (England) Regulations 2000</i></p> <p><i>Air Quality (Standards) Regulations 2010 - England</i></p> <p><i>Environmental Permitting (England and Wales) Regulations 2010</i></p> <p><i>Pollution Prevention and Control (Designation of Directives) (England and Wales) Order 2013</i></p> <p><i>The Air Quality Standards (Wales) Regulations 2010</i></p> <p><i>Environment Strategy for Wales (2006 - under review)</i></p> <p><i>The Air Quality Standards (Scotland) Regulations 2010</i></p> <p><i>Pollution Prevention and Control (Designation of Industrial Emissions Directive) (Scotland) Order 2011</i></p> <p><i>The Air Quality Standards Regulations (Northern Ireland) 2010</i></p>

Key Objectives and Targets

MARPOL addresses the prevention of marine pollution from ships and in part from oil rigs and production platforms. It includes six annexes covering pollution by oil, noxious liquids carried in bulk, harmful substances in packaged form, sewage, garbage and air pollution. Less specific to marine activities, the Convention on Long-Range Transboundary Air Pollution 1979 considers transboundary pollutants including persistent organic pollutants, heavy metals, sulphur, VOCs and nitrogen oxides.

Shipping emissions are becoming a greater concern both in relation to the environmental and health implications they pose, but also their contribution to climate change. The Marine Environment Protection Committee of the International Maritime Organization (IMO) agreed amendments to the Annex VI regulations of MARPOL to further reduce harmful emissions from ships, comprising a progressive reduction in sulphur oxide (SO_x) emissions. Progressive reductions in nitrogen oxide (NO_x) emissions were also agreed, with the most stringent controls being placed on those engines installed on ships constructed on or after 1st January 2016 (see also Directive 2012/33/EU amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels). On 1st July 2010, the amendments to MARPOL came into effect such that ships operating in the North Sea and English Channel will need to use fuel not exceeding 1% sulphur, reducing to 0.1% in 2015. Shipping is presently the source of approximately 3% of global CO₂ emissions (Third IMO GHG Study 2014), though they are excluded from reduction targets in the Kyoto Protocol. Similarly, at the national level international shipping (and aviation) emissions are not specified within the 2050 Climate Change Act target, nor any related carbon budget order, but accounted for 8.7MtCO₂ of UK shipping emissions in 2013. Domestic shipping emissions, which are included in carbon budgets accounted for 2.2MtCO₂ in 2013. The CCC (2008) state that there is significant uncertainty in trying to apportion the UK component of global shipping emissions and that a global emissions cap would be one way to overcome the issue, and the IMO are open to cap-and-trade methods. The CCC (2011) indicated that by 2050 the UK's international shipping emissions could account for up to 11% of those emissions permitted under the Climate Change Act, and recommended (CCC 2012) that they should therefore be accounted for in budgets three to four. Additional uncertainties arise from the measurement and monitoring of emissions, and the possibility that unilateral action to reduce emissions may incentivise the movement of operations to countries with no such targets and therefore not contribute to global emissions reductions. Existing UK carbon budgets have taken account of international shipping emissions by constraining the budgets of other sectors to 2027 such that the UK would be on an emissions trajectory consistent with 2050 reductions, including these international emissions.

The Government's Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007) set national air quality standards with the objective of protecting human health, vegetation and ecosystems. In the longer term, these standards along with other strategies connected with climate change could significantly improve air quality and achieve meaningful reductions in CO₂ by 2050. Many of the standards set in the strategy are derived from EU obligations for the reduction or non-exceedance of a particular pollutant. The UK has an obligation to reduce or limit the emission of certain pollutants under Directives including but not limited to Directive 2001/81/EC on National Emissions Ceilings for certain pollutants and 2008/50/EC on ambient air quality and cleaner air for Europe, with the latter given effect in the UK by the Air Quality Standards Regulations 2010 (and those equivalent regulations of the devolved administrations). Directive 2008/50/EC did not alter former air quality objectives set out in the Air Quality Framework Directive (1996/62/EC) and Daughter Directives, though has a number of other key elements:

- Existing legislation²¹ has been merged into a single directive (with the exception of 2004/107/EC) with no changes to existing air quality objectives.
- New objective for PM_{2.5} including a limit value and exposure related objectives.
- The possibility to exclude natural sources of pollution in assessing compliance values where they can be reliably measured and where exceedances are due in whole or part to natural contributions.
- Possible time extensions of three years for PM₁₀, or five years for NO₂ and benzene for compliance with limit values, based on conditions and assessment by the EC.

Directive 2004/35/EC on environmental liability with regard to the prevention and remedying of environmental damage applies to a number of areas including damage caused by “airborne elements as far as they cause damage to water, land or protected species or natural habitats”. As an addendum to the Air Quality Strategy for England, Wales, Scotland and Northern Ireland (2007), Defra and the devolved administrations published, Air Pollution: Action in a Changing Climate (2010), which outlines how further health benefits may be drawn from the integration of air quality and climate change policies (see below for more discussion on climate change related initiatives). The core messages in this publication are:

- Activities which generate air pollution are often also those which create emissions of gases associated with climate change, and it would therefore be conducive to consider the linkages between climate change and air quality policy areas.
- Connected with the above point, the UK’s commitment to build a ‘Low Carbon Economy’ by 2050 will reduce air pollution, though by varying degrees depending on choices relating to achieving this goal (e.g. energy use and generation mix, and any carbon abatement technology). Optimizing climate policy decisions to account for air pollution could yield economic benefits of approximately £24 billion by 2050 for instance through the improvement of life expectancy from the use of low carbon transport and energy technologies.
- The promotion of low-carbon vehicles and renewable sources of energy that do not involve combustion will contribute to both climate change and air quality targets. At the same time, actions that tackle climate change but damage air quality must be avoided.
- Action will be needed at international, EU, national, regional and local levels to ensure air quality and climate change policies are efficiently integrated and to ensure ambitious but realistic air quality targets are set for the future.

Implications for SEA

The draft plan/programme is set in the wider context of providing both a secure and diverse energy supply, and tackling emissions associated with anthropogenically augmented climate change (see below). Certain activities associated with the plan/programme, including the operation of maintenance and supply vessels and power generation, will contribute negatively to air quality in some areas. Port expansion, or the increased uptake of available port capacity, may have negative local consequences for air quality in these areas, perhaps contributing to the

²¹ Air Quality Framework Directive (1996/62/EC), daughter Directives 1999/30/EC, 2000/69/EC, 2002/3/EC, and Decision on Exchange of Information 97/101/EC.

perpetuation of certain Air Quality Management Areas (AQMAs), which in turn may have health implications. Any offset in energy production from fossil fuel electricity generating stations by the renewable technologies covered by the plan/programme would further contribute to reducing air quality impacts, and in meeting UK targets for the reduction of certain atmospheric emissions.

2.5 Climate and Meteorology

Climate & Meteorology	
International	<p>The United Nations Framework Convention on Climate Change Kyoto Protocol to the UN Framework Convention on Climate Change The Copenhagen Accord (2009) Intergovernmental Panel on Climate Change Fifth Assessment Report (2013-2014) The 2015 international climate change agreement and the EU vision for the new agreement (for negotiation prior to the Paris Climate Conference, December 2015)</p>
EU	<p>European Climate Change Programme I (2000) and II (2005) Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants Communication COM(2008) 30: 20 20 by 2020 Europe's climate change opportunity Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC Directive 2009/29/EC amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme EU Seventh Environmental Action Plan to 2020 (2013) Communication COM(2013) 216: An EU Strategy on adaptation to climate change (2013) Directive 2009/31/EC on the geological storage of carbon dioxide</p>
UK	<p><i>Climate Change Act 2008</i> <i>The Energy Act 2008 (as amended)</i> <i>The Energy Act 2010</i> <i>The Climate Change Act 2008 (2020 Target, Credit Limit and Definitions) Order 2009</i> <i>The Climate Change Act 2008 (Credit Limit) Order 2011</i> <i>The Carbon Budget Order 2011</i> <i>Greenhouse Gas Emissions Trading Scheme Regulations 2012</i> The Carbon Plan: delivering our low carbon future (2011) Sustainable Development Strategy (2006) Stern Review of the Economics of Climate Change (2006) Committee on Climate Change: Building a Low-Carbon Economy - the UK's contribution to tackling climate change (2008), Meeting carbon budgets - ensuring a low-carbon recovery (2010) UK Climate Impacts Programme (UKCIP) (update 2009, UKCP09) Health Effects of Climate Change in the UK (2012) UK Climate Change Risk Assessment (2012) The National adaptation programme (2013)</p>
Local	<p>Environment Strategy for Wales (2006 - under review) Wales Changing Climate: Challenging Choices: the Impact of Climate Changes in Wales 2020-2080 (2000) A Low Carbon Revolution: Wales' Energy Policy Statement (2010) Climate Change Strategy for Wales (2010) Energy Wales: A Low Carbon Transition (2012)</p>

The Climate Change (Scotland) Act 2009
The Climate Change (Annual Targets) (Scotland) Order 2010
The Climate Change (Annual Targets) (Scotland) Order 2011
The Climate Change (Limit on Carbon Units) (Scotland) Order 2011
 Changing Our Ways – Scotland’s Climate Change Programme (2006)
 Climate Change Delivery Plan: Meeting Scotland’s Statutory Climate Change Plans (2009)
 Scotland’s Climate Change Adaptation Framework (2009)
 Committee on Climate Change: Scotland’s Path to a Low-Carbon Economy (2010)
 A Low Carbon Economic Strategy for Scotland (2010)
 Low Carbon Scotland: The Second Report on Proposals and Policies (2013)
 Scottish Climate Change Adaptation Programme (2014)

Northern Ireland Climate Change Bill (pre-consultation in 2013)
 Preparing for Climate Change in Northern Ireland (2007)
 Northern Ireland Greenhouse Gas Action Plan (2011)
 The Climate Change Risk Assessment for Northern Ireland (2012)
 The Northern Ireland Climate Change Adaptation Programme (2014)

Key Objectives and Targets

The United Nations Framework Convention on Climate Change entered into force in 1994, a precursor to the Kyoto Protocol which sets legally binding targets for the reduction of greenhouse gases which are associated with anthropogenically induced climate change. 184 parties have ratified the Kyoto Protocol to date, including the UK. Most recently, the Copenhagen Accord recognises that countries must reduce emissions such that a 2°C rise in global temperature should not be exceeded such that the worst effects of climate change can be avoided. The Copenhagen Accord is not a legally binding document, but endorses the Kyoto Protocol and indicates that Annex I countries should further reduce their emissions reductions initiated under Kyoto.

In the UK, the *Energy Act 2008* (as amended) aims to not only help maintain energy supply reliability, promote competitive markets and ensure affordable heating, but also contribute to the reduction in greenhouse gas emissions (most notably CO₂) which have been linked to anthropogenically augmented climate change. *The Energy Act 2010* implemented some of the key measures of the UK Low Carbon Transition Plan (2007, superseded by the Carbon Plan, 2011), including provisions for a new CCS incentive to support the creation of the four CCS demonstrators (note that two preferred projects have been selected for funding), the introduction of mandatory social price support to tackle fuel poverty and a number of measures to ensure fairness in the energy markets. *The Energy Act 2011* (as amended) primarily sets out the legislative context for the UK Government’s Green Deal, however also includes provisions and consequential amendments in relation to energy security (e.g. access to upstream petroleum infrastructure), and a number of sections outlining measures to reduce carbon emissions, which includes: offshore electricity transmission, the conversion of infrastructure for CCS, and compulsory purchase in relation to CCS pipelines.

The *Climate Change Act 2008* makes provisions for the reduction of CO₂ equivalent emissions (i.e. includes other notable greenhouse gases including CH₄ and N₂O) through a number of measures, including the setting of a "carbon budget". The carbon budget set out in the Act in its original form targeted an 80% reduction in emissions on 1990 levels by 2050, with an interim reduction in emissions of 26% by 2020 (note that devolved Governments have set their own targets). The 2020 carbon budget has been subsequently altered under *The Climate Change Act 2008 (2020 Target, Credit Limit and Definitions) Order 2009* to 34% below 1990 levels. The Act aims to meet this target through a range of measures, but principally through the

establishment and work of the CCC, a system of carbon budgeting and trading, activities that reduce or remove greenhouse gases from the atmosphere and promotion through financial incentive, the production of less waste and more recycling. The third and fourth carbon budgets cover the periods of 2018 to 2022 and 2023 to 2027 respectively, with the latter based on a scenario that carbon equivalent emissions are reduced by 60% on 1990 levels by 2030 (to ~310MtCO₂e). These targets were legislatively introduced through *The Carbon Budget Order 2009* and *The Carbon Budget Order 2011*. A number of initiatives have stemmed from these reduction targets and other provisions of the Act, for instance the establishment of a National Adaptation Programme based on the Climate Change Risk Assessment, which forms part of Defra's Adapting to Climate Change in England programme. The seventh statutory report to Parliament by the CCC on progress towards meeting the carbon budgets set to date, has indicated that despite meeting the first carbon budget, when considering the pace of the underlying emissions reductions, and accounting for the impacts of the recession, the UK is not on target to meet subsequent budgets. The CCC made a series of recommendations, and indicated that it would be necessary for Government to develop and implement further measures/strategies/policy to support the achievement of the statutory carbon budget – projections for 2013 to 2022 suggest that the UK will meet its second and third carbon budgets but that there is a shortfall in the fourth carbon budget assuming no new effort (e.g. additional policy).

Similarly, in Scotland the *Climate Change (Scotland) Act 2009* sets an interim 42% reduction target for greenhouse gases by 2020, increasing to 80% by 2050 on 1990 levels. Scottish ministers have set annual targets through secondary legislation (*The Climate Change (Annual Targets) (Scotland) Order 2010* and *2011*), presently covering the period from 2010-2027. Scotland missed its first annual emissions target and is likely to miss its second; however this was due to weather and improvements in the way emissions inventories were calculated, however generally performed better than the UK as a whole. Recommendations were also made by the CCC in their fourth report on Scotland's progress towards meeting emission reduction targets including in relation to low-carbon heat, energy efficiency, the public sector, transport and agriculture.

In December 2011, the UK Government published Low Carbon Plan, which outlined how the challenges of reducing greenhouse gas emissions as part of the four carbon budgets will be met for each sector while ensuring clean, affordable and secure energy supplies. These broad principles are in line with those of the 2007 Energy White Paper (also see the *Energy Act 2008* and *2010*). Another important element of the 2009 plan was the Framework for the Development of Clean Coal (FDCC) which initiated a programme of CCS demonstration with the ambition to see CCS ready for wider deployment from 2020. All new fossil fuel power stations of a type covered by the Large Combustion Plant Directive and with a capacity of 300MWe or greater, are not to be consented unless it can be demonstrated that they are Carbon Capture Ready²².

CCS and renewables deployment could contribute to a significant reduction in carbon emissions during the currency of this SEA. At an international level, the UK has a legally binding target to generate 15% of energy from renewable sources by 2020, stemming from the EU Renewable Energy Directive (2009/28/EC). The UK Government Renewable Energy Strategy (2009)

²² DECC (2009). Carbon Capture Readiness (CCR). A guidance note for Section 36 Electricity Act 1989 consent applications. Also see, Carbon capture and storage – Commons Library Standard Note SN/SC/5086, 3rd May 2013, and Overarching National Policy Statement for Energy (EN-1).

initially outlined scenarios for achieving this goal, superseded by the Renewable Energy Roadmap in 2011, which is reported on annually. In Scotland, the 2020 Routemap for Renewable Energy reflects the Scottish Government's target to produce 100% of electricity from renewables by 2020. Wales' Energy Policy, A Low Carbon Revolution (2010), aims to (amongst other carbon reduction measures) produce twice as much electricity by 2025 as at present, and by 2050 to produce almost all energy (heat, electricity, transport) from low carbon sources. An indication of progress towards decarbonising the energy industry in Wales, and what the Welsh Government intends to do during its current term to aid a low carbon transition is provided in Energy Wales: A Low Carbon Transition (2012). In the UK, the deployment of renewable energy has been incentivised through the Renewables Obligation since 2002 (see the Renewables Obligation Order 2009, as amended), whereby renewable electricity generators sell their Renewables Obligation Certificates (ROCs) to suppliers which guarantees a premium above wholesale market prices. Suppliers then present their ROCs to Ofgem to show their compliance (i.e. whether they have met their annual obligation), and pay a penalty if they fail to do so. The value of each ROC is decided between the generator and supplier. Under the UK Government's Electricity Market Reform there will be a transition from the Renewables Obligation to "Contracts for Difference" (CfDs), which will be the new support mechanism for renewables, new nuclear and CCS from 2014. The related policy and processes involved in this transition was set out in a consultation which closed in September 2013, also see *The Renewables Obligation Closure Order 2014* (as amended). CfDs will be offered to operators at a fixed price, with the operator paying back any difference between the value of the CfD and wholesale electricity prices for electricity, effectively capping the cost of electricity to the consumer from these sources.

At an international level, the IPCC provide information and evidence for climate change, its impacts, and how mitigation and adaptation might help alleviate its worst effects. The IPCC published their latest Assessment Report (AR5) in 2013-2014. In the UK, the UKCIP provides medium- to long-term projections (to 2100) for climate change specific to the UK and UK marine area. The evidence base for climate change in the UK continues to be updated through the UKCIP programme and the latest reports, UKCP09, remain current albeit with updates to its weather generator model. These projections (e.g. for temperature, precipitation, wave height) will be fully described in the Environmental Report. The MCCIP has close ties with UKCIP, and these programmes help to provide climate change evidence and advice which may be used to inform policy and decision-makers, for example, a consideration of scenarios produced by UKCIP is recommended in the MPS.

Implications for SEA

Activities associated with the draft plan/programme should help to make a net contribution to the reduction of UK CO₂ emissions, as set out in the UK carbon budget (see above), through carbon sequestration, or an increase in the proportion of UK energy generated by renewable technologies. As such, adoption of the plan/programme subject to any spatial considerations and recommendations arising from OESEA3 will also help to achieve the UK's legally binding target of producing 15% of its energy from renewable sources by 2020 – equivalent to ~30% of electricity generation. The longer term UK Government aim, of which the current draft plan/programme is one aspect, is to achieve a sufficient reduction in greenhouse gases (i.e. all of those which contribute to *global warming*, not just CO₂) to prevent extreme climate change scenarios (e.g. as projected by IPCC or in UKCP09) and associated social, environmental and economic costs (e.g. Stern 2006).

2.6 Population and Human Health

Population & Human Health	
International	<p>World Summit on Sustainable Development, Johannesburg, 2002 Aarhus Convention (Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters) (1998) Espoo Convention on Environmental impact Assessment in a Transboundary Context (1991) Commission on Social Determinants of Health (2008), 'Closing the gap in a generation: health equity through action on the social determinants of health and the Rio Political Declaration on Social Determinants of Health (2011)</p>
Regional	<p>Children's Environment and Health Action Plan for Europe 2004</p>
EU	<p>Together for Health: A Strategic Approach for the EU (2007) The European Environment and Health Action Plan 2004-2010 EU Sustainable Development Strategy (EU SDS) First issued 2001, Revised 2006 and reviewed in 2009 Directive 2013/30/EU on safety of offshore oil and gas operations and amending Directive 2004/35/EC</p>
UK	<p><i>Sustainable Communities Act 2007</i> <i>The Localism Act 2011</i> <i>The Health and Safety at Work etc Act 1974 (Application outside Great Britain) Order 2013</i> <i>The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015</i> <i>The Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015</i> Marine Policy Statement (2011) Mainstreaming sustainable development: the government's vision and what this means in practice (2011) The Strategy for Health and Safety in Great Britain in the 21st Century (2009), and One year On : Being part of the solution (2010) Our Seas – a shared resource. High level marine objectives (2009) Equity and Excellence: Liberating the NHS (2010) Health Effects of Climate Change in the UK (2012)</p>
Local	<p><i>Health and Social Care Act 2012 (as amended) - England</i> National Planning Policy Framework (2012) - England East Inshore and Offshore Marine Plans (2014) - England South Inshore and Offshore Marine Plans (ongoing) - England</p> <p><i>National Health Service (Wales) Act 2006 (as amended)</i> <i>Social Services and Well-being (Wales) Act 2014</i> One Wales: One Planet, a new Sustainable Development Scheme for Wales (2009) Technical Advice Note 16: Sport, Recreation and Open Space (2009) - Wales The sustainable development charter (2010) - Wales The Programme for Government: Welsh Assembly Government (2011) Together for Health A Five Year Vision for the NHS in Wales (2011) and Working differently – working together (2012) Well-being of Future Generations Bill (2014) - Wales Welsh National Marine Plan (ongoing)</p> <p><i>Public Health etc. (Scotland) Act 2008 (as amended)</i> <i>Public Services Reform (Scotland) Act 2010</i> Choosing Our Future: Scotland's Sustainable Development Strategy (2005) The Healthcare Quality Strategy for NHS Scotland (2010) The Government Economic Strategy (2011) Scottish Planning Policy (2014) and the National Planning Framework for Scotland 3 (2014) Scotland's National Marine Plan (2015)</p> <p><i>Health and Social Care (Reform) Act (Northern Ireland) 2009 (as amended)</i> PPS 8: Open Space, Sport and Outdoor Recreation (2004) - Northern Ireland Everyone's Involved: the Northern Ireland Sustainable Development Strategy (2010) Making Life Better: Strategic Framework for Public Health 2013-2023 (2014) - Northern Ireland The Marine Plan for Northern Ireland (ongoing)</p>

Key Objectives and Targets

It is acknowledged in The European Environment and Health Strategy that there are potential health implications from environmental impacts, and seeks to make the connection between health and environmental conditions. The plan also has the aim of maximising the economic benefits of good health, recognising that these often outweigh the cost of remedial action. At the UK and UK constituent country level, health is considered in the context of sustainable development and initiatives attempt to address health inequalities, for instance the gap in infant mortality across social groups, and the difference in life expectancy in disadvantaged areas compared with those that are more prosperous. Additionally, at the national and regional planning policy level, human health is a sectoral consideration in the MPS, for instance in relation to fisheries, aquaculture and safe operation of offshore facilities, and the improvement of health and social well-being is an objective of the East Marine Plans and a specific policy in support of proposals which provide such benefits in included.

Implications for SEA

The SEA should consider the implications of the draft plan/programme in the context of regional and UK initiatives designed to improve general health and well-being and reduce inequalities brought about by social and environmental deprivation. The SEA should consider how the plan/programme contributes to government targets in relation to environmental degradation (e.g. air quality, landscape quality) which has associated potential physical and mental health implications.

2.7 Other Users and Material Assets

Other Users & Material Assets	
International	<p>Convention on International Civil Aviation (Chicago Convention) 1944 The London Convention (1972) Marine Pollution Convention, MARPOL 73/78 (the International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978) United Nations Convention on the Law of the Sea (1982) Basel Convention of the control of transboundary movements of hazardous waste and their disposal (1992) FAO Code of Conduct for Responsible Fisheries (1995) UN Fish Stocks Agreement (2001) Nairobi International Convention on the Removal of Wrecks (2007) The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (2009)</p>
Regional	<p>Convention on the Future Multilateral Cooperation in North-East Atlantic Fisheries (NEAFC) (1982) Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) (1992) OSPAR Decision 98/3 on the disposal of disused offshore installations (1998) North Seas Countries' Offshore Grid Initiative (2010)</p>
EU	<p>Council Directive 99/31/EC of April 1999 on the landfill of waste (as amended) (the Landfill Directive) EC Directive on Port Reception Facilities 2000/59/EC Directive 2005/33/EC amending Directive 1999/32/EC as regards the sulphur content of marine fuels Freight logistics in Europe - the key to sustainable mobility (2006) Commission Regulation (EC) No 1013/2006 on shipments of waste and amending Regulation (EC) No 1013/2014 Regulation (EC) No 1692/2006 of the European Parliament and of the Council of 24 October 2006 establishing the second Marco Polo programme for the granting of Community financial assistance to improve the environmental performance of the freight transport system (Marco Polo II) and repealing Regulation (EC) No 1382/2003 (follow-up to Marco Polo II is presently being established) The Treaty of Lisbon (2007) EU Integrated Maritime Policy (2007) Commission Regulation (EC) No 1418/2007 concerning the export for recovery of certain waste listed in Annex III or IIIA to Regulation (EC) No 1013/2006 to certain countries to which the OECD Decision on the control of transboundary movements of wastes does not apply and amending Regulation (EU) No 733/2014 Commission Regulation (EC) No 740/2008 amending Regulation (EC) No 1418/2007 as regards the procedures to be followed for export of waste to certain countries Directive on Waste 2008/98/EC and Decision 2000/532/EC on hazardous waste Commission Regulation (EC) No 669/2008 on completing Annex 1C of Regulation (EC) No 1013/2006 on shipments of waste EU Energy Security and Solidarity Action Plan: Second Strategic Energy Review - Securing our Energy Future (2008) Communication on Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond. COM(2008)768 Communication on the Directive 2004/67/EC concerning measures to safeguard security of natural gas supply (2008) EC Roadmap on Maritime Spatial Planning: Achieving Common Principles in the EU (2008) Regulation (EC) No 1342/2013 establishing a long-term plan for cod stocks Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC Energy 2020: A strategy for competitive, secure, and sustainable energy (2010) Marine and Maritime Agenda for Growth and Jobs, The Limassol Declaration (2012) Decision No 884/2004/EC amending Decision No 1692/96/EC on community guidelines for the development of the trans-European transport network Maritime Transport Strategy 2018 (2009) European Transport Policy (2001-2011) Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system (2011) Regulation (EU) No 1380/2013 on the Common Fisheries Policy Directive 2013/30/EU on safety of offshore oil and gas operations and amending Directive 2004/35/EC European Maritime and Fisheries Fund (2014) Innovation in the Blue Economy: realising the potential of our seas and oceans for jobs and growth COM(2012) 494 final, COM(2014) 254 final/2 and Marine Knowledge 2020: roadmap European Commission Communication: A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy (2015)</p>

UK

The Merchant Shipping and Fishing Vessels (Port Waste Reception Facilities) (Amendment) Regulations 2009
Sea Fisheries (Shellfish) Act 1967 (as amended)
Sea Fish (Conservation) Act 1967 (as amended)
Fisheries Act 1981
Energy Act 2008
Marine and Coastal Access Act 2009
The Energy Act 2008 (Consequential Modifications) (Offshore Environmental Protection) Order 2010
Wreck Removal Convention Act 2011
The Exclusive Economic Zone Order 2013
The Territorial Sea (Baselines) Order 2014
The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015
The Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015
 The Renewables Obligation (introduced 2002)
 National Fisheries Policy: Fisheries 2027 (Defra 2007)
 The strategic importance of the marine aggregate industry to the UK (2007)
 UK Ship Recycling Strategy (2007)
 Our Seas - A Shared Resource. High Level Marine Objectives (2009)
 Round 3 offshore wind leasing (2009)
 The UK Marine Policy Statement (2011)
 The Carbon Plan: delivering our low carbon future (2011)
 Creating growth, cutting carbon: making sustainable local transport happen (2011)
 Concordat on management arrangements for fishing quotas and licensing in the UK (2012)
 CCS Roadmap: Supporting deployment of Carbon Capture and Storage in the UK (2012)
 UK renewable energy roadmap (updated 2013)
 The Wood Review on maximising economic recovery from the UKCS (2013) and related Government response
 27th (2012) and 28th (2014) Seaward Oil and Gas Licensing Rounds
 Contracts for Difference (introduced 2015)
 Next Steps in CCS: Policy Scoping Document (2015) - England and Wales
 The Aviation Plan (2008, updated 2015)

Local

Waste (England and Wales) Regulations 2011
The Scallop Fishing (England) Order 2012
Inshore Fisheries and Conservation Authorities bylaws
 Sea Angling 2012 project - England
 National Policy Statements for Energy (2011): - England and Wales
 Overarching National Policy Statement for Energy (EN-1)
 National Policy Statement for Renewable Energy Infrastructure (EN-3)
 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)
 National Policy Statement for Ports (2012) - England and Wales
 The National Planning Policy Framework (2012) - England
 Waste prevention programme for England (2013)
 East Inshore and Offshore Marine Plans (2014) - England
 South Inshore and Offshore Marine Plans (ongoing) - England

Technical Advice Note 8: Renewable Energy (Wales) - does not cover offshore elements of a development, but makes mention of any associated infrastructure that takes place on land
 Coastal Tourism Strategy for Wales (2008)
 Technical Advice Note 13: Tourism (Wales)
 Wales Freight Task and Finish Group and related reports (latest 2013)
 Marine Renewable Energy Strategic Framework (2007-2011)
 Coastal tourism strategy (2008) - Wales
 The Wales Transport Strategy (2008)
 Towards Zero Waste: The Overarching Waste Strategy Document for Wales (2010)
 Energy Wales: a low carbon transition (2012)
 Wales Marine and Fisheries Strategic Action Plan (2013)
 Draft National Transport Plan for Wales (2015)
 Welsh National Marine Plan (ongoing)

Inshore Fishing (Scotland) Act 1984
Sea Fisheries (Shellfish) Amendment (Scotland) Act 2000
The Marine (Scotland) Act 2010
The Aquaculture & Fisheries (Scotland) Act 2013
 Strategic Framework for Inshore Fisheries in Scotland (2005) and Inshore Fisheries Groups
 National Transport Strategy (2006) - Scotland
 A Fresh Start: The Renewed Strategic Framework for Scottish Aquaculture (2009)
 Scotland's Zero Waste Plan (2010)
 Scottish Government: The Carbon Capture and Storage Roadmap (2010)
 Blue Seas - Green Energy: A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial
 Waters (2011)
 Scotland's Sectoral Marine Plans for Offshore Wind, Wave and Tidal Energy in Scottish Waters
 (consultation draft, 2014)
 A Strategic Plan for Scotland's Marine Tourism Sector (2014)
 Scotland's National Marine Plan (2015)

Marine Act (Northern Ireland) 2013
The Sea Fishing (Licenses and Notices) Regulations (Northern Ireland) 2014
 Tourism Strategy for Northern Ireland to 2020 and the Programme for Government 2011-2015
 (2010)
 Offshore Renewable Energy Strategic Action Plan 2012-2020 and Offshore Wind and Marine
 Renewables Energy SEA Environmental Report (2012) - Northern Ireland
 Sustainable Energy Action Plan 2012-2015 and beyond (2012) - Northern Ireland
 Envisioning the Future: Considering Energy in Northern Ireland to 2050 (2013)
 Delivering Resource Efficiency: the revised Northern Ireland Waste Management Strategy (2013)
 The Marine Plan for Northern Ireland (ongoing)

Key Objectives and Targets

The marine licensing regime for a number of activities underwent changes resulting from the *Marine and Coastal Access Act 2009*. The Act combined the regimes under FEPA, the *Coast Protection Act 1949* and *Telecommunications Act 1984* (Schedule 2 Electronic Communications Code). Activities (in England and Wales) will be regulated by the MMO which will control the environmental, navigational, human health and other impacts of constructions, deposits and removals in the marine environment for matters that are not devolved; an exception being major (or nationally significant) infrastructure projects (e.g. offshore marine renewable energy projects of greater than 100MW capacity) for which decisions are considered separately as indicated in the *Planning Act 2008*, and authorisations made under the *Petroleum Act 1998* and *Energy Act 2008*. In Scotland, Marine Scotland is the relevant authority with marine planning and policy responsibilities, and in Northern Ireland, the NIEA is the licensing and enforcement authority (as part of the Department of the Environment) for devolved matters.

Planning decisions relating to activities taking place in the marine environment are now made in the context of the MPS, the first step in marine spatial planning for the UK made under provisions in the *Marine and Coastal Access Act 2009*. Subsequent stages of marine planning involve the creation of a series of Marine Plans, with regionally specific policies which are in keeping with the MPS. The first of these, the East Inshore and Offshore Marine Plans were adopted in 2014 and the second set, the South Inshore and Offshore Marine Plans are expected to be consulted upon in 2015. The devolved administrations have (Scotland) or are in the process of (Northern Ireland and Wales) producing their own national marine plans.

A significant fraction of renewable energy generation in the next 10 years will come from offshore wind and other marine renewables as they are increasingly deployed and become more technically and economically feasible, and the UK has a legally binding target to produce

15% of its energy from renewable sources by 2020. These will help deliver part of the government targets to reduce carbon dioxide equivalent emissions (34% on 1990 levels by 2020) and increase renewable energy deployment (30% of electricity by 2020). Devolved Governments have also released a number of documents outlining their commitment to transitioning to low carbon energy production, such as the Welsh Assembly Government Marine Renewable Energy Strategic Framework, Scotland's Sectoral Marine Plans for Offshore Wind, Wave and Tidal Energy in Scottish Waters, and the Northern Ireland Renewable Energy Strategic Action Plan. The UK Government Renewable Energy Roadmap sets out what is required to achieve the desired (and legally binding) renewables targets, including both the role of Government, and Individuals and businesses, progress on renewable technologies and priority actions.

Within the UK, sources of CO₂ are clustered around a relatively few centres of significant industrial activity; Thames Estuary, Humberside, Merseyside, the Firth of Forth and Teesside and Tyneside. Two preferred bidders were identified as part of the UK CCS commercialisation programme (Peterhead Project, Aberdeenshire and the White Rose project, Yorkshire) and DECC announced its intention in December 2013 to provide funding to support FEED of the White Rose and Peterhead CCS Projects, and a final investment decision from DECC is due in 2016. Of these two projects, the White Rose project also secured up to €300m (approximately £238m) through the European Commission NER300 funding call in 2013. The Office of Carbon Capture and Storage (OCCS) was formed within DECC and is responsible for helping to deliver the initial demonstration projects and for setting the longer term strategy for wider deployment to 2030 through its UK CCS roadmap.

Since the accident involving the Deepwater Horizon semi-submersible in the Gulf of Mexico and subsequent problems in both stemming the flow of oil from the open well and adverse environmental and socio-economic impacts, the UK Government instigated a review to put into context the present regulatory and safety procedures which ensure that the UK oil and gas sector operates appropriately. A number of steps were initiated including the recruitment of additional offshore environmental inspectors with a view to doubling the number of annual inspections on drilling rigs, a review of the indemnity insurance requirements of operating on the UKCS (see DECC guidelines on the demonstration of financial responsibility), and the establishment of an industry trade association (The Oil Spill Prevention and Response Advisory Group) by Oil and Gas UK which assessed and reported on the strengths and weaknesses in how the UK would respond to such an incident in its waters. This body included representatives from both industry and the regulators. Furthermore, in response to the Deepwater Horizon incident, the EU adopted a Directive on safety of offshore oil and gas operations (the offshore safety directive) in 2013 which seeks to reduce as far as possible the occurrence of major accidents related to offshore oil and gas operations. The majority of its provisions are covered by existing UK instruments, however new secondary legislation (*The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015*, *The Offshore Petroleum Licensing (Offshore Safety Directive) Regulations 2015*) and amendments to other Regulations have been made to transpose the Directive. The Directive came into force on 19th July 2015.

In order to implement the same environmental regulations which apply to the oil and gas industry to the storage and offloading of combustible gas, and the storage of CO₂ (i.e. those activities licensed under the *Energy Act 2008*), the *Energy Act (Consequential Modifications) (Offshore Environmental Protection) Order 2010* was made. This instrument ensures that regulations including the *Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999* (as amended), the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended), the *Offshore Combustion Installations (Prevention and Control of Pollution) Regulations 2001* (as amended) and the

Offshore Marine Conservation (Natural Habitats, &c) (Amendment) Regulations 2010 apply to these new types of development.

Shipping and port activity has expanded considerably in recent years, particularly since the introduction of the tonnage tax in 2000, and will remain the principal means by which the UK exchanges goods. Ships, though emitting less CO₂ per tonne of goods transported than other methods of bulk transport, represent a significant source of anthropogenic gaseous and particulate emissions, and these emissions though presently largely unregulated, will need to be accounted for in the coming years. The National Policy Statement for Ports was published in 2012, which outlines the framework for decision making in relation to nationally significant port developments in England and Wales, and recognises the strategic role of UK ports in the movement of goods.

UK fisheries have reduced in recent years in part due to declining fish stocks and resulting management techniques including catch and effort management. *The Marine and Coastal Access Act* aims to strengthen fisheries and environmental management protection. Inshore fisheries management is now handled by Inshore Fisheries and Conservation Authorities (IFCAs), which replaced Sea Fisheries Committees. IFCAs are responsible for activities out to 6nm from the coast and in estuaries where they will be responsible for sea fisheries management. In Scotland, Marine Scotland has a number of roles including marine research, marine policy and regulatory functions.

Implications for SEA

The SEA should take into account the interaction of the plan/programme and its alternatives with the present (e.g. safety of navigation, recreation interests including sailing and surfing), and possible future use of the marine environment (e.g. use of areas for hydrocarbon gas and CO₂ storage and marine renewables) and the various management and regulatory regimes which control their activities. The SEA should also consider how the programme may contribute to government targets such as renewable energy generation, security of energy supply and reductions in greenhouse gases.

2.8 Cultural Heritage

Cultural Heritage	
International	<p>UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (1972) Convention on the Protection of Underwater Cultural Heritage (2001) United Nations Convention on the Law of the Sea (UNCLOS)</p>
Regional	<p>World Heritage Convention 1972 Tentative list of possible future world heritage nominations (2012-2014)</p>
Europe	<p>Council of Europe, European Convention on the Protection of the Archaeological Heritage 1992, the 'Valetta Convention' Council of Europe, European Landscape Convention 2000</p>
UK	<p><i>Protection of Military Remains Act 1986</i> <i>Ancient Monuments and Archaeological Areas Act 1979</i> <i>National Heritage Act 2002</i> <i>Marine and Coastal Access Act 2009</i> <i>The Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2009</i> <i>The Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2012</i> Marine Policy Statement (2011)</p>
Local	<p><i>Protection of Wrecks Act 1973</i> - England, Wales and Northern Ireland <i>National Heritage Act 1983</i> (as amended) - England <i>Treasure Act 1996</i> - England and Wales <i>Planning (Listed Buildings and Conservation Areas) Act 1990</i> - England and Wales <i>National Heritage Act 2002</i> (as amended) - England English Heritage: Climate Change and the Historic Environment (2008) English Heritage: Conservation Principles, Policies and Guidance for Sustainable Management of the Historic Environment (2008) English Heritage National Heritage Protection Plan (2012, amended 2013) National Planning Policy Framework (2012) English Heritage National Heritage Protection Plan, 2011-2015 (2013) English Heritage: Strategic Environmental Assessment, Sustainability Appraisal and The Historic Environment (2013) Conserving and enhancing the historic environment (2014) - England Marine Aggregate Levy Sustainability Fund (MALSF) Regional Environmental Characterisations including : South Coast, Thames, East Coast and the Humber areas.</p> <p><i>The Heritage Bill</i> - Wales Conservation Principles for the sustainable management of the historic environment in Wales (2011) A Research Framework for the Archaeology of Wales (2011) Historic Environment Strategy for Wales (2013) Planning Policy Wales Edition 7 (2014) Welsh National Marine Plan (ongoing)</p> <p><i>Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997</i> <i>Marine (Scotland) Act 2010</i> <i>The Historic Environment Scotland Act 2014</i> Scottish Natural Heritage: Natural Heritage Futures (2002, updated 2009) Scottish Historic Environment Policy (2009, updated 2011) Scotland's Historic Environment Audit (2014) Scottish Planning Policy (2014) and the National Planning Framework for Scotland 3 (2014) Scotland's National Marine Plan (2015) Historic Scotland's Marine Heritage Strategy 2012-2015</p> <p><i>The Planning (Northern Ireland) Order 1991</i> <i>The Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995</i> <i>Marine Act (Northern Ireland) 2013</i> Planning Policy Statement 6: Planning, Archaeology and The Built Heritage (Northern Ireland) (1999) and 2005 addendum</p>

Key Objectives and Targets

International protection of marine heritage features is provided by Articles 149 and 303 of United Nations Convention on the Law of the Sea (UNCLOS), and more recently the Convention on the Protection of Underwater Cultural Heritage (CPUCH). Though the UK is not a signatory of the latter, the convention received acceptance or ratification of the minimum number of 20 states on 2nd October 2008 and entered into force on 2nd January 2009. The CPUCH covers those archaeological, historical or cultural items which have been, 'partly or completely under water, periodically or continuously, for at least 100 years', which includes not only shipwrecks but buildings, artefacts, human remains, aircraft, cargo and prehistoric items. A central tenet of the Convention is that underwater heritage is preserved *in situ*.

At present, the principal form of marine heritage protection in the UK is for that of shipwreck, provided by the *Protection of Wrecks Act 1973* and the *Protection of Military Remains Act 1986*. These seek to protect either wrecks or wreck sites that contribute to the understanding of the past on account of their historical, archaeological or artistic importance, or vessels or aircraft which appear to have become sunk or stranded while in military service.

The *Marine and Coastal Access Act 2009* has a number of provisions in relation to the historic environment, including consideration of historic or archaeological sites within the grounds for designating MCZs. The *Marine (Scotland) Act 2010* allows Scottish Ministers to designate Historic Marine Protected Areas in Scottish territorial waters (i.e. out to 12nm). These designations have been used to cover all wrecks in Scottish waters formerly designated under the *Protection of Wrecks Act 1973*, which is not repealed in Scotland. Military remains will remain within the remit of the *Protection of Military Remains Act 1986*. Although Scottish territorial waters are not within the remit of this SEA (with the exception of for gas storage and oil and gas licensing), landfall locations and offshore developments may take place within close proximity to territorial limits. For the purposes of the *Marine (Scotland) Act* historic assets may include:

- a vessel, vehicle or aircraft (or a part of a vessel, vehicle or aircraft), or its remains
- an object contained in, or formerly contained in, a vessel, vehicle or aircraft
- a building or other structure (or a part of a building or structure)
- a cave or excavation
- a deposit or artefact (whether or not formerly part of a cargo of a ship) or any other thing which evidences, or groups of things which evidence, previous human activity

Under the reform of heritage protection, the Scottish Government released a policy document in 2008 which consolidated the Scottish Heritage Protection Policy series of reports. The 2011 update of the Scottish Historic Environment Policy (SHEP) takes account of the *Marine (Scotland) Act* and the *Historic Environment Scotland Act 2011*. The SHEP document covers both statutory and non-statutory designations, and includes a number of annexes providing criteria and guidance on scheduling, listing and conservation areas, as well as information on listed building consent and associated planning permission process.

English Heritage (now Historic England) produced a National Heritage Protection Plan (2012, updated 2013) which sets out the priorities for which English Heritage will dedicate resources to in the years 2011-2015, for all aspects of national heritage, spanning both the pre-historic and historic periods. The Action Plan embedded in this document sets out what is to be delivered,

stating measures and activities to achieve this, with activities consisting of a number of linked projects undertaken by English Heritage. In the context of the marine environment, a number of relevant topics are assigned resources including: marine exploitation impacts, mineral extraction impacts, unknown marine assets and landscapes and submerged heritage assets and landscapes. Plan activities are due to be carried out in a comprehensive and clear manner, involving local communities and with results which are widely disseminated and accessible.

English Heritage commissioned the Centre for Maritime Archaeology at the University of Southampton to co-ordinate the development of a Maritime and Marine Historic Environment Research Framework, which was published in 2011²³. The framework is intended to inform future management, policy and planning for the marine historic environment, and provide research priorities for which funding may be sought.

Implications for SEA

The SEA should consider the potential effects of draft plan/programme activities on coastal and marine heritage features, including on landscape/seascape and setting, and highlight guidance and best practice in relation to the historic environment and marine energy developments (e.g. Gribble & Leather 2011).

²³ Also see Jesse *et al.* (2013). *People and the Sea: A Maritime Archaeological Research Agenda for England*, York, GB, Council for British Archaeology, 272pp.

3 Environmental Baseline

3.1 Introduction

The provision of environmental information is required under Schedule 2 of *The Environmental Assessment of Plans and Programmes Regulations 2004* (Regulation 12(3)).

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...*” These include:

- 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.

3.2 Overview of the Environmental Baseline

The environmental baseline for OESEA3 will build on upon that previously produced for OESEA (2009) and OESEA2 (2011), and also on other studies which included regional descriptions of the environment (e.g. OSPAR QSR 2010 and Charting Progress 2), and be provided in full as an Appendix to the Environmental Report having been updated to reflect the latest available literature and other inputs including from consultation. The geographic scope (entire UKCS) and level of detail will be the same as for OESEA – this baseline can be viewed on the [gov.uk webpages](http://gov.uk/webpages).

The environmental baseline will consider those topics introduced in Section 3.1 in a UK context, before providing more detailed information on key features specific to UK Regional Sea areas.

The following provides a summary of the UK context for each SEA topic area, the key updates which will be made to each topic chapter. It should be noted that the SEA baseline has been kept under review since the publication of OESEA2, and the tabulations provided below only show the most pertinent new literature due to the number of relevant publications since 2011.

A number of technical reports will be commissioned during the SEA process to underpin individual baseline topic sections. In addition to these, a number of studies have been commissioned by DECC since OESEA2 to inform understanding of the environment and its interactions with aspects of the plan/programme. Outputs from these studies are listed below where relevant.

Consultation Question

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.

3.3 UK Context

3.3.1 Biodiversity, habitats, flora and fauna

The UK has a rich marine biodiversity reflecting both the range of habitats from estuaries, through coastal waters to depths of >2400m, and its position where several biogeographical provinces overlap (see for example Murray (1886), Longhurst (1998) and Spalding *et al.* (2007)). Some species and habitats are naturally rare, whilst others are endangered by human activities, and actions to protect and promote biodiversity are being taken at many levels. This section is subdivided into ecological components, with separate descriptions for plankton, benthos, cephalopods, fish & shellfish, turtles, marine birds and marine mammals.

Plankton

In broad biogeographical terms, the planktonic flora and fauna of UK waters is part of the North-East Atlantic Shelves Province which extends from Brittany to mid-Norway. In addition, the deeper Faroe-Shetland Channel and areas to the north are within the Atlantic sub-Arctic Province. Each province can be subdivided according to hydrography and plankton composition. The phytoplankton community is largely dominated by diatoms and dinoflagellates, with others, such as the calcifying coccolithophore *Emiliana huxley*, becoming significant components during their seasonal peak in abundance. Phytoplankton blooms typically take place in spring, with a smaller bloom in late summer. Some phytoplankton blooms may be toxic to marine life. The timing, composition and size of these blooms are dependent on a range of environmental factors with important spatial differences across the UKCS. The zooplankton community is dominated by copepods, particularly *Calanus* species which show a strong geographical divide, with *C. finmarchicus* and *C. Helgolandicus* dominating northern and southern waters respectively. Jellyfish, krill and salps are also abundant, as are the larvae of fish, and many benthic animals (meroplankton).

Benthos

The composition of the seabed fauna of the UK reflects the intersection of four biogeographical zones:

- Boreal Province including the North and Irish Seas

- Lusitanian-Boreal Province comprising the Celtic Sea and west coasts of Ireland and Scotland
- Arctic Deep-Sea Province, a deep water zone centred on the Norwegian Sea but extending into the Faroe-Shetland and Faroe Bank Channels
- Atlantic Deep-Sea Province, a deep water zone to the west of northeast Europe

Within each Province it is possible to distinguish a series of faunal communities inhabiting specific sediment types and depth ranges. Often these communities extend over wide areas (e.g. the fine sands of the central North Sea and the sandy muds of the Fladen Ground in the northern North Sea) and include both infauna and epifauna. In addition, there are a number of highly localised habitats and communities, including reefs of long lived horse mussels and cold water corals, where high biodiversity is accompanied by high sensitivity to human pressures. Habitat characterisation across the UKCS continues to improve, including through the efforts made in identifying and designating MPAs.

Cephalopods

Most cephalopods in UK waters are long-finned squids, short-finned squids, bobtail squids, octopuses or cuttlefish. The long-finned squids (including *Loligo forbesii*) tend to have a more coastal distribution and a northerly distribution. Short-finned squids are oceanic species and are recorded particularly to the west of the UK. Bobtail squids are abundant in shallow, coastal regions, while octopuses and cuttlefish are more common in southern areas. A number of deep-sea cephalopods are present in the deep waters of the Faroe-Shetland Channel and Rockall Trough.

Fish and shellfish

A wide range of biogeographic distribution patterns are shown by the fish in UK waters. The majority of continental shelf species have a north-east Atlantic/northern Atlantic distribution, although a proportion are found globally in the tropics/subtropics and others have a circum-polar pattern of occurrence. Widely distributed species often include local stocks with distinct breeding times and locations (e.g. herring). Widespread pelagic species include herring and mackerel, particularly around the western and northern parts of the UK. Demersal species include gadoids (e.g. cod, whiting) and flatfish (e.g. plaice, dab). Demersal communities tend to be more diverse in southern areas of the UK. Diadromous fish in UK waters include sea trout and Atlantic salmon. A number of sharks and rays are present in UK waters, including the basking shark. Deep water fish show different distribution patterns with major differences occurring north and south of the Wyville Thomson Ridge (ca. 60°N), and a distinct species group found in the cold waters of the Faroe-Shetland Channel and Norwegian Sea. Widespread commercial shellfish species include crustaceans (e.g. *Nephrops*, brown crab), bivalve molluscs (e.g. scallops, cockles) and gastropod molluscs (e.g. whelks). Many of these species, such as *Nephrops* and scallops, are closely tied to particular seabed sediments and so occupy distinct grounds. Virtually all commercially fished species are heavily exploited.

Turtles

Of the five species recorded in UK waters, the vast majority of records are of the leatherback turtle (*Dermochelys coriacea*) which is the only species considered a regular member of the UK marine fauna. While turtles have been observed along the majority of UK and Irish coasts, records are concentrated on the west and south coasts of Ireland, southwest England, south and northwest Wales, the west coast of Scotland, Orkney and Shetland.

Birds

The bird fauna of the UK is western Palaearctic, that is the great majority of species are found widely over western Europe and extend to western Asia and northern Africa. There are 3 regular patterns of species occurrence: resident, summer visitors (to breed) and winter visitors. Some of the summer visitors undertake long migrations to overwinter in southern Africa or South America. The seabird community in the UK comprises a number of gull, auk, tern and skua species, while numerous waders, ducks, and geese make up seasonal and year-round assemblages in coastal wetlands. A few species are found only or predominantly in the UK. For example, the three Pembrokeshire islands of Skomer, Skokholm and Middleholm are estimated to hold some 50%, and the Isle of Rum off western Scotland between a quarter and a third of the world's breeding population of Manx shearwaters.

Marine mammals

Many of the species of cetaceans found in UK waters have a worldwide distribution, although a number have restricted ranges, typically temperate to sub-Arctic or Arctic waters of the North Atlantic. British whales and dolphins include resident species as well as migrants (regularly moving through the area to and from feeding and breeding grounds) and vagrants (accidental visitors from the tropics or polar seas). The most abundant cetacean in UK waters is the harbour porpoise. Two species of seal breed in the UK; the grey seal has a North Atlantic distribution with the UK holding over 40% of the world population; and the harbour seal, found along temperate, sub-Arctic and Arctic coasts of the northern hemisphere, with the UK population representing over 5% of the global total. Otters inhabit a variety of aquatic habitats, with some populations feeding in shallow, inshore marine areas. The most important otter populations utilising coastal habitats occur in western Scotland, Shetland, west Wales and the Wash and north Norfolk coast. Small numbers of the Nathusius' pipistrelle bat occur seasonally over UK waters on migrations between the UK and mainland Europe.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
General	
UK Biodiversity Indicators 2014 http://jncc.defra.gov.uk/page-4229	A review of benthos, sediments and contaminant levels in each of the Mid-North Sea High and West of Hebrides seismic survey areas is proposed. As part of wider SEA monitoring, a resurvey of regional sampling of the Fladen Ground and central North Sea is also proposed.
Marine Scotland publications: http://marinedata.scotland.gov.uk/~marine/	
Plankton	
Latest studies and reports produced from analyses of data from the Continuous Plankton Recorder operated by the Sir Alister Hardy Foundation for Ocean Science (SAHFOS), including the following: Beare <i>et al.</i> (2013). Long-term trends in calcifying plankton and pH in the North Sea. <i>PLoS ONE</i> 8 : e61175. Edwards <i>et al.</i> (2013). Marine ecosystem response to the Atlantic Multidecadal Oscillation. <i>PLoS ONE</i> 8 (2): e57212. Edwards <i>et al.</i> (2014). Global Marine Ecological Status Report: results from the global CPR survey 2012/2013. <i>SAHFOS Technical Report 10</i> : 1-37. Plymouth	It is proposed that an underpinning report be produced to provide an overview of plankton communities and trends over time on UKCS.
Fehling <i>et al.</i> (2012). The relationship between phytoplankton distribution and water column characteristics in North West European shelf sea waters. <i>PLoS ONE</i> 7 : e34098.	

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
Benthos	
Relevant outputs from the NERC and Defra funded FLOW and Benthic Ecology (FLOWBEC) project http://noc.ac.uk/project/flowbec	-
Reports commissioned by JNCC to improve mapping of biotopes and habitats, including of deep-sea habitats. http://jncc.defra.gov.uk/page-2132	
UKSeaMap 2010 (McBreen <i>et al.</i> 2011) http://jncc.defra.gov.uk/ukseamap	
Relevant reports commissioned by SNCBs as part of the effort to identify and designate MCZs/MPAs.	
Relevant outputs from the MAREMAP initiative http://www.maremap.ac.uk/	
Reports from benthic surveys carried out by e.g. Marine Scotland Science, CEFAS, marine energy developers	
Relevant outputs from Defra project ME5301: "Mapping the structure, function and sensitivity of seabed sediment habitats to support assessment of the sea-floor status and the broadscale monitoring and management of the benthic environment"	
Cephalopods	
Reports by the ICES working Group on Cephalopod Fisheries and Life History (WGCEPH)	-
Fish and Shellfish	
All relevant ICES reports	-
Fish and Shellfish stocks: 2014 edition published by Marine Scotland http://www.gov.scot/Publications/2014/09/5642	
Results from tagging studies to explore elasmobranchs' distribution and movement patterns	
Essential fish habitat modelling project (MMO1096) – ongoing	
Turtles	
Annual Reports of records submitted to the TURTLE database	-
Birds	
Studies on the distribution of marine birds commissioned by JNCC as part of the efforts to identify offshore SPAs http://jncc.defra.gov.uk/page-2132	-
Latest studies and reports produced from analyses of long-term seabird monitoring data, published by JNCC.	
Wetland Bird Survey (WeBS) reports http://www.bto.org/volunteer-surveys/webs	
The State of the UK's birds reports http://www.bto.org/volunteer-surveys/bbs/bbs-publications/sukb	
Relevant reports commissioned by the Scottish Government to inform renewable development, including: Lewis <i>et al.</i> (2012). Final Report: Population sizes of seabirds breeding in Scottish SPAs. Report for the Scottish Government, 342pp.	
Thaxter <i>et al.</i> (2012). Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. <i>Biological Conservation</i> 156 : 53–61.	
Seabird tagging studies, including those commissioned by DECC https://www.gov.uk/offshore-energy-strategic-environmental-assessment-sea-an-overview-of-the-sea-process#offshore-energy-sea-the-current-sea	

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
Ornithological data inventory for offshore wind farm consenting (MMO1093) – yet to be published	
Marine Mammals	
Relevant reports commissioned by the SNCBs as part of efforts to collate and analyse cetacean distribution data, especially in relation to SACs designation and including results from Marine Mammal Observers sightings during seismic operations. http://jncc.defra.gov.uk/page-2132	It is proposed that an underpinning report be produced covering beaked whales.
Studies and reports on the bottlenose dolphin population of the Moray Firth and its wider distribution along the East Coast https://www.gov.uk/government/publications/uk-offshore-energy-strategic-environmental-assessment-2-supporting-documents	
Latest scientific advice on seal distribution and trends in abundance provided to the Special Committee On Seals (SCOS) by the Sea Mammal Research Unit (SMRU). http://www.smru.st-andrews.ac.uk/pageset.aspx?psr=411	
Seal tagging studies commissioned by DECC and relevant data analyses prepared by SMRU https://www.gov.uk/government/publications/uk-offshore-energy-strategic-environmental-assessment-2-supporting-documents	
Grey and harbour seal usage maps and related report (2013a) http://www.gov.scot/Topics/marine/science/MSInteractive/Themes/seal-density	

3.3.2 Geology substrates and coastal geomorphology

The distribution of geological strata in the UKCS is determined by past geological and geomorphological processes. The distribution of sediments and certain topographic features is a function of the underlying geology, and millennia of aeolian, fluvial and glacial activity both in the marine and terrestrial environment. The distribution of sediments and deep geological structure of the UKCS, and the North Sea in particular, is quite well known, particularly in areas of mature oil and gas production which have been extensively explored since the 1960s. Oil and gas reserves are dependent on viable source rocks and a suitable impermeable cap-rock, and these reservoirs are responsible for the distribution of much offshore activity. Certain topographic features are notable, primarily for the quality of habitat they provide, and these are bound by geology (e.g. Haig Fras) or sediment type (e.g. north Norfolk sandbanks). There are over 100 estuaries in England and Wales of relevance to the draft plan, which can be divided into a number of broad geomorphological types. Potential areas which may be suitable for gas storage and CCS include hydrocarbon reservoirs, halite deposits and saline aquifers.

Existing levels of contamination in the UK marine environment vary considerably on both regional and local scales, and in general have declined appreciably in recent decades. The majority of marine pollution comes from land-based activities; most pollutants enter the UK marine environment through direct discharges of effluents, land run-off (mainly via rivers) or indirectly via the atmosphere. The highest concentrations of contaminants, and hence the greatest effects, are therefore often in inshore areas. Water samples with the highest levels of chemical contamination are found at inshore estuary and coastal sites subject to high industrial usage. In offshore waters, contaminant levels (chiefly hydrocarbons) in water and sediments are generally expected to be at or near background concentrations. Levels are expected to be higher at close proximity to oil and gas infrastructure, with concentrations decreasing with increasing distance from the source.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
Updates to the UK civil hydrography programme and the latest status of UK hydrographic survey coverage. https://www.gov.uk/the-civil-hydrography-programme	It is considered that there is sufficient information to characterise the broadscale geological environment from existing data sources, however it is recognised that there is limited coverage in certain areas. There has been increasing concern over the potential effects of the introduction of hard substrate, primarily from wind farm development options, but also in relation to pipeline stabilisation and protection. In order to understand the context of any such placement, it is proposed that an underpinning study reviews the relative occurrence of hard substrates on the UKCS (outcropping rock, density of boulders, cobbles, large shell banks). The placement of nearshore structures and landfall activities has raised concerns over effects on coastal sedimentary processes. It is proposed that an underpinning study look at suspended sediment loads, particle size composition, and their temporal variability on the UKCS. Though three sites on the UKCS have been designated for submarine structures made by leaking gases, knowledge about the wider distribution of related pockmark and methane derived authigenic carbonate (MDAC) on the UKCS is poorly understood. It is proposed that an underpinning study building on previous work, review the distribution of pockmarks and MDAC on the UKCS.
Data collected as part of MAREMAP http://www.maremap.ac.uk/view/search/searchMaps.html	
Latest habitat maps collated by JNCC and the UK Statutory Nature Conservation Bodies http://jncc.defra.gov.uk/page-6639	
Seafloor biotope analysis of the deep waters of the SEA4 region of Scotland's seas (Bett 2012) http://jncc.defra.gov.uk/page-6333	
Latest report on the petroleum prospectivity of the principal sedimentary basins on the United Kingdom Continental Shelf (Gray 2013)	
Areas identified as of potential opportunity for CCS in Marine Planning documents (e.g. East Inshore and Offshore Marine Plans). Updates to UKCS prospectivity for carbon storage (e.g. Noy <i>et al.</i> 2012)	
BGS offshore geindex of marine sediment sampling http://www.bgs.ac.uk/data/mapViewers/	
Latest MCCIP report card for coastal erosion (Masselink & Russell 2013) and sea-level (Horsburgh & Lowe 2013) http://www.mccip.org.uk/annual-report-card/	
Braemar cSAC, Scanner cSAC and Turbot Bank MPA Proposal Survey (Cefas & JNCC 2015)	
Data collected as part of the MCZ and MPA identification and designation – also see 3.3.10 Conservation.	
Relevant outputs from the NERC and Defra funded FLOW and Benthic Ecology (FLOWBEC) project http://noc.ac.uk/project/flowbec	

3.3.3 Landscape/Seascape

Seascape is defined by the European Landscape Convention (ELC) as “an area perceived by people, whose character is the result of the action and interaction of natural and/or human factors”, and can be separated into areas of sea, land and intervening coastline, and more recently in the MPS as, “landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other.” The study of seascape is not only concerned with the physical character of a given view but the interaction of that view with individuals and how changes can affect overall visual amenity. Seascapes and coastal environments (including the sea itself) are extensively used for recreation which generates significant tourist income from which many coastal communities are dependent, and this can strongly conflict with commercial and industrial activity (Hill *et al.* 2001). The ‘value’ of many of the UK’s seascapes is reflected in the range of designations which relate in whole or in part to the scenic character of a particular area (e.g. AONB, Heritage Coast, National Scenic Area), however the ELC and MPS (and most recently the East Marine Plans) define landscape and how they are to be considered in more general terms, acknowledging the value of all landscapes whether or not they are subject to designation.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
<p>Marine Management Organisation seascape character assessments for the East Inshore and Offshore, and South Inshore and Offshore Marine Plan areas Natural England Commissioned Report NECR106: Seascape Characterisation around the English Coast (Marine Plan Areas 3 and 4 and Part of Area 6 Pilot Study) – 2012 Seascape character area assessment: East Inshore and East Offshore marine plan areas – 2012 Seascape assessment for the South inshore and offshore marine plans – 2014 Seascape character description marine areas 10,11 and 5 (north west) (MMO1091/92) – ongoing</p>	<p>It is considered that the ongoing seascape characterisation programmes accompanying the marine planning processes for England and Wales, and previous characterisations of devolved administrations are sufficient to inform the baseline characterisation for OESEA3.</p> <p>The potential for larger wind turbine generators and the lack of a technology specific sensitivity assessment for renewable devices in English waters represents a gap in strategic knowledge in seascape. It is proposed that the basis of the seascape study undertaken for OESEA (2009) is reviewed.</p>
<p>Historic Seascape Characterisations, including those undertaken since the publication of OESEA2 (Bristol Channel and Severn Estuary, The Irish Sea (English sector), Newport to Clacton and Adjacent Water, Hastings to Purbeck and Adjacent Waters) http://archaeologydataservice.ac.uk/archives/view/seascape/</p>	
<p>Updates to the National Character Area profiles (England) https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles</p>	
<p>The sensitivity of the Welsh Coast and Seascape to Tidal Stream Developments LUC – 2011</p>	
<p>National Seascape Character Assessment for Wales LUC – ongoing (part of Wales’ National Marine Plan)</p>	
<p>Northern Ireland Regional Seascape Character Assessment – 2014 http://www.doeni.gov.uk/niea/land-home/landscape_home/seascape_character_areas.htm</p>	

3.3.4 Water environment

The UK marine water environment is highly varied, ranging from entirely oceanic conditions to the north and west of the UK to complex estuarine systems widely distributed around the coast. It is also a dynamic environment, with a complex system of currents and varied oceanographic conditions including areas of considerable frontal activity and high-energy wave and tidal environments. The OESEA3 baseline would contain updated detailed information on the water masses and circulation, stratification and frontal zones, coastal tidal flows, temperature, salinity and wave climate.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
<p>Assessment of the OSPAR Report on Discharges, Spills and Emissions to Air from Offshore Installations, 2010-2012 http://www.ospar.org/v_publications/download.asp?v1=p00635</p>	<p>None. It is regarded that the previous baseline and new sources in grey and primary literature are sufficient to inform the OESEA3 baseline.</p>
<p>Relevant outputs from the NERC and Defra funded FLOW and Benthic Ecology (FLOWBEC) project http://noc.ac.uk/project/flowbec</p>	
<p>Relevant outputs from the Brahan Project http://www.thebrahanproject.com/</p>	
<p>WFD water body status (particularly coastal and transitional waters)</p>	

3.3.5 Air Quality

Whilst air quality is not monitored routinely offshore, regular air quality monitoring is carried out by local authorities in coastal areas adjacent to each Regional Sea and by the OSPAR Comprehensive Atmospheric Monitoring Programme (CAMP) network. The air quality of all local authorities is generally within national standards set by the UK government's air quality strategy though a number of AQMAs have been declared to deal with problem areas. Industrialisation of the coast and certain inshore areas has led to increased levels of pollutants in these locations which decrease further offshore, though oil and gas platforms provide numerous fixed point sources of atmospheric emissions.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
Updates to the NAEI since the publication of OESEA2 http://naei.defra.gov.uk/	None. It is regarded that the previous baseline and new sources in grey and primary literature are sufficient to inform the OESEA3 baseline.
Assessment of the OSPAR Report on Discharges, Spills and Emissions to Air from Offshore Installations, 2010-2012 http://www.ospar.org/v_publications/download.asp?v1=p00635	
Comprehensive Atmospheric Monitoring Programme Deposition of air pollutants around the North Sea and the North-East Atlantic in 2011 and 2012 http://www.ospar.org/v_publications/download.asp?v1=p00597 , http://www.ospar.org/v_publications/download.asp?v1=p00632	
Emissions of air pollutants in the UK and their trends, 1970-2013 https://www.gov.uk/government/statistics/emissions-of-air-pollutants	
Changes or additions to UK Air Quality Management Areas and progress to meet emissions reductions targets http://uk-air.defra.gov.uk/aqma/	

3.3.6 Climate and Meteorology

The UK lies within temperate latitudes and the climate is generally mild. Numerous easterly moving depressions meet the UK in the west leading to a gradient of relatively high wind speeds and precipitation in the exposed west and relatively low wind speeds and precipitation in the sheltered south and east. The upland nature of much of the west coast also contributes to this west-east gradient, with topography-induced enhanced precipitation, particularly in the north-west. The UK has a strong maritime influence, which has the effect of reducing the diurnal and annual temperature ranges; such effects are most notable at the coast and on islands (e.g. Orkney, Shetland). The North Atlantic Oscillation (NAO) has also been linked with variations in UK sea surface temperatures, wind strength, direction and rainfall. It is very likely that climatic change is influenced and/or generated by the anthropogenic production of greenhouse gases, which are likely to generate a temperature increase of more than 1.5°C by the end of the century (relative to 1850-1900), or 0.3-0.7°C for the period 2016-2035 (relative to 1986-2005). Related changes include increase in sea-level, possibly more changeable and extreme weather, and alteration to metocean conditions (also covered in relevant topic areas elsewhere).

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
IPCC fifth assessment report (AR5) https://www.ipcc.ch/report/ar5/	None. It is regarded that the previous baseline and new sources in grey and primary literature are sufficient to inform the OESEA3 baseline.
Any updates arising from the UKCIP during the drafting of the SEA Environmental Report http://ukclimateprojections.metoffice.gov.uk/	
MCCIP Report Card 2013, or any update during the drafting of the SEA Environmental Report. http://www.mccip.org.uk/annual-report-card/	
UK greenhouse gas emissions statistics DECC – 2015 https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-statistics	
UK Climate Change Risk Assessment (2012) and National Adaption Programme (2013) https://www.gov.uk/government/publications/2010-to-2015-government-policy-climate-change-adaptation/2010-to-2015-government-policy-climate-change-adaptation	
Relevant public body reporting requirements under the Climate Change Act 2008 https://www.gov.uk/government/publications/adapting-to-climate-change-2013-strategy-for-exercising-the-adaptation-reporting-power	
Meeting Carbon Budgets – Progress in reducing the UK's emissions: 2015 Report to Parliament http://www.theccc.org.uk/publication/reducing-emissions-and-preparing-for-climate-change-2015-progress-report-to-parliament/	

3.3.7 Population and Human Health

The total mid-2013 UK population is estimated to have been 64.1 million people. Population density was highest in England at 413 persons per km², comparably lower in Wales and Northern Ireland at 149 and 135 persons per km² respectively, and the lowest by a considerable margin in Scotland at 68 persons per km². In coastal areas, there are lower densities around much of the southwest of England, west and north Wales, the far north of England, and much of Scotland excluding the central belt. The highest coastal densities are around much of southeast England, part of northeast England, the Firths of Forth and Clyde, part of northwest England, south Wales and around the Severn Estuary. These areas are typically where conurbations are largest and most numerous, although more isolated areas of higher densities are dotted around much of the coast. Higher densities are also observed in several coastal areas of Northern Ireland.

In 2011, 81.4% of people in England described their health as “Very good” or “Good” in 2011. This compared with a similar value of 82% in Scotland, and comparatively lower figures of 79.5% and 77.8% in Northern Ireland and Wales respectively.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
ONS UK population figures mid-2013 http://www.ons.gov.uk/ons/rel/pop-estimate/population-estimates-for-uk--england-and-wales--scotland-and-northern-ireland/2013/stb---mid-2013-uk-population-estimates.html	None. It is regarded that the new sources in grey and primary literature are sufficient to inform the OESEA3 baseline.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
2012-based national population projections http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2012-based-projections/rep-summary-results.html	
ONS Economic and Personal well-being 2011-2014 http://www.ons.gov.uk/ons/guide-method/user-guidance/well-being/	
2011 census data including health and employment structure http://www.ons.gov.uk/ons/guide-method/census/2011/census-data/index.html http://www.scotlandscensus.gov.uk/ http://www.nisra.gov.uk/census/2011census.html	
2012-based Historic and Projected Mortality Data http://www.ons.gov.uk/ons/rel/lifetables/historic-and-projected-data-from-the-period-and-cohort-life-tables/2012-based/stb-2012-based.html	
MMO Socio-Economic Typologies of Coastal Communities, including the related method, document and spatial outputs https://www.gov.uk/government/publications/marine-planning-socio-economic-study	
MMO East Inshore and Offshore, and South Inshore and Offshore Marine Plans (in preparation) https://www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans https://www.gov.uk/south-inshore-and-south-offshore-marine-plan-areas	
Scotland's National Marine Plan http://www.gov.scot/Topics/marine/seamanagement/national	
National Marine Plans of Northern Ireland and Wales, and Scottish Regional Marine Plans (ongoing, will potentially not be finalised during the drafting of OESEA3)	
Oil and gas economic report (Oil & Gas UK) http://www.oilandgasuk.co.uk/2014-economic-report.cfm	
Wind Energy in the UK: State of the Industry Report 2014 http://www.renewableuk.com/en/publications/reports.cfm/state-of-industry-report-2014	

3.3.8 Other users, material assets (infrastructure, other natural resources)

UK waters are subject to a multitude of uses – particularly in coastal areas. The range and importance of existing and potential uses of the sea will be fully described in an appendix to the Environmental Report. This will use accurate and recent information on other current and likely uses of the sea in the foreseeable future, using input from marine spatial plans where these have been completed.

The UK is heavily reliant on shipping for the import and export of goods, and will remain so for the foreseeable future. Over 95% of the goods entering or leaving the UK are transported by ship, with substantial numbers of vessels also transiting UK waters en route to European and more distant ports. In recognition of the vessel traffic densities and topographic constraints on various routes, the IMO has established a number of traffic separation schemes and other vessel routing measures to reduce risks of ship collision and groundings. In addition, IMO regulations required that from 2005, an Automatic Identification System (AIS) transponder be fitted aboard all ships of >300 gross tonnage engaged on international voyages, all cargo ships of >500 gross tonnage and all passenger ships irrespective of size. AIS data allow precise

tracking of individual vessels, and provide accurate information on important areas for larger vessel navigation. From 2012, fishing vessels over a certain size (initially >24m, but >15m since 2014) have also been required to have an AIS installed.

Fishing in the UK has a long history and is of major economic and cultural importance. In 2013, there were just over 12,000 working fishermen in the UK, operating 6,399 vessels, many of which are smaller inshore boats (5,036 less than 10m in length compared with 1,363 greater than 10m). These vessels landed 624,000 tonnes of fin- and shellfish in 2013, with a total value of £718 million. On top of this, fish processing provides nearly 12,000 full time equivalent jobs in the UK. The livelihoods of individual fishermen depend on their ability to exploit traditional fishing grounds and to adapt to changing circumstances to maximise profit. Consequently, they are vulnerable to competition within the UK industry and with foreign vessels, and to being displaced from primary grounds. Various sources of information on fishing effort show that while the majority of UK waters are fished to some extent, certain areas receive considerably more effort than others. In general, the greatest density of fishing effort takes place in coastal waters, for both static (such as pots, traps or gillnets) and mobile (such as trawls and dredges) gears. Further offshore, the density of effort was greatest to the northeast of Scotland (particularly the Fladen Ground), around the Northern Isles and to the southwest of the UK.

Military use of the coasts and seas of the UK is extensive, with all 3 Services having defined Practice and Exercise Areas, some of which are danger areas where live firing and testing may occur. Additionally, several military radars – Air Surveillance and Control Systems (ASACS) – are present around the coasts of the UK. Tourism and recreational use of UK coasts and coastal waters is of major importance in many areas. Major recreational uses of the sea beyond beaches and coastal paths include yachting (for which the Royal Yachting Association has published charts of cruising and racing routes), surfing and sea angling. Statistics for England in 2012 indicated that anglers spent £1.23 billion on the activity (or £831 million after imports and taxes are excluded), with 884,000, 125,000 and 76,000 people involved in the sport in England, Scotland and Wales respectively (Armstrong *et al.* 2013). Many visitors to the coast cite unspoilt and beautiful natural scenery as the important factors influencing their selection of location to visit. The importance of such attributes are widely recognised and protected through designations such as National Parks, AONBs and National Scenic Areas.

Various areas of sea are used or licensed/leased for marine aggregate extraction, telecommunications and other cables, disposal of capital and other dredging wastes, offshore wind farms and other marine renewables, surface and subsea oil and gas production, hydrocarbon gas storage and export infrastructure, and carbon dioxide storage. Potential future uses/enhanced use of the sea and seabed includes carbon dioxide storage in geological formations, wave and tidal projects, and subsea cables forming connections as part of an offshore grid. Projects in these areas are either in the demonstration phase or in early planning, but are expected to be commercially proven or be in planning in the coming years.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
MMO fishing activity data 2007-2014 http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml	It is proposed that a review be conducted of predicted and actual navigational consequences from offshore wind farm installations.
MMO AIS data http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml	
Latest UKHO charted data including military PEXAs	

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
<p>Latest Crown Estate Interest spatial data and related leasing and planning progress http://www.thecrownestate.co.uk/coastal/downloads/maps-and-gis-data/</p>	
<p>Latest oil and gas licensing position, and all surface and subsea installations and infrastructure https://www.gov.uk/oil-and-gas-offshore-maps-and-gis-shapefiles</p>	
<p>Latest data on submarine cables http://www.kis-orca.eu/ http://www.seafish.org/industry-support/kingfisher-information-services/awareness-flyers/subsea-cable-awareness-flyers</p>	
<p>Updated national trails, including coastal trails under the <i>Marine and Coastal Access Act</i> https://www.gov.uk/government/collections/england-coast-path-improving-public-access-to-the-coast</p>	
<p>Status of UK bathing waters and blue flag beaches http://environment.data.gov.uk/bwq/profiles/ http://apps.sepa.org.uk/bathingwaters/LastSeason.aspx http://www.doeni.gov.uk/niea/bathingqualityni.htm http://gov.wales/topics/environmentcountryside/epq/waterflooding/bathing-water-quality-and-beaches/?lang=en</p>	
<p>Modelling marine recreation potential in England (MMO report 1064) https://www.gov.uk/government/publications/modelling-marine-recreation-potential-in-england-mmo-1064</p>	
<p>Latest UK fisheries statistics and trends since OESEA2, including: density of fishing effort by gear, density of UK landings (value and weight) by species group http://www.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/RectangleData</p>	
<p>Evaluating the distribution, trends and value of inshore and offshore fisheries in England (MMO 1011) http://webarchive.nationalarchives.gov.uk/20140108121958/http://www.marinemanagement.org.uk/evidence/1011.htm</p>	
<p>Understanding the distribution and trends in inshore fishing activities and the link to coastal communities – (Cefas MB0117) http://randd.defra.gov.uk/Document.aspx?Document=10279_MB0117_TwoPager_finalversion.pdf</p>	
<p>Social impacts of fisheries, aquaculture, recreation and tourism and marine protected areas in marine plan areas in England (MMO1035) http://webarchive.nationalarchives.gov.uk/20140108121958/http://www.marinemanagement.org.uk/evidence/1035.htm</p>	
<p>Location and statistics on mariculture http://www.gov.scot/Topics/marine/Fish-Shellfish https://www.gov.uk/government/publications/aquaculture-statistics-for-the-united-kingdom-2012</p>	
<p>Relevant publications as part of the Digest of UK energy statistics https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes</p>	

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
Renewable Energy Planning Data https://www.gov.uk/government/collections/renewable-energy-planning-data	

3.3.9 Cultural Heritage

The collective inventory and knowledge of maritime sites in particular is quite poor and may be subject to recording biases. Archaeology associated with human and/or proto-human activities either on the current seafloor of the southern North Sea, in the coastal zone of the British Isles and further inland, has the potential to date back at least as far as 500,000 years BP. Relatively recent finds of flint artefacts from the Cromer Forest-bed Formation, Suffolk date to as early as 700,000 years.

The current understanding of marine prehistoric archaeology is based on knowledge of the palaeolandscapes of the continental shelf between the UK and Europe during glacial phases and limited finds of archaeological materials, augmented with knowledge of analogous cultural and archaeological contexts from modern day terrestrial locations. The record for wreck sites is biased towards those from the post-Medieval and later periods, presumably a function of greater traffic and increased reporting associated with the introduction of marine insurance and the Lloyds of London list of shipping casualties in 1741. The strategic military importance of the sea, the importance of the North Sea as a fishing area, the importance of maritime trade routes and the treacherous nature of many near-shore waters, has led to a large number of ship and aircraft wrecks in UK waters.

A number of coastal sites have been designated as cultural World Heritage Sites for example St Kilda, the Cornwall and West Devon Mining Landscape and the Heart of Neolithic Orkney.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
Orders updating designated and controlled sites under The Protection of Military Remains Act 1986	It is proposed that an underpinning report providing an overview of marine archaeology is produced, in particular focussing on any changes in perspectives since the previous individual SEA reports.
Changes to the designation of wrecks in Scottish waters http://www.historic-scotland.gov.uk/wrecksites	
Updates to the Rapid Coastal Zone Assessment Programme, including those published since OESEA2: http://historicengland.org.uk/images-books/publications/rczas-nmp-sw-england-south-devon-coast/ https://www.historicengland.org.uk/images-books/publications/nwrcza-phase2-project-report/ https://www.historicengland.org.uk/images-books/publications/serczas-phase1-nmp/ http://historicengland.org.uk/images-books/publications/serczas-nmp-comp-1-2/	
Sturt <i>et al.</i> (2013) New models of North West European Holocene palaeogeography and inundation. <i>Journal of Archaeological Science</i> 40 : 3963-3976.	

3.3.10 Conservation of sites and species

Designated conservation sites are widespread and abundant around the UK coast; a variety of levels of designations exist from statutory international to voluntary local, affording various

levels of protection to habitats, species, and geological, cultural and landscape features. Some of the most widespread designations include the European-level SACs and SPAs and the national-level Sites/Areas of Special Scientific Interest (SSSIs/ASSIs). Relevant sites may include those which are terrestrial, terrestrial with marine components or else be entirely marine. Progress towards further identification of marine sites is ongoing; a number of offshore SACs are in the process of being designated, work is underway to identify new marine SPAs, and the boundaries of some coastal and marine sites have or are being extended. Additionally, the *Marine and Coastal Access Act 2009* introduced further requirements for identification and designation of Marine Conservation Zones (known as Marine Protected Areas in Scotland). Detailed listing and descriptions of conservation sites, species and nature conservation measures will be provided as an appendix OESEA3.

Proposed sources of information to update the baseline	Proposed technical reports to inform the baseline
<p>Latest listings of proposed or designated UK marine and coastal sites, including those which are international, European, national, and where relevant, local. These include but are not restricted to: SACs, SPAs, Ramsars, MPAs and MCZs, SSSIs, GCRs, World Heritage Sites, Heritage Coasts, AONBs, National Scenic Areas, Protected Wrecks.</p> <p>The condition, conservation status and trajectory of sites and their features</p>	<p>None. It is regarded that sufficient information is available from the national statutory conservation bodies to inform the OESEA3 baseline.</p>
<p>Spatial data relating to all relevant UK conservation designations</p> <p>http://jncc.defra.gov.uk/protectedsites/SACselection/gis_data/terms_conditions.asp</p> <p>http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml</p>	
<p>Relevant site information including citations</p> <p>http://jncc.defra.gov.uk/</p> <p>http://publications.naturalengland.org.uk/category/1721481</p> <p>http://gateway.snh.gov.uk/sitelink/index.jsp</p> <p>http://www.eea.europa.eu/data-and-maps/data/natura-2000</p> <p>http://publications.naturalengland.org.uk/category/6490068894089216</p>	
<p>Nature conservation body publications on work towards the identification and designation of new sites</p> <p>http://jncc.defra.gov.uk/default.aspx?page=5317</p>	
<p>Habitats and species identified in Regulations which are subject to protection whether or not they are contained within a designated site</p>	
<p>2012 Status Report on the OSPAR Network of Marine Protected Areas</p> <p>http://www.ospar.org/v_publications/download.asp?v1=p00618</p>	
<p>OSPAR background documents on species on the OSPAR List of threatened and/or declining species and habitats</p> <p>http://www.ospar.org/v_publications/browse.asp</p>	

3.4 Regional Seas

The previous Offshore Energy SEAs used the draft regional sea boundaries defined by JNCC (2004) as a means of considering the broad scale biogeographical regions within UK waters. Iterations to the draft regional seas (e.g. Verling 2009) were underway during the last SEA, and subsequently, a number of other regional subdivisions have been used to delineate the UKCS. These include those used for marine spatial planning, those defined by OSPAR, MSFD sub-

regions, and those used in Charting Progress 2 to describe and report on the condition of the UK marine environment. The latter regions were modified from those used in the first Charting Progress on the basis of updated knowledge on the distribution of features, and to align more with WFD water bodies and MSFD sub-regions.

It is proposed that this SEA subdivide its description of the UKCS using the Charting Progress 2 (CP2) regional seas. The differences between those boundaries used in CP2 and the 2004 draft regional seas are relatively small with the exception of the area to the north of the UK (Faroe-Shetland Channel, Rockall Trough and Bank, and Atlantic North West Approaches) which are treated as one area. For the purposes of this SEA, these areas will be considered separately as the *Faroe-Shetland Channel* area (Regional Sea 8, see Figure 3.1) and the *Rockall Trough and Bank and Atlantic North West Approaches* (Regional Sea 9).

Consultation Question

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

3.4.1 Summary of UK Regional Seas

The text below describes the broad physical features of each Regional Sea, including the features upon which their boundaries are based. Detailed information on key features of each of the Regional Seas will be provided by the various sub-appendices of the Environmental Report.

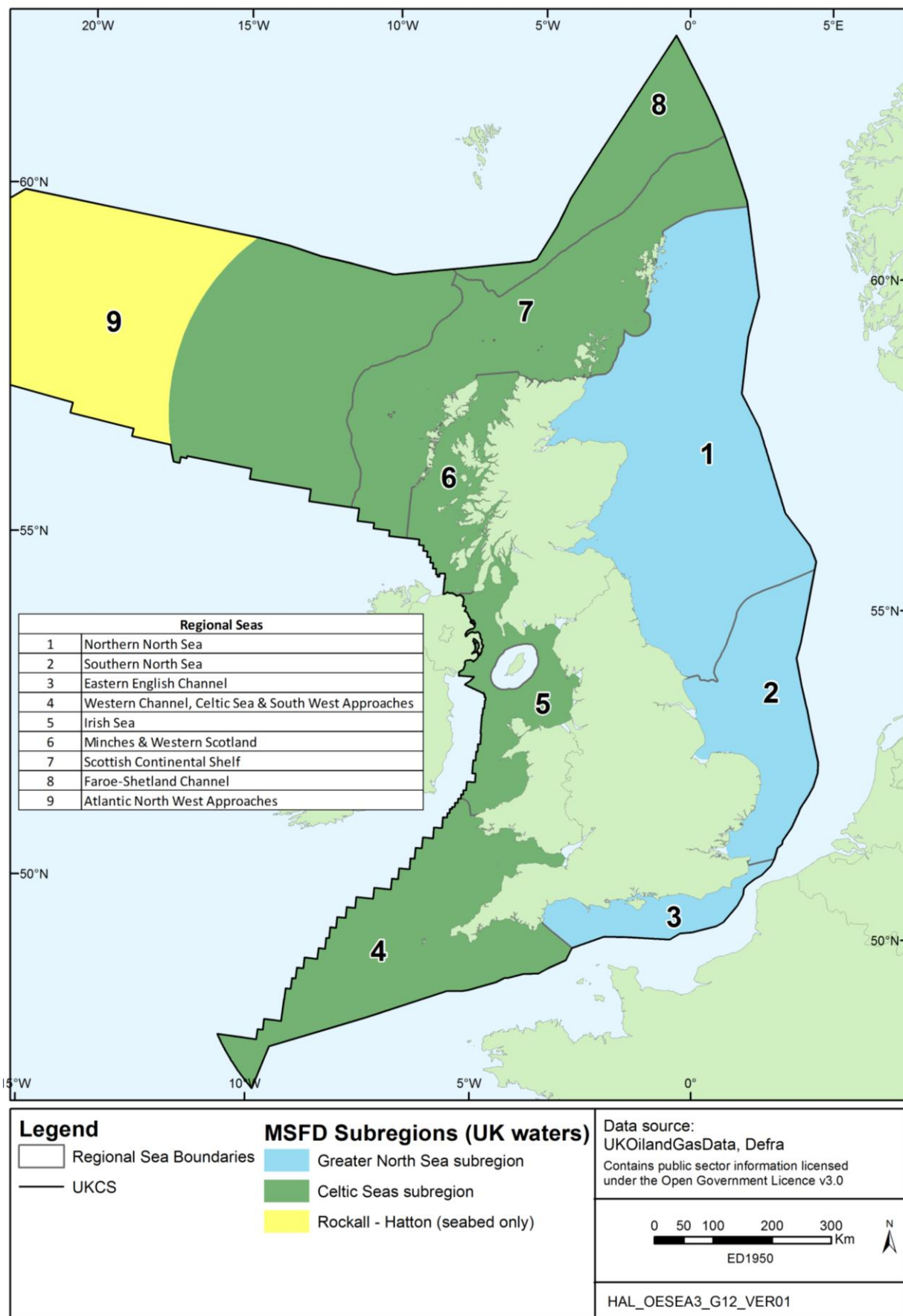
Regional Sea 1

The northern North Sea is bounded by the Flamborough front to the south, marking the transition from the shallow mixed waters of the southern North Sea to the deeper waters (50-200m) in the north which stratify thermally in summer along with a transition from sands to muddier sediments. Waters are generally of coastal origin but with a strong influx of Atlantic water in the north; turbidity is moderate. The northern boundary marks the transition from water dominated by the continental shelf current to the North Sea waters of mixed origin.

Regional Sea 1 supports an increasing diversity of cetacean species from south-north, high densities of seals (particularly around the Northern Isles), and an important population of bottlenose dolphins along the Scottish east coast. The adjacent coastline represents an important migratory pathway for many Arctic-breeding species, while the widespread and often remote cliff habitats support vast numbers of breeding seabirds; seabird densities at sea are relatively high over much of the area. The deeper waters over the mud and muddy sand of the Fladen Ground support an abundance of fish and *Nephrops*, yielding one of the most valuable fishing grounds in UK waters; additionally, inshore waters are heavily fished throughout the area. Regional Sea 1 supports a high number of coastal and offshore designations encompassing both European (SAC and SPA) and National (MPA and MCZ) sites, and a number of draft or proposed sites for features including seabirds, seabed habitats and marine mammals are presently under consideration.

Oil and gas development is extensive, particularly in the east, and renewables activity is centred on the territorial and offshore waters of the Moray Firth and the Firth of Forth. A number of tidal and wave lease areas have been granted in the territorial waters around Orkney and Shetland.

Figure 3.1: Regional Sea subdivisions to be used in OESEA3 in relation to MSFD subregions



Regional Sea 2

The southern North Sea extends from the Flamborough front in the north to north of the Dover Straits in the south, with a transition from North Sea water to Atlantic water. This region is shallow (generally 0-50m), with a predominantly sandy seabed, and mixed water experiencing large seasonal temperature variations. The influences of coastal water are particularly marked in this region, the water is turbid, and it exhibits a characteristic plankton composition.

Much of Regional Sea 2 is less than 50m water depth, with many extensive sandbank features present at less than 25m depth; these include areas which have been designated under the Habitats Directive such as Dogger Bank SCI, the North Norfolk Sandbanks SCI and the Margate and Long Sands SCI. Further seabed features have been designated, or are in the process of being designated, as part of the Marine Conservation Zone project. The western flank of the Dogger Bank also supports high densities of seabirds, with notable colonies on the east coast located at Flamborough Head including for kittiwake, gannet, guillemot, razorbill and fulmar. Harbour porpoise are widely distributed throughout much of the area, with apparently variable densities between two major surveys a decade apart. Large numbers of harbour seals breed on the coast adjacent to the Wash; these animals forage widely in adjacent waters. Similarly, grey seals are present throughout the area with a notable haulout and breeding site located at Donna Nook on the entrance to the Humber Estuary SAC.

The region experiences high densities of shipping activity, particularly in the south, and major shipping lanes run approximately parallel to the entire length of the coast. Fishing effort is moderate overall, with vessels generally avoiding the shallowest of sandbank areas, although inshore effort is fairly high in the south with international effort high in the southeast. Many dredging licence and application areas are present in the region. Gas development is extensive south of the Dogger Bank to approximately 53°N, while a number of existing, under construction and planned offshore wind farms are present in the greater Wash and Thames, the Dogger Bank and off Holderness (Hornsea area) and East Anglia. Regional Sea 2 is the most prospective area for carbon dioxide storage due to its underlying geology, and an Agreement for Lease and the first Carbon Dioxide Appraisal and Storage Licence are located to the east of the Yorkshire coast.

Regional Sea 3

The eastern English Channel is bounded by the Dover Straits to the east and extends to the west to a line drawn between Start Point and Cherbourg on the north coast of France. Depths are generally shallow and rarely exceed 60m. There are isolated deeps of 80-100m (e.g. the Northern Palaeovalley) and shallower deeps (60-70m) such as St Catherine's Deep to the south of the Isle of Wight. Waters are mixed, with strong tidal current velocities in the central channel which decrease to the west and east. The seabed is variable; a general transition can be observed from coarser sediments in the west to sand in the east, although localised rock outcrops occur throughout the English Channel basin. Water temperatures vary considerably with season. The western boundary denotes a transition in benthic fauna from the eastern English Channel (Boreal fauna) to a different community in the western English Channel (Lusitanian fauna).

The majority of Regional Sea 3 receives high to very high densities of shipping traffic, and has a water depth of less than 60m. The coastline is one of the most densely populated in the UK, and adjacent waters are used by a great number of recreational vessels. Additionally, very high levels of fishing activity occur, particularly in inshore waters, with high levels of effort by non-UK vessels also observed in this area. Many dredging licence and application areas are present in the region and a number of Round 3 offshore wind farm developments have either been proposed (Navitus Bay) or consented (Rampion).

Regional Sea 4

The western English Channel and Celtic Sea is a large region west of a line drawn between Start Point and Cherbourg and extending to approximately the 500m depth contour on the continental slope in the west. It is bounded to the northeast by the Celtic Sea front, marking the transition from oceanic water to the coastally influenced waters of the Irish Sea. Depth in the region varies from 50-200m with a general trend of increasing depth towards the west. The seabed is largely composed of sand and gravels with isolated rocky outcrops. The waters are generally subject to seasonal stratification, although mixing and seasonal temperature variation is greater in the east. The southern boundary is marked by a transition to warmer water and a community containing a greater number of Lusitanian species. The region is heavily influenced by Atlantic water, with reduced coastal influences; turbidity is moderate.

The Atlantic south west Approaches (formerly considered as a separate Regional Sea in OESEA and OESEA2), is a region bounded to the east by the shelf break and extends westwards into the northeast Atlantic. As only a very small proportion of this region lies within UK waters, it is therefore grouped with the adjacent Regional Sea 4. The seabed is generally composed of fine material. The water is oceanic in origin, with negligible coastal influences, low turbidity and is stratified. While comparable to the other deep water Regional Seas, influences from the Mediterranean current are stronger in this region leading to Lusitanian species being present in the water column. The area is intersected by submarine canyons, characterised by the upwelling of nutrient-rich deep waters and with cold-water corals present.

A large area with a water depth less than 60m extends west from the Bristol Channel to approximately 5°W, and also to some distance off the coast of north Cornwall. Surveys have observed seasonally high densities of seabirds in coastal waters around southwest England, while densities are also seasonally high in the north of the area around southwest Wales. The Celtic Sea is an important area for cetaceans, particularly common dolphins which may be seasonally present in large numbers. A large proportion of UK's leatherback turtle sightings occur in this region. In offshore waters west of Land's End lies Haig Fras – an area of rocky reef currently designated as a SCI. Additional SCI sites containing reef features are located in inshore waters including Start Point to Plymouth Sound and Eddystone SCI, Lizard Point SCI and Lands End and Cape Bank SCI. More recently, Marine Conservation Zones have been designated for features including high to moderate energy circalittoral, infralittoral or intertidal rock, and coarse sediments (Skerries Bank and Surrounds MCZ, Padstow Bay MCZ, East of Haig Fras MCZ). Two designated sites are located in the south west Approaches, including The Canyons MCZ (deep sea bed and cold water coral) and the South-West Deeps (subtidal coarse, mixed and sandy sediments, and relict sandbank features). A range of other rMCZ sites are located in the western English Channel, Celtic Sea and Atlantic south west Approaches.

The inshore waters off the southwest coast of England receive some of the highest levels of fishing effort in UK waters. Fishing effort is also high across the majority of Regional Sea 4, while this area is also of considerable importance to recreational craft and commercial shipping. Several dredging licence and application areas are present in the inner Bristol Channel and off the south Wales coast.

Regional Sea 5

The Irish Sea is bounded to the south approximately by the Celtic Sea front, and extends north to a line from the Mull of Kintyre, Scotland, to Fair Head, Northern Ireland, and includes the North Channel. Movements of species suggest the North Channel to represent an area of gradual transition rather than sharp change. The seabed is variable in nature, although dominated by glacial deposits re-worked by tidal currents. Waters are strongly influenced by

coastal processes and turbid with influxes of water from the Celtic Sea and north from the continental shelf current. Stratification occurs in deeper waters but not in the coastal margin or in the north east of the area.

UK waters within the Irish Sea are generally shallow, with the majority of the area less than 60m depth from the coast west to approximately 5°W. Seabird densities are seasonally high in the west, particularly in the far north and south Irish Sea. Concentrations of Manx shearwaters occur in the Irish Sea, with colonies on islands off Pembrokeshire and in the Inner Hebrides representing the majority of the world breeding population of this species. Bottlenose dolphins occur off the west and north Welsh coast, with sightings focussed in Cardigan Bay where the species is one of the qualifying features of the Cardigan Bay SAC. Shell Flat and Lune Deep SCI is located in inshore waters near Morecambe Bay, and the territorial waters of Northern Ireland contain The Maidens SCI (reefs, sandbanks and grey seal) and Red Bay SCI (sandbanks). A single designated MCZ is located in Liverpool Bay (Fylde MCZ), selected for extensive areas of subtidal sediment habitats and related plant and animal communities. A number of other rMCZs are located in Regional Sea 5 which are either awaiting the outcome of consultation (West of Walney), or are yet to be consulted upon. In offshore waters, the Croker Carbonate Slabs SCI and Pisces Reef Complex SCI are designated for Annex I submarine structures made by leaking gases and reefs respectively.

High densities of shipping are experienced in the central St. George's Channel, off north Wales leading to the Mersey, and in the North Channel. High levels of fishing effort occur in the north, particularly to the west of the Isle of Man and off the Cumbria coast. Considerable gas infrastructure is present in the eastern Irish Sea associated with producing gas fields and there are a limited number of producing oilfields. There are also a number of existing and planned offshore wind farms.

Regional Sea 6

The Minches and west Scotland is bounded to the south by a line from the Mull of Kintyre to Fair Head, to the west by the Malin front, and to the north by a line from the Butt of Lewis to Cape Wrath. The region encompasses waters which are largely sheltered from Atlantic swells by Northern Ireland and the Outer Hebrides. The seabed is characterised by muddy sand and mud, although more gravel is present in the south of the region. The waters in the region largely comprise North Atlantic water as part of the continental shelf current but are modified by coastal influences. The majority of the waters in the region stratify in the summer months, and turbidity is moderate-low.

Regional Sea 6 is characterised by relatively deep waters considering its coastal nature. The complex, undulating coastline with many islands is predominantly rural with very low population density and remote from large conurbations. The region is of high environmental sensitivity for a range of features. A high diversity and abundance of marine mammals and seabirds are present, along with many coastal otter populations. This area supports some of the highest densities of harbour seals in UK waters. Fishing effort is very high throughout much of the area, and is dominated by small, inshore vessels. Cold water corals occur in the area, and other reef features are present in many of the sheltered sea lochs. These lochs also support extensive mariculture activities.

A very large number of designated conservation sites are present along the adjacent coast, including numerous habitat, species and landscape designations, as well as the East Mingulay SCI. Additionally, two MPAs have been designated, the Small Isles and Wester Ross. Both have been selected on the basis of supporting a range of habitat and species features, with the former containing the only known aggregation of fan mussels in UK waters. Both are also designated for marine geodiversity features. Three other significant MPA proposals are located

in Regional Sea 6; these are, the Sea of the Hebrides, North-East Lewis and Shiant East Bank. Proposed site features range from seabed habitats and fauna (including fan mussel aggregations, basking shark, sandeel and marine mammals including minke whale and Risso's dolphin). Each site is also proposed for marine geodiversity features.

Regional Sea 7

The Scottish continental shelf runs along the continental shelf to the north and northwest of the UK. It is bounded to the west, south of the Wyville Thomson Ridge, by the 1000m depth contour - reflecting the changes in community composition which has been observed in various studies on shelf slope fauna. To the north of the Wyville Thomson Ridge (also a designated SCI), the boundary lies along the 600m contour where the influence of cold Norwegian Sea/Arctic Intermediate water commences. The entire continental shelf is dominated by the warm (>8°C) North Atlantic waters of the continental shelf current until the Orkney and Shetland Isles. The boundary to the east reflects the division between Lusitanian and Boreal fauna in the channel between the Orkney and Shetland Islands, with Lusitanian fauna occurring in the Orkney Islands but not in the Shetland Islands. The seabed is characterised by sand and coarse sediment of glacial origin re-worked by tidal processes, and in deeper areas close to the shelf break sediments have been formed into iceberg ploughmarks – a complex matrix habitat of stony ridges and sandy troughs. Water in this region is subject to seasonal stratification, has low turbidity and there is a low level of material of terrestrial origin entering the sea.

Regional Sea 7 covers a large area and range of water depths, although waters shallower than 60m are generally restricted to those immediately west of the Outer Hebrides. The region supports a rich diversity and abundance of marine mammals, with all typical UK shelf species present in addition to many oceanic, deeper water species along the shelf edge to the north and west. Large numbers of grey seals breed on the several small remote islands present, including those around Orkney and Shetland. Seabird densities are high throughout coastal waters and to a considerable distance offshore. Of particular environmental sensitivity is the St. Kilda archipelago. Lying 66km west of the Outer Hebrides, these islands support very large populations of breeding seabirds and receive numerous conservation designations, including dual World Heritage status for both its natural and cultural significance, and SPA designation for the islands and surrounding waters. Large numbers of breeding seabirds also occur on the adjacent coast of the Outer Hebrides, north mainland and Northern Isles. The region includes two SCI sites designated for reef features (Stanton Banks and Solan Bank), and more recently MPA sites including the West Shetland Shelf, North-west Orkney and part of the Faroe-Shetland Sponge Belt.

Shipping density is particularly high along the north mainland and through the Pentland Firth, while fishing effort is moderately high throughout the majority of the region. A limited amount of oil and gas activity occurs to the west of Shetland. Population density along the adjacent coast is the lowest in the UK.

Regional Sea 8

The Faroe-Shetland Channel is characterised by the influx of dense cold water from the Arctic and Norwegian Sea into the channel at depths below 600m. The western boundary of the region is the Wyville Thomson Ridge which prevents the majority of the flow of cold water from entering the Rockall Trough, which instead exits to the northwest via the Faroe Bank Channel. The seabed of the channel is mainly composed of silt and clay at the base with more sand and some areas of gravel and cobbles/boulders on the flanks of the continental slope, particularly in areas sculpted in the past by icebergs; glacial dropstones occur throughout the area. Water temperatures vary considerably through the water column, from approximately 0°C at the

seabed but above 600m depth, where North Atlantic water flows, between 6.5-8°C. Both main water masses in the region are oceanic in origin and turbidity is typically low but there are periods with elevated turbidity in near slope areas. The cold waters at depth result in a different characteristic benthic community to that found at shallower depths in adjacent areas or in the Rockall Trough.

Regional Sea 8 supports a diverse and abundant cetacean community, including many poorly understood oceanic and deep-diving species such as sperm whales, beaked whales and large baleen whales. Evidence suggests that this area represents a migratory route for a number of cetacean species. Along the southwest boundary of the area lies the Wyville Thomson Ridge SCI, a large area of full salinity stony and bedrock reef. The area also includes part of the Faroe-Shetland Sponge Belt MPA, and the North-East Faroe-Shetland Channel MPA. Amongst other features, both are designated for deep sea sponge aggregations and offshore subtidal sands, and contain representative marine geomorphological features.

Regional Sea 9

Regional Sea 9 covers the Rockall Trough and Bank and Atlantic North West Approaches. These are deep-sea regions west of the Scottish continental shelf. Regional Sea 9 is bounded to the east by the 1000m depth contour and to the west by the western extent of the UKCS. The seabed supports a different faunal community to that observed at depths less than 1000m, and is mainly composed of muddy sand and mud, with clay mud present in the deep waters to the west. In shallower water, on Rockall Bank and the seamounts, the fauna is likely to be similar to those found at the western edge of the Scottish continental shelf. The waters of these regions are totally oceanic in origin with negligible inputs of material of a terrestrial origin and little seasonal change in primary productivity. Turbidity is very low. Waters are cooler in the Atlantic North West Approaches due to an influx of south flowing Arctic water.

Compared to UK shelf waters, information on the natural environment of Regional Sea 9, particularly the Atlantic North West Approaches, is sparse. Known key features include a diversity and abundance of cetaceans, including several large baleen whales species and deep diving species. Evidence suggests that this area represents a migratory route for a number of cetacean species. Several seamounts are present which are known to contain extensive reef habitat, including cold-water corals. In the far northeast of the region lies the Wyville Thomson Ridge SCI, and the Darwin Mounds SCI. In the far west of Regional Sea 9 lies the North West Rockall Bank SCI. Moderate levels of fishing effort by UK vessels occur over topographical rises in the area, such as the Anton Dohrn seamount and Rockall Bank; these features are also fished extensively by non-UK vessels.

3.5 Relevant Existing Environmental Problems

The SEA Directive requires consideration of any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 2009/147/EC and 92/43/EEC (the Birds and Habitats Directives). More recently, the principal problems in UK waters have been reviewed and considered in relation to MSFD descriptors of GES, and set against relevant targets and monitoring programmes with a view to meeting the requirements of the MSFD²⁴. These inputs have been reviewed and are considered here in relation to their implications for this SEA. In addition to these, a number of other potential

²⁴ See Charting Progress 2, Marine Strategy Part 1 and Part 2.

problems of relevance to the SEA not specifically related to conservation of environmental protection are considered, for instance in relation to material assets and cultural heritage. No judgement of importance should be inferred from the position of problems/issues in the section.

Consultation Question

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

Eutrophication

The majority of UK waters do not experience significant eutrophication – the eutrophication problems are restricted to a small number of areas in coastal waters, particularly estuaries and embayments where circulation is restricted. For instance in a limited number of coastal areas in the east, south and north-west of England inputs of nutrients of anthropogenic origin (notably nitrate and phosphate from agriculture and urban waste water sources) have resulted in nutrient enrichment in some small estuaries and bays. Where measures have been taken to reduce nutrient inputs, it may be decades before eutrophication is absent because nutrients can be released from soil and sediments, however the existing programmes for assessing the eutrophication status for coastal and marine waters developed under the WFD and the OSPAR Convention have to a large extent already been applied successfully.

Implications for SEA

The SEA must consider the potential implications of the draft plan/programme on attaining good environmental status of both marine and coastal/estuarine waters as determined by the WFD and MSFD. One of the descriptors for determining GES under the MSFD (Descriptor 5) is that human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters. Whilst plan level activities may not directly contribute to or generate eutrophication, any effects which could lead to cumulative effects should be considered.

Hazardous Substances

Environmental concentrations of monitored hazardous substances in the sea have generally fallen, but are still above levels where there is a risk of pollution effects in many coastal areas, especially where there have been historical discharges, emissions and losses from high population densities or heavy industry.

Concentrations of some metals (cadmium, mercury and lead) and persistent organic pollutants are above background in some offshore waters of the North Sea, and unacceptable in some coastal areas. In the Greater North Sea, lead levels, for example, were unacceptable at 40% of locations monitored, while PAHs and PCBs were at unacceptable levels at more than half of the monitoring sites. In the Celtic Seas, heavy metal, PAH and PCB concentrations in sediment, fish and shellfish have fallen, but are still above acceptable levels in some coastal areas, mainly around the Irish Sea. Concentrations of PAHs and PCBs are unacceptable at more than half the sites tested in the Celtic Seas (OSPAR 2010).

The volume of oil accidentally spilled varies widely from year to year and is generally small and of relatively minor significance unless there is a major spill.

Implications for SEA

The SEA must consider international and national scale measures to reduce operational and accidental discharges at sea and from the terrestrial environment in relation to the possible impacts of the draft plan/programme (e.g. operational and accidental discharges from oil and gas exploration and production, and transportation and storage of CO₂), in the context of targets set for the attainment of good environmental status under the MSFD particularly for descriptor 8, including that, “*Concentrations of substances identified within relevant legislation and international obligations are below the concentrations at which adverse effects are likely to occur*” and that “*Occurrence and extent of significant acute pollution effects (e.g. slicks resulting from spills of oil and oil products or spills of chemical) and their impact on biota affected by this pollution should be minimised through appropriate risk based approaches.*”

Marine Litter

Amounts of marine litter are a concern, and are considered problematic in all areas where there are systematic surveys of beached litter density. There has only been limited surveying of litter on the seabed and in the water column, which has demonstrated that litter tends to accumulate in certain areas as a result of wind and currents. There is limited information from the northern part of the Celtic Seas sub-region.

In the Greater North Sea over 90% of fulmars have microscopic plastic particles in their stomachs and 45% to 60% have more than the Ecological Quality Objective (EcoQO) set by OSPAR. Beach litter in the southern North Sea is at OSPAR-wide average (around 700 items per 100m of beach), but levels are higher in the northern North Sea. On beaches around the Irish Sea there are unacceptable quantities of litter, reaching over 1,000 litter items per 100m of beach in some areas. This can be dangerous to seabirds, and to turtles and marine mammals when in the sea. Much of this litter probably comes from sources on land.

Implications for SEA

The importance of tackling marine litter has been highlighted in the MSFD, which includes the descriptor that properties and quantities of marine litter do not cause harm to the coastal and marine environment. Whilst information is being collected about the levels of marine litter in UK waters, trend-based targets have been set with a view to more specific targets being available by 2018. The majority (~80%) of marine litter is regarded to come from terrestrial sources. The SEA must consider how marine litter is controlled for the potential activities arising from the plan (e.g. in relation to MARPOL Annex V), and any other potential waste sources and how they are handled (including waste to shore).

Impact of Climate Change

The pace of warming of the sea over the past 30 years has been highest in the southern North Sea and to the west of Scotland, rising at a rate of 0.2-0.4°C a decade. Plankton and fish communities are already changing in response to warming. Fish like Silvery John dory, sea bass and red mullet are becoming more common further north, while stocks of cold-adapted species in the North Sea such as cod, haddock and whiting have declined. Additionally, there is a northwards movement of non-native species.

Sea level is rising, increasing the risk to coastal erosion, and from flooding and loss of intertidal habitat due to ‘coastal squeeze’. This is a particular concern in the southern North Sea, eastern Channel and Bristol Channel regions due to continued adjustment of the land following the end of the last glaciation, which is resulting in gradual sinking, and the coasts of south-eastern England are low lying. The coasts of the south and east are also generally formed of soft sediments compared to those in the north and west, which are susceptible to erosion and

retreat. The southern North Sea and Channel coasts have the highest proportion of coastal defence and flood protection schemes in the UK and further development in response to rising sea level will add to the existing pressure on intertidal sediment habitats. In some areas, shoreline management plan and other coastal policies are directing management towards managed realignment or retreat where further defences may not be economically feasible or else would themselves be environmentally detrimental.

In addition to the direct effects of temperature changes, other effects include those from ocean acidification. 30% of all anthropogenically emitted carbon dioxide has been absorbed by the oceans since the industrial revolution, and the acidification expected to continue to take place, with projections for 2100 in the range 0.06-0.32 pH (a change of approximately 0.1 pH units is regarded to have been connected to anthropogenic carbon dioxide uptake to date). Ecological consequences of reduced pH include changes to the carbonate system which could affect a range of calcifying organisms such as echinoderms, molluscs and corals.

Implications for SEA

Activities associated with the draft plan/programme should help to make a net contribution to the reduction of UK CO₂ emissions, as set out in the UK carbon budget, through carbon dioxide storage, or an increase in the proportion of UK energy generated by renewable technologies. As such, adoption of the plan/programme subject to any spatial considerations and recommendations arising from OESEA3 will also contribute to the achievement of the UK's legally binding target of producing 15% of its energy from renewable sources by 2020 – equivalent to ~30% of electricity generation. The longer term UK Government aim, of which the current draft plan/programme is one aspect, is to achieve a sufficient reduction in greenhouse gases (i.e. all of those which contribute to global warming, not just CO₂) to prevent those extreme climate change scenarios (e.g. as projected by IPCC or in UKCP09) and associated social, environmental and economic costs (e.g. Stern 2006).

Climate change has the potential to affect the range of some non-native species, and the SEA should consider the potential for any plan related activities to contribute to their spread in the context of existing measures which are in place for their control, and any new monitoring and control measures arising from targets relating to the MSFD Descriptor on non-native species.

The SEA should also consider relevant UK policy (e.g. MPS and National Planning Policy) and that of devolved administrations with regards to the design and siting of developments, particularly at or near the coast, in terms of resilience to climate change effects including sea-level rise.

Pressures on Fish Stocks

Some important North Sea fish stocks are still outside sustainable limits, while damaging practices have been reduced. The poor status of cod is of particular concern (however some improvement is suggested for the North Sea). By-catch of rays, sharks, porpoises and dolphins in fishing nets is also of concern. While trawl effort has fallen in the Irish Sea and to the west of Scotland, fishing effort is still high. Some beam trawlers have switched to otter trawling or scallop dredging, a fishery without quotas²⁵. Several fish stocks are harvested unsustainably. Cod and whiting are depleted to the west of Scotland and in the Irish Sea. To date, recovery plans for cod have not been effective in rebuilding the Irish Sea stock. The amount of fish caught and discarded is still a problem, which is being addressed through the demersal landing

²⁵ See *The Scallop Fishing (England) Order 2012*

obligation as part of the Common Fisheries Policy, due to be phased in between 2016 and 2019.

Implications for SEA

Potential activities resulting from implementation of the draft plan/programme may have the potential to improve local fish stocks through the designation of safety zones around structures, and fish attraction to structures, though the corollary to this is fisheries displacement. The SEA should also consider any potential source of effect on fish and shellfish from activities, in the context of the current understanding of fish stocks and pressures on these from other activities, and those targets and indicators set under the MSFD descriptor on populations of commercially exploited fish.

Declines in Bird Numbers

In the northern North Sea, some seabirds have suffered a decade of poor breeding or failure, possibly due to the combined effects of climate change and fishing on key prey species (e.g. sandeel). Additionally, a reduction in fish discards may have resulted in the decline of some scavenging species such as fulmar, though evidence is limited. Although seabird breeding success was good in 2009, the long-term picture is still one of serious concern, with wider seabird population trends for 2000-2013 showing a general decline in most recorded species²⁶. Similar declines in seabird breeding numbers have been observed to the west of Scotland associated with predation by introduced mammals and food supply shortages.

In the southern North Sea, some waterbird populations have declined and this has been linked to reduced food availability possibly due to pressure from shellfisheries. In the Irish Sea, the number of waterbirds, such as waders, has decreased as more birds are now wintering in east coast estuaries, potentially as a result of a changing climate.

Implications for SEA

Given that many seabird and waterbird species may be in decline, the SEA should review areas to be licensed/leased for oil and gas, offshore wind, marine renewable or carbon transport and storage activities, and ensure awareness so that potential activities do not exacerbate the risk of surface pollution or significant disturbance to bird populations. Potential activities which may impact on coastal and marine SPAs will be subject to Appropriate Assessment by the relevant Competent Authority. The SEA should consider any potential effect of plan activities in the context of targets relating to bird abundance and productivity under MSFD descriptors 1 and 4.

Damage to Seabed Habitats

Significant damage has occurred to shallow sediment habitats and reefs as a result of bottom fishing practices especially beam trawling (OSPAR 2010). Around the UK, coastal and offshore seabed sediment habitats such as sands and muds are impacted by a range of activities, however the spatial extent of damage generated by bottom trawling activity, which may damage ecosystem functioning, is considered to be the main source of pressure on benthic environments.

Implications for SEA

The SEA should review areas to be licensed/leased for oil and gas, offshore wind, marine renewable or carbon transport and storage activities and ensure awareness of existing

²⁶ <http://jncc.defra.gov.uk/page-3201>

problems related to the benthos so that potential activities do not exacerbate problem. Safety zones around surface infrastructure will likely locally reduce trawling activities in these areas thereby reducing trawling pressure on benthos. The potential for marine renewable devices to affect sediments and seabed morphology (e.g. through energy removal, changes to tidal regimes) should also be considered. The SEA should consider activities likely to arise from adoption of the plan on benthos in the context of those targets set to achieve good environmental status under MSFD descriptors 1, 4, 6 and 7.

Poor Knowledge of the Status of Marine Mammals

At present, there are insufficient data on the populations of marine mammals in the OSPAR region III Celtic Seas (OSPAR 2010). Within this region, dolphins, porpoises and grey seals are impacted through fisheries by-catch. Harbour seals are counted every five or six years, the minimum to assess their status, and other marine mammals have little systematic recording. A third survey of cetaceans in European Atlantic waters (SCANS-III) is due to commence in the coming years. Marine mammals may become entangled in ropes and nets in coastal waters to the west of Scotland and in the Minches there is concern about entanglement of minke whales, which are important to the local economy, through marine wildlife watching.

Implications for SEA

There is the potential for disturbance of marine mammals from the activities that may result from implementation of the draft plan/programme. Activities will be spatially variable, though noise will certainly be concentrated in areas of renewable energy development utilising pile driving, and oil and gas exploration activities using seismic survey methods, principally the North Sea, Irish Sea and west of Shetland. The SEA should consider such activities in the context of current controls on their occurrence, available mitigation, and implications in relation to monitoring under the MSFD. There is also a collision risk associated with offshore structures and shipping activity.

Problems associated with the conservation of species and habitats

The OSPAR QSR 2010 (OSPAR 2010) identifies a series of environmental problems in relation to the protection and conservation of biodiversity and ecosystems. These apply to the OSPAR marine area but are equally relevant to UK waters and include:

Pressures such as the removal of species (e.g. by fishing), loss of and damage to habitats, the introduction of non-indigenous species, obstacles to species migration and poor water quality are still present. Some pressures are still increasing in parts of the OSPAR area and all can act in synergy or be exacerbated by climate change. These pressures result in loss of biodiversity, including declines in the abundance and variety of species and habitats. Interruption of ecological processes, such as spawning, migration, and biological communication, may also occur.

The most sensitive features are those that are easily damaged and slow to recover. Reefs of the cold-water coral *Lophelia pertusa* and individuals of the fan mussel *Atrina fragilis* are slow-growing and delicate and can be severely damaged by bottom trawl fisheries.

Coastal waters contain feeding grounds, spawning and nursery areas, and feature on migration routes for seabirds and some fish species. These areas also host intense and varied human activities, which exert a wide range of pressures and can lead to the damage or loss of key habitats in estuaries and intertidal areas. Salt marshes and seagrass beds, which are highly productive and act as natural carbon sinks, are under pressure from relative sea-level rise and coastal development. Key areas of the shelf seas, including offshore banks and reefs, and

frontal zones between different water masses, play important roles in pelagic productivity. Fishing is recognised as a key pressure on species and habitats in the shelf seas and there continues to be a need for information about ecologically important areas to guide improvements in management.

With reference to habitats and species protected under the Habitats Directive, JNCC have assessed their conservation status. This assessment of conservation status does not only relate to that component of the habitat area or species population to be found in Special Areas of Conservation, but to the totality of the habitats and species throughout the United Kingdom. The 2013 Article 17 report (JNCC website – <http://jncc.defra.gov.uk/page-6563>) prepared under the Habitats Directive is the third six year report.

When assessing the conservation status of habitats, four parameters were considered. These were: range, area, structure and function (referred to as habitat condition) and future prospects. For species, the parameters are: range, population, habitat (extent and condition) and future prospects. Each of these parameters was assessed as being in one of the following conditions: Favourable, Unfavourable-inadequate, Unfavourable-Bad, or Unknown. An overall assessment was determined by reference to the conclusions for the individual parameters, and, in general, reflects the least favourable of the individual parameter conclusions.

The overall UK assessments for seven Annex I marine habitats assessed included: 3 which were determined to be in 'bad and deteriorating' condition (estuaries; mudflats and sandflats not covered by seawater at low tide; large shallow inlets and bays); 3 in 'inadequate' condition (sandbanks which are slightly covered by seawater all the time; coastal lagoons; reefs), and 1 in 'unknown' condition (submarine structures made by leaking gases).

Of the 22 Annex II marine species assessed: 2 were considered in 'bad' condition (allis shad; harbour seal), 1 in 'inadequate' condition (Atlantic salmon), 2 in 'inadequate but improving' condition (river lamprey; twaite shad), 10 in 'favourable' condition (brook lamprey; bottlenose dolphin; common dolphin; harbour porpoise; grey seal; Atlantic white-sided dolphin; white-beaked dolphin; minke whale; fin whale; otter), and 8 in 'unknown' condition (sea lamprey; killer whale; long-finned pilot whale; Risso's dolphin; sperm whale; leatherback turtle; maerl).

Hayhow *et al.* (2014) provide information on trends in abundance and breeding success of seabird and waterbird species, many of which are protected by SPA designations.

Implications for SEA

The SEA should consider the implications of the draft plan/programme and its alternatives on the wider marine environment, in relation to the features of conservation sites of European and national importance, and those areas for which designations are proposed. The SEA will need to draw attention to the current location of these sites and the species or habitats for which they are designated, and any sites which are currently being considered for designation, in addition to characterising the present baseline condition and issues relating more generally to the marine environment. At this more general level, the SEA must consider the potential implications of the draft plan/programme on attaining good environmental status of both marine and coastal/estuarine waters as determined by the WFD and MSFD.

Changes to landscape and seascape

Prior to the development of offshore renewables, offshore developments in UK waters have primarily been in relation to North Sea oil and gas installations where the only representation of such developments at the coast or on land was generally in the form of cable and pipe landfall and associated infrastructure. Drilling activity and production platforms have in the most part

(with the exception of Beatrice in the Moray Firth, exploration wells sites off Dorset and Cardigan Bay, structures in the east Irish sea and those associated with the Cromarty Firth rig support industry) been too far from shore to be visible. The more recent development of offshore renewables, namely offshore wind farms, has led to a greater consideration of landscape/seascape issues in addition to other potentially deleterious environmental influences. Current planned or constructed offshore wind farms have been restricted on technical and economic grounds to water depths of up to 60m, though most have been in much shallower, and therefore nearshore, waters.

Implications for SEA

The SEA should consider the potential scale and location of activities which could arise from the adoption of the plan in relation to seascape (including historic seascape) character, in the context of existing and proposed developments, and relevant landscape planning policy as contained in National Policy Statements, the MPS and national and regional marine plans of the UK and devolved administrations.

Impact of air quality on human health and the environment

Though the UK's terrestrial air quality is generally improving there are still areas which do not meet current exceedance levels for pollutants, primarily NO₂, SO₂ and PM₁₀s. SO₂ and NO₂ are known to be involved in acid deposition and the human health effects of particulates are still poorly understood. Air quality management areas in the UK are generally associated with large urban areas (which may include ports) and major roads.

Implications for SEA

Consider potential scale of plan activities in relation to current air quality problems and in the context of the range of emissions controls there are for plan activities.

Possible disturbance of submerged cultural heritage

There is an increasing awareness of submerged archaeological material located for example in the southern North Sea, though their distribution is speculative and even the specific location of known sites are sometimes not precise. These include former occupied landscapes (palaeolandscapes) and any potential associated material, in addition to more recent maritime archaeology. These areas and sites are vulnerable to offshore operations which disturb the seabed (e.g. drilling, piling, cabling, and trawling), though development-led studies, for instance associated with the aggregates industry, have added considerably to knowledge in this area.

Implications for SEA

The SEA should consider the potential effects of plan activities in relation to current understanding of submerged cultural heritage in the context of international and national protection measures and planning policy. The SEA should raise awareness of available industry guidance (e.g. Gribble & Leather 2011) on marine cultural heritage.

3.6 Updates to Information Supporting Potential Sources of Effect from Plan Activities

In addition to new sources of information which characterise the baseline, a significant quantity of literature has been published that relates to potential sources of effect relevant to activities being considered as part of this plan/programme, including methodological approaches to in-combination or cumulative effects. This following table summarises key advances in relation to specific assessment areas, but should not be taken as a definitive list of new sources which will be used to inform the OESEA3 assessment.

High level summary of update	Relevant publications
Noise	
Further definition of the displacement and subsequent recovery times of harbour porpoises to pile-driving noise at Danish and German offshore wind farms.	Brandt <i>et al.</i> (2011) and Dähne <i>et al.</i> (2013).
The marine mammal populations of the Moray Firth have been the focus of a number of relevant studies which may also have wider applicability.	Thompson <i>et al.</i> (2012, 2013a, b)
Further studies on noise effects on fish and shellfish have been undertaken, however significant data gaps remain.	André <i>et al.</i> (2011), Bolle <i>et al.</i> (2012), Halvorsen <i>et al.</i> (2012), Aguilar de Soto <i>et al.</i> (2013), Solé <i>et al.</i> (2013), Malcolm <i>et al.</i> (2013), Hawkins <i>et al.</i> (2015)
DECC have funded two studies on the effects of construction activities, particularly piling for harbour seals and cetaceans, the results of which are either emerging or expected during the drafting of OESEA3.	Hastie <i>et al.</i> (2015)
Further studies on auditory damage in response to impulsive and broadband sounds on harbour porpoise and other marine mammals have been undertaken.	Popov <i>et al.</i> (2011, 2014), Kastelein <i>et al.</i> (2012), Finneran & Schlundt (2013), Kastelein <i>et al.</i> (2015a, 2015b)
Three priority projects of relevance are being considered by the Offshore Renewables Joint Industry Programme, "Project 2: Population Consequences of Acoustic Disturbance", "Project 3: Underwater noise mitigation technologies for piled foundations in deeper water" and "Project 4: Improvements to standard underwater noise mitigation measures during piling". Phase 1 of Project 4 has been completed. Subsequent relevant outputs will be considered if available during the drafting of OESEA3.	SMRU Marine & Xodus (2013)
JNCC examined data from 1,196 seismic surveys in UK and adjacent waters between 1994 and 2010 to assess the effects of seismic operations on marine mammals and overall trends in compliance with the JNCC Guidelines for Minimising the Risk of Injury and Disturbance to Marine Mammals from Seismic Surveys.	Stone (2015a, b)
Contracts being led by the Joint Industry Programme on E&P Sound and Marine Life – Phase III. Any publications made during the drafting of OESEA3 will be considered.	-
Physical damage/change to features and habitats	
Defra funded project on mapping the structure, function and sensitivity of seabed sediment habitats to support assessment of the sea-floor status and the broadscale monitoring and management of the benthic environment.	Defra (2013) and associated papers.
Reviews of Offshore Wind Farm Monitoring Data 2010 and 2014	Cefas (2010), MMO (2014a)
Relevant outputs from the NERC and Defra funded FLOW and Benthic Ecology (FLOWBEC) project	See: http://noc.ac.uk/project/flowbec
Consequences of energy removal	
Further studies have been undertaken since OESEA2 on the potential influences of marine energy devices on wave and tidal energy and related sediment dynamics.	Neill & Couch (2011), Shapiro (2011), Shields <i>et al.</i> (2011), Neill <i>et al.</i> (2012), Smith <i>et al.</i> (2012), Robins <i>et al.</i> (2014)
Relevant reports and publications associated with the Supergen Marine UK Centre for Marine Energy Research.	See: http://www.supergen-marine.org.uk/drupal/content/references

High level summary of update	Relevant publications
Output from NERC project ME5208 on marine renewables, which was commissioned to research on the magnitude and extent of the consequences/impacts of wave energy extraction on ecosystem services.	see: http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17305
Physical presence – ecological effects	
The Strategic Ornithological Support Services (SOSS) group has published a number of reports with respect to collision risk and displacement effects which seek to reduce the consenting risk posed by critical gaps in knowledge of the effects of offshore wind farms on birds.	Band (2012), Collier <i>et al.</i> (2012), Cook <i>et al.</i> (2012), Rexstad & Buckland (2012), Wright <i>et al.</i> (2012), WWT(2012)
Bird foraging range and behaviour data has provided insights into potential effects, particularly from wind farm development.	Thaxter <i>et al.</i> (2011, 2012), Langston & Teuten (2012), Soanes <i>et al.</i> (2012, 2014)
Indices for use in assessing vulnerability to collision risk and displacement of birds to offshore wind farms have been proposed for Scottish waters. The key results were ranked species lists in relation to collision mortality impacts on populations and in relation to displacement impacts on populations.	Furness & Wade (2012), Furness <i>et al.</i> (2013)
There is still relatively little information available on the potential interactions of birds, marine mammals and fish with marine renewable energy devices, however some advances in knowledge have been made and other work is ongoing.	Shields <i>et al.</i> (2011), Aquatera (2012), Frid <i>et al.</i> (2012), Hastie (2012), Lusseau <i>et al.</i> (2012), Plonczkier & Simms (2012), Soanes <i>et al.</i> (2012, 2013), Teilmann J & Carstensen (2012), Witt <i>et al.</i> (2012), Slaski <i>et al.</i> (2013), Thompson <i>et al.</i> (2013c). University of St Andrews RESPONSE research programme, DECC-funded work by SMRU on marine mammal responses to an operational tidal turbine.
Mathematical modelling simulating the behaviour of bottlenose dolphins in the Moray Firth and the biological significance of disturbance caused by vessel traffic.	New <i>et al.</i> (2013)
Since the publication of OESEA2, concern was raised that a number of dead seals (>76 animals) displaying corkscrew injuries was related to ship propellers, especially as spiral lacerations consistent with those observed on carcasses were reproduced in scale model tests using ducted propulsion systems. Advice was produced by the statutory nature conservation bodies (SNCBs) to reflect this in 2012, but was subsequently modified in 2015 following direct observations on the Isle of May of an adult grey seal attacking grey seal pups and post-mortem analyses carried out on 11 carcasses gave incontrovertible evidence that such injuries can be caused by predation. While further research may be necessary before interactions from ducted propellers can be entirely discounted, it is now considered very likely that the use of such vessels may not pose any increased risk to seals over and above normal shipping activities.	Bexton <i>et al.</i> (2012), Thompson <i>et al.</i> (2015), Onoufriou & Thompson (2014), van Neer <i>et al.</i> (2015)

High level summary of update	Relevant publications
One priority project of relevance is being considered by the Offshore Renewables Joint Industry Programme, "Project 1: Bird collision risk and avoidance rate monitoring". Relevant outputs will be considered if available during the drafting of OESEA3.	-
Physical presence – other users	
Key strategic issues which may arise from the development of offshore wind farms in the UK and impact on the safe co-existence of commercial shipping and other marine navigation activities.	Anatec (2012)
A methodological framework to identify and consider issues relating to co-location for a wider range of activities. They provide a staged process of assessment for co-existence of marine activities, including in relation to conservation site management. The methodology may be applied at a range of scales depending on the level of information available on which to base an assessment (e.g. plan and project level) and confidence in this information.	MMO (2014b)
Landscape/seascape	
An approach to Seascape Character Assessment (project NECR105)	Natural England (2012)
Marine Discharges	
A number of papers have been published which consider the impacts of produced water and drilling wastes (e.g. drilling muds and cuttings), and updated OSPAR reports are available on ongoing monitoring of discharges and emissions from offshore installations.	Trannum <i>et al.</i> (2011), Gates & Jones (2012), Jones <i>et al.</i> (2012), Bakke <i>et al.</i> (2013), OSPAR (2014)
Climatic Factors	
Confidence in the nature and likelihood of potential impacts of climate change continue to improve at a global and national level, and considerable progress has been made since the publication of OESEA2.	Climate Change Risk Assessment, McColl <i>et al.</i> (2012), IPCC (2013), MCCIP report card 2013
Information on how ocean energy and wind will contribute to the mitigation of climate change (i.e. through lower carbon sources of energy)	IPCC (2012)
Updates to projected energy supply by source over the currency of the SEA and to 2035.	DECC (2014)
Accidental events	
The impact of the Macondo (Deepwater Horizon) well has been studied in relation to a number of marine ecology topics including birds, benthos, marine mammals, and coastal areas leading to peer-reviewed and grey literature publications which will be used to inform the consideration of accidental spills in OESEA3	Bik <i>et al.</i> (2012), Silliman <i>et al.</i> (2012), White <i>et al.</i> (2012), Mahmoudi <i>et al.</i> (2013), Schwacke <i>et al.</i> (2013), Fisher <i>et al.</i> (2014), Haney <i>et al.</i> (2014), Turner <i>et al.</i> (2014).
DECC made a number of revisions to OPEP guidance in response to this incident, and more recently, the transposition of the Offshore Safety Directive has led to further legislative and related guidance amendments.	DECC (2015)

High level summary of update	Relevant publications
Findings from environmental monitoring of the Elgin gas/condensate have been published.	Russell <i>et al.</i> (2012), Webster <i>et al.</i> (2012)
A number of projects (e.g. QICS and ECO2) have been undertaken or are ongoing, which seek to study the potential environmental impact of CO2 leakage from pipelines and geological storage sites. These range from laboratory and field based studies, modelling of possible release scenarios and comparison with natural carbon dioxide seeps.	Rodolfo-Metalpa <i>et al.</i> (2010), McGinnis <i>et al.</i> (2011), Beaubien <i>et al.</i> (2013), Blackford & Kita (2013), Boatta <i>et al.</i> (2013), Dewar <i>et al.</i> (2013a, b), Ishida <i>et al.</i> (2013), Wareing <i>et al.</i> (2013, 2014), Caramanna <i>et al.</i> (2014), Pearce <i>et al.</i> (2014a, 2014b), Hu <i>et al.</i> (2014), Linke <i>et al.</i> (2014), Morgan <i>et al.</i> (2014), Kita <i>et al.</i> (2015), Phelps <i>et al.</i> (2015), Pratt <i>et al.</i> (2015), Shitashima <i>et al.</i> (2015), Tait <i>et al.</i> (2015), Schmidt <i>et al.</i> (2015) and the reviews in IEAGHG (2011) and Kirk (2011).
Potential for cumulative effects	
The Marine Management Organisation (MMO) Strategic Evidence Plan (SEP) 2011-2015 indicates that cumulative effects are a priority area for research. The MMO provided a review of existing approaches to cumulative effects assessment along with a conceptual framework for documenting potential cumulative effects of offshore wind farms, describing the main steps for cumulative effects assessment within the context of marine planning.	MMO (2013)

3.7 Likely Evolution of the Baseline

The SEA Directive (Annex I) 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.

Consultation Question

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

Biodiversity, habitats, flora and fauna

Plankton

The MSFD requires that the biodiversity, distribution and abundance of species and habitats be in line with prevailing physiographic, geographic and climatic conditions; this is true of the plankton around the British Isles whose biodiversity, abundance and distributions are primarily affected by hydroclimatic forcing as opposed to anthropogenic influences. GES also requires that ecosystems are not adversely affected by eutrophication, contamination, and non-indigenous species introduced through anthropogenic activities. The planktonic ecosystem of the British Isles meets these criteria as, though eutrophication and contamination may occur in some highly localised areas, the majority of plankton are unaffected by nutrient loading or chemical contamination and there is no evidence that non-indigenous organisms have caused negative impacts on the native plankton. Additionally, changes to marine foodwebs caused by alterations in plankton phenology (trophic mismatch) or community composition appear to be related to climatic factors and are not likely to be the direct result of anthropogenic pressures.

An increase in phytoplankton biomass recorded since the mid 1980s has been positively correlated with sea surface temperature (SST) and wind strength. North Atlantic inflows to the North Sea may affect plankton communities, and have been linked to the increase in the ratio of *Calanus helgolandicus* to *C. finmarchicus* over the last 20 years. There have been widespread changes in the zooplankton community and in the timing of phytoplankton blooms, with wider consequences throughout the ecosystem. Overall, plankton in UK seas are relatively unaffected by direct anthropogenic factors.

The most recent MCCIP report card indicates that confidence in predictions of future changes to plankton from climate change are generally low, however future warming and increased ocean acidification are likely to alter the geographical distribution of primary and secondary plankton production (0-5 yrs), affecting ecosystem services such as oxygen production, carbon sequestration and biogeochemical cycling (20-50 yrs). Such changes have the potential to place additional stress on fish stocks and therefore on mammals and seabird populations which rely on fish as prey species.

Benthos

Over recent geological timescales (ca. 11,000 years) seabed habitats around the UK have been subject to continuous processes of change associated with post-glacial trends in sea level, climate and sedimentation. In the shorter term, seasonal, inter-annual and decadal natural changes in benthic habitats, community structure and individual species population dynamics may result from physical environmental influences (e.g. episodic storm events; hydroclimatic variability and sustained trends) and/or ecological influences such as reproductive cycles, larval settlement, predation, parasitism and disease.

Clark & Frid (2001) reviewed long-term changes in the North Sea ecosystem, at all trophic levels, and concluded that in the northern, western and central areas of the North Sea, long-term changes are predominantly influenced by climatic fluctuations. Here, primary productivity during a particular year is related to the effect of weather on the timing of stratification and the resulting spring bloom. In the southern and eastern areas of the North Sea, the lack of stratification and the large inputs of nutrients mean that primary productivity is more strongly influenced by variations in anthropogenic nutrient inputs, and is only weakly related to climatic variation. However, the weight of evidence shows that long-term changes in the ecosystem may ultimately be related to long-term changes in either climate or nutrients, although the long-term dynamics of certain taxa and communities do show evidence of being influenced by both anthropogenic factors and/or internal factors such as competition and predation.

The MCCIP Annual Report Card 2013 Scientific Review – shallow and shelf subtidal habitats (Birchenough *et al.* 2013) concluded that:

- There is evidence that climatic processes influence species abundance and community composition in soft-sediment habitats in the North Sea. There is no obvious signal of warming-effects in southern and south-westerly sediments.
- Hard-substrate habitats in southern and south-westerly waters appear to be affected, with changes in algal distribution and abundance and the appearance and increased occurrence of a previously unrecorded warm-water barnacle.
- Climate change is likely to impact benthos in future. The changes documented in soft-sediment communities are expected to continue, and probably escalate, in response to the cumulative effects of seawater warming and ocean acidification (e.g. changes in species distribution).

- Future impacts on these habitats are likely to have socio-economic ramifications (e.g. under European legislation and as an important food resource for commercial fish).
- There are knowledge-gaps in a number of areas. We are currently unable to fully assess the scale of benthic species and community responses in relation to climate change, understand how climate interacts with other marine stressors or model future species distributions for many benthic species.

The MSFD requires that benthic biodiversity (descriptor 1) and sea-floor integrity (descriptor 6) are not adversely affected. The UK initial assessment for MSFD indicated that physical damage and loss, particularly from bottom fishing, remains a problem but that depending on the nature of future measures (e.g. in relation to MPA management measures in the wider environment and within MPAs (under national legislation and under the Common Fisheries Policy), such effects are likely to be reduced and therefore some improvement in benthic habitats could be expected. Potential future issues could arise from enhanced coastal squeeze from climate change related sea-level rise, impacts from ocean acidification, and from tidal range devices on intertidal habitats.

Cephalopods

The biology and ecology of many cephalopod species remains little known and as a result, the potential effects of a changing climate on cephalopod populations are not easy to predict. However, it is known that for many species, temperature has an important influence on a number of life history processes, including recruitment (through maturation rate and the rate of embryonic development), the timing of migration and the distribution range. As well as this, food availability and predator abundance and distribution are likely to be affected by changes in the marine environment.

Fish and Shellfish

The general colonisation of the warming southern North Sea and Celtic Sea regions by Lusitanian demersal species (e.g. sea bass), and a retreat of Boreal species (e.g. cod, whiting) into the deeper parts of UK waters in the northern North Sea is likely to continue. However, variations in habitat preferences and sensitivities to prey and environmental conditions of individual species, the possible role of food web effects, and particularly the extent of future fisheries may complicate this simple picture. Similarly, trends in the distribution of *Nephrops* landings in the north east Atlantic appear to be consistent with an apparent poleward shift in distribution but may also reflect regional differences in fishing patterns, changes in the distribution of fishing effort, or indirect food web effects resulting from the decline of predator abundances. Some pelagic fish species have and are likely to continue to show pronounced latitudinal responses to seasonal sea temperatures (e.g. anchovy, horse mackerel), although predicting their likely distribution is complicated by the important influence of poleward flowing shelf edge currents which carry warm water into high latitudes. Species which are unable to adapt their distributions due to strict habitat association (e.g. lesser sandeels which closely associate with coarse sandy sediments) are likely to be less able to respond to predicted climate changes (Heath *et al.* 2012).

With respect to migratory fish, recent trends may continue with declines in salmon strongly correlated with rising temperatures in oceanic foraging areas, with temperature affecting growth, survival and maturation of salmon at sea. Freshwater temperatures have also increased significantly in the last four decades, with implications for survival of juvenile diadromous fish (e.g. salmon and shad) (Simpson *et al.* 2013).

Turtles

Records of marine turtle sightings and strandings in UK waters indicate that they are predominantly of leatherback turtles (e.g. Penrose & Gander 2014), with UK waters likely to represent the northerly limit of routine seasonal leatherback foraging migrations (e.g. McMahon & Hays 2006). Leatherback turtles visit only during the warmer months of the year and it has been suggested that through climate change increased seawater temperature might allow them to utilise UK waters for longer (McMahon & Hays 2006). However, the low numbers of recorded turtles and the quality of recording effort²⁷ make determining likely future trends very difficult.

Birds

Seabird breeding populations in the UK increased in size over much of the last century, but since 1999 these populations have declined by an average of 7.5%. Breeding success has also declined over the same period. Some of the greatest reductions have occurred in the northern North Sea and Scottish Continental Shelf. Climate change is considered to be one of the main drivers of these declines. Warmer winter sea temperatures have resulted in major changes in abundance and species composition of plankton in the North Sea that have contributed to the reduction in abundance and quality of seabird prey species such as sandeels, with knock-on effects for seabirds (Daunt & Mitchell 2013). For example, between 2000 and 2013, declines greater than or equal to 50% have occurred in Arctic skua and kittiwake²⁸, both of which feed on small shoaling fish such as sandeels. There is also growing evidence that breeding phenology is changing, with seabirds becoming increasingly de-synchronised from their prey. However, regional variations in the impacts of climate change are apparent, with weaker effects on seabird demography in the Irish Sea, Celtic Sea and English Channel (Daunt & Mitchell 2013).

There is increasing evidence that the overwintering distributions of many coastal waders and waterfowl have changed. In recent decades, in response to warming, their distributions have shifted north and eastwards out of the UK. This has resulted in declines in usage of the UK's east coast sites, by waders, in favour of The Netherlands. These declines may have been partly reversed by the most recent cold winters²⁹.

Marine Mammals

Whilst the ability to detect long-term trends in cetaceans around the UK is limited by the paucity of effort-based sightings data, range shifts appear to have been observed in a number of cetacean species (Evans & Bjørge 2013). For example, short-beaked common dolphin and striped dolphin appear to have extended their shelf sea range further north off western Britain and around into the northern North Sea, and these have been linked to increasing sea temperatures. However, the mechanisms causing those changes remain uncertain, and for some species, it is difficult to differentiate between short-term responses to regional resource variability and longer-term ones driven by climate change. With respect to seals, whilst it is possible that recent demographic changes (increases in most grey seal populations and declines in some harbour seal populations) are linked in some way to climate-mediated changes in food supply, other factors (depletion of food resources from fishing, recovery from epizootics, interspecific competition, density dependent effects) may be more important (SCOS 2008, cited in Evans & Bjørge 2013).

²⁷ http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1223_UK.pdf

²⁸ <http://jncc.defra.gov.uk/page-3201>

²⁹ <http://www.mccip.org.uk/media/1301/mccip-arc2013.pdf>

Geology, Substrates and Coastal Geomorphology

The environmental baseline is likely to evolve slowly in the absence of anthropogenic influences. At present there are no anthropogenic activities which are likely to cause significant regional scale changes to geology and sediments, though trawling and dredging activities can generate localised scour and sediment plumes, and energy removal has the potential to result in local or regional changes to sedimentary processes.

Relative sea levels are predicted to rise by 21-68cm for the period 1990-2095 (for London) – note there are regional UK variations in the predicted rate of sea-level rise, including due to glacial isostasy. While these figures are considered to remain valid, they will be updated in due course using new information and data arising from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Coastal erosion is estimated to affect 17% of UK coasts and there are large regional variations connected with coastal rock types – England and Wales have the highest overall erosion rates with 28% of coasts retreating at more than 10cm per year. These rates are expected to rise in the future, corresponding to higher sea levels and possibly also enhanced storminess.

Landscape/Seascape

There are presently 3 offshore wind farms in planning and a further 19 which have been consented (including Round 2 extensions), adding to the 31 which are either operational or under construction (or 27 for England and Wales). A number of these are, or are likely to be, visible from the coast (e.g. those in territorial waters) and future leasing rounds for wind and other renewable technologies which could be developed in proximity to the coast, or be coast connected, are possible. There is a likelihood of landscape effects from coastal and terrestrial wind generation projects, other marine energy developments and continued industrial, port and urban expansion.

Water Environment

Sea-surface temperatures (SST) in UK coastal waters and in the north east Atlantic have risen by between 0.1 and 0.5°C per decade since the 1980s, and fastest locally in the southern North Sea. The temperature of the upper ocean (0-800m) to the west and north of the UK has been generally rising since the 1970s and 1980s. Superimposed on the underlying upward trend are decadal variations with relative maxima around 1960 and in the 2000s and relative minima in the 1980s and 1990s. However, it remains difficult to fully distinguish natural variations in temperature from those due to anthropogenic influence (including emissions of CO₂) (Dye *et al.* 2013)³⁰.

There is a history of strong variability in UK wave climate. Inter-annual variability in the modern wave climate is strongest in the winter and can be related to atmospheric modes of variability, most notably the NAO. Rather dramatic increases in wave height occurred between 1960 and 1990, but these are now seen as just one feature within a longer history of variability and there is no clear pattern in results since 1990. There is as yet no consensus on the future storm and wave climate (Woolf & Woolf 2013)³¹.

³⁰ <http://www.mccip.org.uk/annual-report-card/2013/climate-of-the-marine-environment/temperature-air-and-sea/>

³¹ <http://www.mccip.org.uk/annual-report-card/2013/climate-of-the-marine-environment/storms-and-waves/>

Temperature stratification over the NW European shelf seas is showing evidence of beginning slightly earlier in the year, on average although it is very difficult to decipher trends against natural variability (Sharples *et al.* 2013)³².

Air Quality

Air quality statics for the UK (urban and rural areas) indicate a general long term improvement in air quality metrics (urban background and roadside particulate pollution), and fewer days of moderate or higher pollution (at urban and rural pollution monitoring sites). The main drivers of the average number of days when air pollution was moderate or higher were particulate matter and ozone³³.

Atmospheric emissions associated with offshore oil and gas have generally decreased or remained stable with the exception of SO₂ which continues to vary greatly year on year. Significant reductions have been noted in CO₂ and nmVOC over the previous 10 year period, likely as a result of EU or national measures. Factors which may influence atmospheric emissions in the future, include ageing fields requiring a higher consumption of energy (e.g. additional compression), and the consequent depletion of available gas for fuel, which may require additional usage of diesel for power generation leading to increased atmospheric emissions (OSPAR 2014).

Climate and Meteorology

It is very likely that climate change is influenced and/or generated by the anthropogenic production of greenhouse gases, with globally averaged temperatures having risen by 0.85°C in the period 1880-2012, and other meteorological parameters such as rainfall also having been affected (e.g. there is high confidence after 1951 that precipitation has increased over mid-latitude land areas of the northern hemisphere). It is also considered likely that further changes in temperature, rainfall and incidence of extreme weather (e.g. heavy precipitation, drought, warm spells/heat waves) will occur in the course of the next century. It is considered virtually certain that the upper ocean has warmed in the period 1971-2010 (globally 0.11°C per decade for the upper 75m), and very likely that other changes such as in salinity representing alteration in evaporation and precipitation trends have taken place. Future warming is considered to be strongest in tropical and northern hemisphere subtropical regions. Other changes in the 21st century include a weakening of the Atlantic Meridional Overturning Circulation (AMOC) of between 11% and 35% depending on the scenario considered, but there is low confidence in projections beyond the 21st century.

Population and Human Health

In the UK as a whole, population is expected to increase by 3.4 percent to 67.1 million by 2020 compared with the estimated UK population for 2015. Growth is projected to be most significant in England (3.6% growth) and least in Wales (1.99%) over the same period. For the period 2003-2013, the greatest population increase has been in areas adjacent to Regional Seas 2 and 3, and least for areas adjacent to Regional Sea 6, and parts of Regional Sea 1. Continued growth will increase population density. Human health in the UK is unlikely to change considerably in the near future, with life expectancy at birth projected to increase to 84.1 years

³² <http://www.mccip.org.uk/annual-report-card/2013/climate-of-the-marine-environment/shelf-sea-stratification/>

³³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423353/National_Statistic_on_Air_Quality_2014.pdf

for males and 87.3 years for females by 2037, an increase of around five years since 2012. The UK population is ageing population is aging and there is an increasing trend to obesity.

Other Users

Existing marine activities include shipping and port activities, military exercises, fishing, recreational sailing, oil and gas exploration and production, aviation and offshore wind farm construction and operation. Port activities have been continuously expanding, particularly in the last 5 years and associated with this expansion, shipping tonnage has also increased. Through-traffic in the North Sea is predicted to increase by 2020. The fishing industry is dynamic with frequent and sometimes unpredictable changes in fish abundance and distribution, climatic conditions, management regulations and fuel costs all affecting activity. Consequently the baseline is rapidly evolving. In general, the fishing industry has been in decline in recent years in terms of numbers employed, vessels at sea and catch, and in coming years technical developments, economics, changes in management strategy and changes in target species, abundance, composition and distribution are all likely to be important. A number of demonstrator wave and tidal power electricity generation devices have been deployed which may lead to commercial scale developments in the future. Similarly there are a number of tidal lagoons which have received planning permission and could be deployed during the currency of OESEA3.

Cultural Heritage

There is an increasing awareness of submerged archaeological material located for example in the southern North Sea, though their distribution is speculative. These areas are vulnerable to offshore operations which disturb the seabed (drilling, piling, cabling). The development of increasingly sophisticated detection methods, mapping, and underwater excavation and updated guidance to industry means that the recovery of archaeological material or information is increasingly likely.

Conservation of Sites and Species

The number of conservation sites continues to grow as understanding of the marine environment improves. MCZs and MPAs established under *The Marine and Coastal Access Act 2009* (and equivalent Acts of the devolved administrations) have the aim of completing an ecologically coherent and well-managed network of MPAs, together with existing and future Natura 2000, OSPAR and other conservation sites. These should also contribute to the achievement of GES in the MSFD. It is expected that more marine and coastal sites will be identified during the currency of OESEA3.

Onshore

The Countryside Survey 2007 (Carey *et al.* 2008) indicates general trends in the physical and ecological (flora) structure of 'broad habitats' (e.g. Broadleaved Woodland, Improved Grassland, Neutral Grassland) constituting the countryside of England, Scotland, Wales and Northern Ireland. However, coastal habitats are not specifically addressed.

Coastal habitats in the UK, which are variously influenced by physical processes including underlying geology, past and ongoing sedimentary regimes (including aeolian deposition and erosion) are important in terms of their conservation value (e.g. Annex I dune and machair sites, and priority UKBAP dune machair, coastal vegetated shingle and maritime cliffs), and the services which they provide including flood risk reduction. In England, almost a third of international designations are coastal, a proportion of which are intertidal, and over half of AONB designations have a coastal element (Jones *et al.* 2013b).

Many of these coastal habitats are not in favourable condition, being subject to past human intervention through land reclamation (for instance the use of dunes for forestry and golf course development) and the erection of hard defences. This, aligned with projections for future sea-level rise may lead to the further reduction of such areas, particularly where development and hard defences prevent the landward migration of certain habitats (i.e. coastal squeeze), and also where such defences prevent erosion which is a necessary part of the coastal sedimentary system. In other areas, managed realignment is likely to be considered.

Jones *et al.* (2013b) summarises the likely impact that climate change will have on coastal habitats including sand dunes and sandy beaches, machair, saltmarsh, shingle structures and beaches, and hard and soft rock maritime cliffs and slopes which include those with maritime grassland and heath. In addition to sea-level rise, changes in temperature, rainfall, wind speed and direction will affect dune landform development, but the likely results of such changes are uncertain. The range of some plant communities may extend northwards, such as the *Leymus arenarius* and the *Ammophila arenaria-Festuca rubra-Hypnum cupressiforme* subcommunity. Warmer and wetter conditions may be favourable in terms of dune stabilisation and development, these are likely to be offset by drought periods and storms. Hydrological changes in dune slacks may also lead to changes in dune slack communities. Low-lying machair habitats are similarly affected by sea-level rise and storm events should they increase as a result of climate change. Similarly, saltmarsh environments may be affected by sea-level rise and any increase in storminess, which may further decrease their extent. Their inability in some cases to adjust through inland migration enhances their vulnerability. Regional changes in precipitation could also result in effects such as changes in sediment supply from freshwater runoff, and species distribution could be affected by elevated carbon dioxide levels. Shingle beaches and structures may be affected by changes in wave and tidal energy potentially resulting in the movement of some features out of designated site boundaries. Where movement is not considered acceptable (e.g. in proximity to Dungeness power station), replenishment will be required. There is likely to be landward migration of narrow beaches (coastal squeeze), and coastal defences may be more at risk of being undermined as beach levels lower. Sea-level related impacts to key shingle areas may be disproportionate as they coincide with areas where projected sea-level rise is greatest (i.e. in the south and east). Changes in vegetation of shingle beaches are also likely (for instance the loss of the northern oysterplant in several southern areas is attributed to warmer temperatures, along with assisting the spread invasive garden species which could displace native species. Additionally, more frequent storms could also affect the rate of recolonisation of sparse native vegetation.

Maritime cliffs may erode more rapidly as sea-level and storminess increase, exacerbated by an increase in rainfall which may help promote a greater number of landslips. Such increased disturbance would favour early successional species and may reduce vegetation mosaics important for scarce invertebrates, and warmer temperatures may also favour invasive species.

4 Approach to Assessment

4.1 Introduction

This SEA will cover a very large marine area comprising relevant UK territorial and offshore waters from the low water mark to depths of more than 2,400m. The draft plan/programme includes hydrocarbon, gas storage and renewable energy based elements and associated infrastructure. The assessment will therefore have to address complex issues and multiple interrelationships where a simplistic score based matrix assessment would be inadequate. An evidence based consideration is therefore proposed for this SEA. Significant use will also be made of Geographical Information System (GIS) tools to collate, process, analyse and present spatial information.

The assessment for this SEA is a staged process incorporating inputs from a variety of sources:

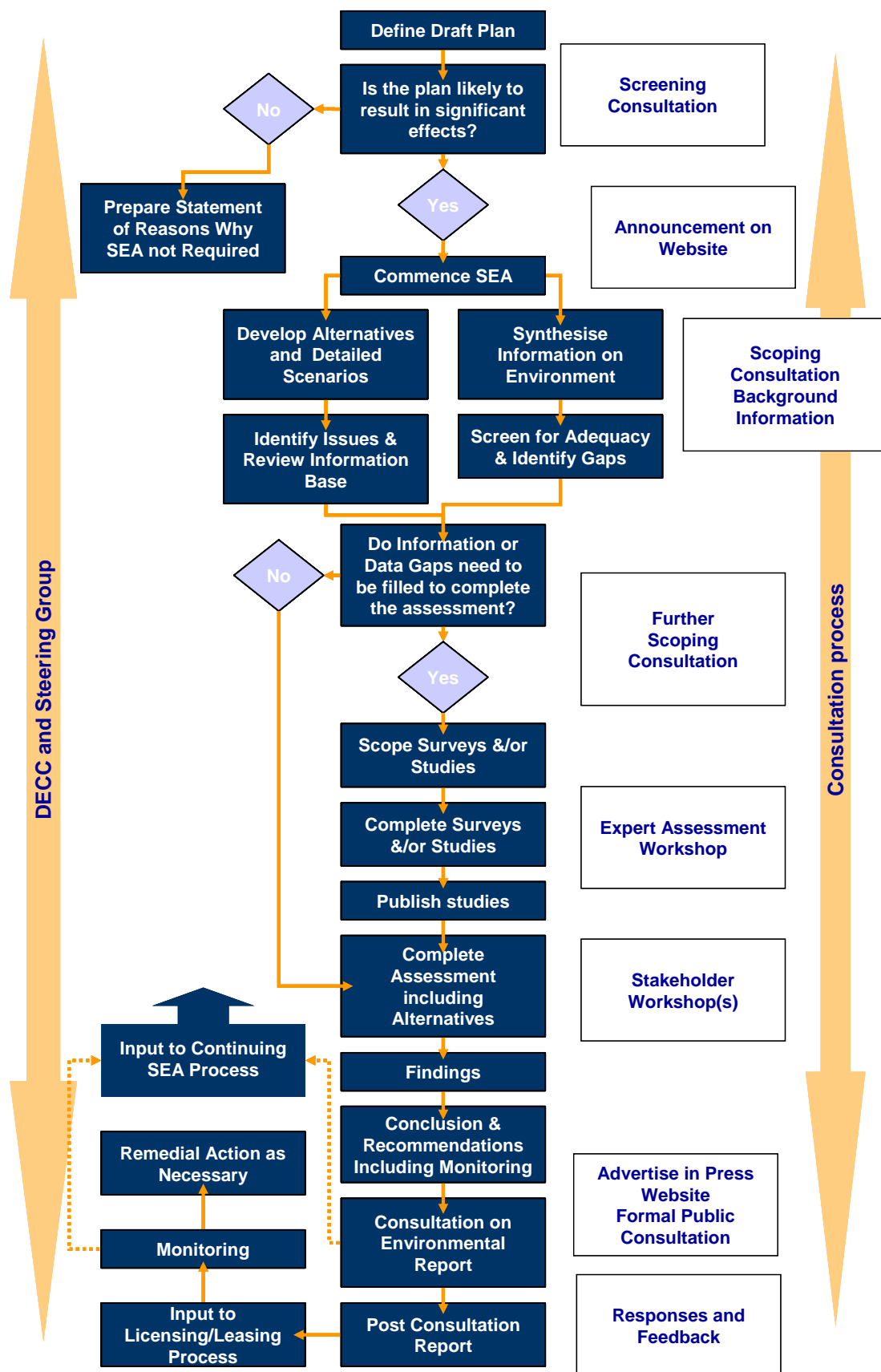
- Baseline understanding of the relevant receptors (including other users) grouped according to the SEA Directive together with existing environmental problems and the likely evolution of the baseline conditions
- The likely activities, and potential sources of effect and the existing mitigations, regulatory and other controls
- The evolving regulatory framework
- The evolution of technology
- SEA objectives
- The evidence base regarding the relative risks and potential for significant effects from offshore wind farm, offshore oil and gas exploration and production and gas storage including CCS related activities
- Steering Group, statutory consultee and stakeholder perspectives on important issues, information sources and gaps, and potential areas to exclude from licensing/leasing derived from scoping, SEA stakeholder and assessment workshops, meetings and other communications

At a strategic level, a distinction will 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 (and hence not be strategically significant).

Examples of this approach might 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 – as is done for example, in the selection of qualifying features for Natura 2000 sites.

Figure 4.1: Assessment Process



4.2 Consideration of Alternatives

It is intended to review the initial alternatives in the Environmental Report using the hierarchy of options shown below:

Need or demand: is it necessary?
Can the need or demand be met without implementing the plan or programme at all?

Mode or process: how should it be done?
Are there technologies or methods that can meet the need with less environmental damage than 'obvious' or traditional methods?

Location: where should it go?

Timing and detailed implementation:
When, in what form and in what sequence, should the plan or programme be carried out? What are the important issues? Do existing controls and measures address them? What other controls and measures are required?

Adapted from: Office of the Deputy Prime Minister (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"

The following initial alternatives to the draft plan/programme have been identified as:

- Not to offer any blocks for licensing or lease/license any activities
- To proceed with the licensing/leasing programme as proposed
- To restrict the licensed/leased areas temporally or spatially

4.3 Draft SEA Objectives and Indicators

The development of SEA objectives is a recognised way in which environmental considerations can be described, analysed and compared in an assessment. The objectives and indicators for previous DECC Offshore Energy SEAs were developed with a range of stakeholder inputs at the scoping stage, including discussion with the Steering Group. A list of draft objectives and indicators proposed for this SEA are given in Table 4.1. The guide phrases, which are included to assist in interpretation, were drafted as part of OESEA2 and in part reflect descriptors of GES associated with the MSFD.

Consultation Questions

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.

Table 4.1: SEA Topics, Objectives and Indicators

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.	<p><i>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.</i></p> <p><i>Plan activities do not lead to the introduction of non-native species at levels which adversely alter marine ecosystems.</i></p> <p><i>The plan recognises the ecosystem importance of land-sea coupling, for instance its role in species migration.</i></p> <p><i>The plan promotes the achievement of good ecological status for water bodies as outlined at a European Level.</i></p>	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.
Avoids significant impact to conservation sites, including draft, possible, candidate, classified and designated Natura 2000 sites, and recommended and candidate Marine Conservation Zones and Marine Protected Areas.		Activities subsequent to licensing/leasing which are on, or potentially affecting, a Natura site are compliant with the requirements of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended), the Conservation (Natural Habitats, etc.) (Northern Ireland) Regulations 1995 (as amended), the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended), and the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended).
Avoids significant impact to, or disturbance of, protected species.		Every activity with the potential to impact upon or disturb a protected species is compliant with the requirements of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended), the Conservation (Natural Habitats, etc.) (Northern Ireland) Regulations 1995 (as amended), the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended), and the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended).
Geology and Soils		
Protects the quality of the seabed and its sediments, and avoids significant effects on seabed morphology and sediment transport processes	<p><i>Activities arising from the plan do not adversely affect the quality and character of the geology and geomorphology of seabed or coastal sediments.</i></p> <p><i>Plan activities avoid adverse effects on designated geological and geomorphological sites of international and national importance.</i></p>	No adverse change in quality of seabed sediments, and seabed sediment transport, at a series of regional monitoring stations.
Protects the integrity of coastal and estuarine processes.		No physical damage to designated marine and coastal geological conservation sites (e.g. GCRs and MCZs).
Avoids significant damage to geological conservation sites and protects important geological/geomorphological features.		

SEA Objectives	Guide Phrases	SEA Indicators
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.	<p><i>Activities do not adversely affect the character of the landscape/seascape.</i></p> <p><i>The plan helps to conserve the physical and cultural visual resource associated with the land and sea.</i></p>	<p>No significant impact on nationally-designated areas.</p> <p>Extent of the visual resource potentially affected by the particular developments.</p> <p>Number of areas of landscape sensitivity affected by proposed developments (e.g. offshore wind).</p> <p>Trajectory of change in coastal National Character Areas shows no adverse effects arising from plan activities.</p> <p>Change in 'tranquillity' based on national mapping projects.</p>
Water Environment		
Protects estuarine and marine surface waters, and potable and other aquifer resources.	<p><i>Plan activities do not result in concentrations of contaminants at levels giving rise to pollution effects.</i></p> <p><i>Plan activities do not result in permanent alteration of hydrographical conditions which adversely affect coastal and marine ecosystems.</i></p> <p><i>Plan activities do not result in adverse effects on saline and potable aquifer resources.</i></p>	<p>No adverse change in quality of surface water and aquifers.</p> <p>UKCS Exploration and Production (E&P) meets OSPAR discharge reduction targets.</p> <p>Number of oil and chemical spills and quantity of material spilled.</p>
Air Quality		
Avoids degradation of regional air quality from plan related activities.	<p><i>The plan contributes to the achievement of air quality targets for those emissions outlined in the UK Air Quality Strategy.</i></p> <p><i>Emissions from plan activities do not contribute to, or result in, air quality issues which adversely affect human health or the wider environment.</i></p>	<p>Monitoring of local air quality shows no adverse impact.</p> <p>Targets relating to airborne emissions at a regional and UK level are not exceeded.</p>
Climatic Factors		
Minimises greenhouse gas emissions.	<p><i>The plan contributes to the achievement of targets relating to greenhouse gases at a national and international level.</i></p> <p><i>Plan activities contribute to mitigating climate change.</i></p>	<p>UKCS E&P greenhouse gas emissions.</p> <p>UK progress towards meeting greenhouse reduction targets under <i>The Climate Change Act 2008</i>.</p> <p>UKCP09 projections for the expected currency of the plan/programme, and any updates resulting from new research.</p>

SEA Objectives	Guide Phrases	SEA Indicators
Population and Human Health		
Has no adverse impact on human health.	<p><i>Plan activities do not result in, or contribute to the contamination of fish and other seafood for human consumption at levels which exceed those established by Community legislation or other relevant standards.</i></p> <p><i>Plan activities avoid adverse effects on physical and mental health.</i></p>	<p>Progress in achieving OSPAR targets for continued reduction in harmfulness of offshore discharges.</p> <p>Relevant wellbeing metrics when developed as part of Office of National Statistics project.</p>
Avoids disruption, disturbance and nuisance to communities.	<p><i>Plan activities avoid adverse nuisance to communities, for instance through noise or vibration.</i></p> <p><i>Adverse effects on the quality or access to areas used for recreation (e.g. amenity, sailing, surfing), are minimised or avoided.</i></p>	<p>Monitoring in relation to Noise Action Plans shows no adverse effects.</p> <p>Relevant Office for National Statistics wellbeing metrics.</p> <p>See also; seascape indicators.</p>
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.	<p><i>Plan activities integrate with the range of other existing uses of the marine environment.</i></p> <p><i>Plan activities do not result in adverse effects on marine assets and resources.</i></p>	<p>Spatial planning capable of addressing changes in technology, policy and prioritisation of site selection.</p> <p>Economic and social impact (both positive and negative).</p>
Safety of Navigation.	<i>Plan activities avoid adverse effects on, and contribute to the maintenance of, safe navigation, including recognised shipping routes, traffic separation and existing and proposed port operations.</i>	Increased collision risks and restrictions on pollution prevention methods or Search & Rescue options in the event of an emergency.
Reduces waste.	<i>Properties and quantities of waste and litter resulting from plan activities do not cause harm to the coastal and marine environment.</i>	Progress in reducing volumes of waste to landfill.
Cultural Heritage		
Protects the historic environment and cultural heritage of the United Kingdom, including its setting.	<i>Activities avoid adverse effects on the character, quality and integrity of the historic and/or cultural landscape, including those sites which are designated or registered, and areas of potential importance.</i>	No adverse impact upon the condition of designated sites and features (including impact on their setting) and minimal impact on all other recorded sites and features.
	<i>Plan activities contribute to the archaeological and cultural knowledge of the marine and coastal environment.</i>	Number of archaeological finds reported through best practice as a result of plan activities.

4.4 Potential Sources of Effect

Those activities outlined in Section 1.3 can interact with the natural and broader environment in a number of ways. In initial list of the main potential sources of environmental effects from activities which could follow adoption of the draft plan/programme is provided below:

- 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
- Decommissioning and legacy issues
- Accidental events

These are further elaborated upon in Table 4.2 below, where more specific potential sources of significant effects on the environment from the activities covered in the draft plan/programme have been identified, including on which SEA topics effects are considered possible. A question mark indicates uncertainty of potential for effect.

Consultation Question

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?

Table 4.2: Sources of Potentially Significant Effect against Plan Level Activities

Sources of 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	X	X	X	X	X	X	X
Potential behavioural and physiological effects on marine mammals, birds and fish from seismic surveys	X	X	X				
Potential behavioural and physiological effects on marine mammals, birds and fish associated with construction noise	X	X	X	X	X	X	X
Potential behavioural and physiological effects on marine mammals, birds and fish associated with operational noise	X	X	X	X	X	X	X
Potential behavioural and physiological effects on marine mammals, birds and fish associated with decommissioning noise	X	X	X	X	X	X	X
Potential for non-native species introductions in ballast water discharges or spread through “stepping stone” effect	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
Collision risks to marine mammals, fish and large water column animals					X	X	X
Barriers to movement of birds (e.g. foraging, migration)				X		X	
Barriers to movement of fish and marine mammals					X	X	X
Changes/loss of habitats from major alteration of hydrography or sedimentation					?	X	?
Potential for effects on flora and fauna of produced water and drilling discharges	X	X	X	X	X	?	X
EMF effects on sensitive species				X	X	X	X
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 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				

Sources of Potentially Significant Effect	Oil & Gas	Gas Storage	Carbon Dioxide Storage	Offshore Wind	Tidal Stream	Tidal Range	Wave
Landscape/Seascape							
Potential visual impacts and seascape effects of development including change to character	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
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

Notes: ² Outline assessment only

The Environmental Report will be subdivided both thematically and geographically. The assessment will consider the environmental effects (short, medium, long-term; temporary, permanent; positive and negative; and secondary, cumulative and synergistic) by SEA topic – note at this stage no activities, potential effects or receptors have been scoped out.

4.5 Monitoring

In fulfilment of the requirements of the *Environmental Assessment of Plans and Programmes Regulations 2004*³⁴, DECC will monitor the effects of the activities arising following the adoption of the draft plan/programme for the purpose of identifying unforeseen adverse effects at an early stage, and to allow appropriate remedial action to be undertaken where necessary. The indicators shown in Table 4.1 form the basis of providing a high level framework within which to monitor the effects of the plan/programme, and previous SEAs have utilised a number of existing monitoring and other arrangements to fulfil the requirements of the Regulations³⁵. A high level overview of these sources is provided in Table 4.3 below.

Consultation Question

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?

Table 4.3: SEA Indicators and Related Monitoring

Indicator	High Level Monitoring Outcomes and Relevant links
Biodiversity, habitats, flora and fauna	
<p>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.</p>	<p>Research and monitoring relating to conservation sites and species are kept under review by DECC as part of the SEA programme. These include:</p> <ul style="list-style-type: none"> Monitoring and Advice by The Special Committee on Seals (SCOS) The Seabird Monitoring Programme (SMP) The Wetland Bird Survey (WeBS) Site condition monitoring for Natura 2000 sites Common Standards Monitoring for Designated Sites (CSM) The Clean Seas Environment Monitoring Programme (CSEMP) <p>Studies undertaken to further understand potential effect of plan activities on birds and marine mammals – see OESEA.gov.uk webpages</p> <p>Links: UKMMAS, SCOS Reports, SMP Results, WeBS Report, CSM, CSEMP, Supporting documents for OESEA and OESEA2, the Offshore Energy SEA BGS data archive.</p> <p>Marine Strategy Part Two: UK Marine Monitoring Programmes (to be considered in relation to all MSFD Annex I descriptors)</p>

³⁴ Regulation 17(1), "The responsible authority shall 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."

³⁵ In keeping with Regulation 17(2), "The responsible authority's monitoring arrangements may comprise or include arrangements established otherwise than for the express purpose of complying with paragraph 17(1)".

Indicator	High Level Monitoring Outcomes and Relevant links
<p>Activities subsequent to licensing/leasing which are on, or potentially affecting, a Natura site are compliant with the requirements of the <i>Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)</i>, the <i>Conservation (Natural Habitats, etc.) (Northern Ireland) Regulations 1995 (as amended)</i>, the <i>Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)</i>, and the <i>Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended)</i>.</p>	<p>HRA screening and Appropriate Assessment was undertaken for Block licences where a likely significant effect was identified for the 27th Round. The granting of licences was not found to give rise to significant effects on the integrity of relevant sites. HRA screening was undertaken for the 28th Round, with likely significant effects identified for 94 blocks which were subject to Appropriate Assessment.</p> <p>Appropriate Assessment was undertaken for Round 3 offshore wind leasing by The Crown Estate.</p> <p>Links: 27th Seaward Licensing Round HRA, 28th Round Appropriate Assessments</p>
<p>Every activity with the potential to impact upon or disturb a protected species is compliant with the requirements of the <i>Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)</i>, the <i>Conservation (Natural Habitats, etc.) (Northern Ireland) Regulations 1995 (as amended)</i>, the <i>Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)</i>, and the <i>Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (as amended)</i>.</p>	<p>Convictions relating to European protected species disturbance in relation to plan activities (note there have been none to date).</p>
Geology and soils	
<p>No adverse change in quality of seabed sediments, and seabed sediment transport, at a series of regional monitoring stations.</p>	<p>Results from OGUK regional surveys and syntheses of offshore wind farm licensing conditions monitoring do not reveal adverse changes to sediment quality or character associated with plan activities.</p> <p>Links: Charting Progress 2, Charting Progress Ocean Processes feeder report, Review of Offshore Wind Farm Monitoring Data 2010 and 2014, OSPAR Coordinated Environmental Monitoring Programme (CEMP) Reporting</p> <p>Marine Strategy Part Two: UK Marine Monitoring Programmes (to be considered in relation to MSFD Annex I descriptors 6 and 7)</p>

Indicator	High Level Monitoring Outcomes and Relevant links
No physical damage to designated marine and coastal geological conservation sites (e.g. GCRs and MCZs).	<p>Keep under review the level of plan related activity, e.g. new pipelines (including landfalls)</p> <p>For those constructed, each was subject to EIA and consultation with the public and statutory consultees including nature conservation bodies responsible for the identification and management of conservation sites.</p> <p>13 agreements for lease are in place from The Crown Estate relating to Round 2 extension and Round 3 offshore wind farm cables which include a landfall. These sites are individually assessed as NSIPs by PINS, or by the Scottish Government.</p> <p>27 Marine Conservation Zones and 30 Marine Protected Areas have been designated in English and Scottish waters respectively. DECC required consideration of designated and potential MCZs for all new Block licence applications through the 28th Round, and requires their consideration during permitting of all subsequent activities.</p> <p>Links: Environmental Statements reviewed/ approved in relation to oil and gas activity (including pipelines), Yorkshire and Humber CCS Cross Country Pipeline, The Crown Estate Offshore Wind leasing map,</p>
Landscape/seascape	
No significant impact on nationally-designated areas.	Maintain awareness of any development following plan adoption refused consent on the basis of landscape or seascape effects on nationally-designated sites.
Extent of the visual resource potentially affected by the particular developments.	Taken as a measure of the number of proposed or approved developments associated with the plan which are within 12nm, or viewable distance, of the coast.
Number of areas of landscape sensitivity affected by proposed developments (e.g. offshore wind).	Taken as a measure of the number of proposed or approved developments associated with the plan which are within 12nm, or viewable distance, of sensitive or designated landscapes.
Trajectory of change in coastal National Character Areas shows no adverse effects arising from plan activities.	<p>The majority of plan activities to date have taken place some distance offshore or are transient, however the scale of future offshore wind may present changes to the character of some coasts associated with National Character Areas (NCAs). Such a trajectory of change will be reviewed following offshore wind farm construction and review of NCAs, however it is acknowledged that these are identified as a driver of change within certain NCA descriptions.</p> <p>Link: National Character Areas</p>
Change in 'tranquillity' based on CPRE and CCW national mapping projects.	Updates to these measures will be kept under review so that a monitoring outcome cannot be provided.
Water Environment	
No adverse change in quality of surface water and aquifers.	<p>WFD indicators of chemical and biological status for coastal and transitional waters.</p> <p>Trends or condition with regards to hazardous substances, eutrophication, litter and radioactivity in marine waters.</p> <p>Marine Strategy Part Two: UK Marine Monitoring Programmes (to be considered in relation to MSFD Annex I descriptors 5, 8 and 10)</p> <p>Links: Charting Progress 2, Charting Progress Clean and Safe Seas feeder report, WFD trends, Marine Strategy Part One</p>

Indicator	High Level Monitoring Outcomes and Relevant links
UKCS Exploration and Production (E&P) meets OSPAR discharge reduction targets.	<p>Note that OSPAR reduction targets of 15% on 2000 figures by 2006 exceeded for oil in produced water: 24% by 2006 and 45% by 2008.</p> <p>Since 2008, both the quantity of produced water discharged and average oil in water concentrations have reduced: 198 to 152 million m³ and 16 to 14.35mg/l respectively.</p> <p>Links: Oil and gas: field data, Charting Progress 2</p>
Number of oil and chemical spills and quantity of material spilled.	<p>Links: ACOPS, PON1 reporting</p>
Air Quality	
Monitoring of local air quality shows no adverse impact.	<p>Contribution of plan activities to emissions associated with designation of Local Air Quality Management Areas.</p> <p>Links: Air Pollution in the UK 2013</p>
Targets relating to airborne emissions at a regional and UK level are not exceeded.	<p>Levels of pollutants on the National Atmospheric Emissions Inventory (NAEI) during the currency of the OESEA3 plan/programmes for England and the devolved administrations. National Emissions Ceilings Directive targets for NO_x, NMVOCs, SO₂ and NH₃ and those targets set under the Gothenburg Protocol, to be met by 2020.</p> <p>Regional deposition of air pollutants around the North Sea and the North-East Atlantic.</p> <p>Links: OSPAR Comprehensive Atmospheric Monitoring Programme (CAMP) Report 2013, UK National Atmospheric Emissions of Air Quality Pollutants 1970-2011, NAEI data and reports, National Statistics: Emissions of air pollutants</p>
Climatic Factors	
UKCS E&P greenhouse gas emissions.	<p>UK E&P greenhouse gas emissions through the duration of the plan/programme.</p> <p>Link: OSPAR oil and gas emissions and discharges, UK greenhouse gas emissions statistics (Exploration, production and transport of oils and gas)</p>
UK progress towards meeting greenhouse reduction targets under <i>The Climate Change Act 2008</i> .	<p>Link: UK greenhouse gas emissions statistics, UK Carbon Budget</p>
UKCP09 projections for the expected currency of the plan/programme.	<p>DECC are mindful of the updated IPCC (2013) physical science basis and the introduction of a revised set of emissions scenarios to inform modelling of UK regional and National trends. This indicator is being kept under review.</p> <p>Links: IPCC Assessment Report 5, UKCP09</p>
Population and human health	
Progress in achieving OSPAR targets for continued reduction in harmfulness of offshore discharges.	<p>See response to indicators for Water Environment and Air Quality</p>
Monitoring in relation to Noise Action Plans shows no adverse effects.	<p>Contribution of plan activities to noise for those agglomerations where Noise Action Plans have been implemented.</p> <p>Link: Noise Action Plans</p>
Relevant Office for National Statistics wellbeing metrics.	<p>Trends in well-being are reported through the Office for National Statistics (ONS).</p> <p>Link: Measuring National Well-being: Life in the UK 2014</p>

Indicator	High Level Monitoring Outcomes and Relevant links
Other users of the sea, material assets (infrastructure, and natural resources)	
Spatial planning capable of addressing changes in technology, policy and prioritisation of site selection	<p>Keep emerging marine spatial planning policy under review.</p> <p>Link: East of England Marine Plans, South of England Marine Plans, National Marine Plan for Scotland, Wales, Ireland</p>
Economic and social impact (both positive and negative).	<p>Contribution of the plan/programme to the maintenance of security of supply, jobs and fiscal returns.</p> <p>Links: Oil & Gas UK Economic Report 2010, 2011, 2012, 2013, 2014, The ONS UK Environmental Accounts 2010, 2011, 2012, 2013, 2014, DECC Energy Trends 2014, Recent Decisions on Energy Infrastructure Applications, Charting Progress Productive Seas feeder report</p>
Increased collision risks and restrictions on pollution prevention methods or Search & Rescue options in the event of an emergency.	<p>Compliance of all developments to undertake suitable navigational risk assessments. Adherence of offshore wind farm applications to MCA Marine Guidance Note 371: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response Issues.</p> <p>Links: Oil and gas environmental data: consent to locate, Navitus Bay, Triton Knoll, East Anglia One, Gallopier Wind Farm, Burbo Bank Extension, Walney Extension, Rampion, Dogger Bank Creyke Beck, Dogger Bank Teesside A&B, Hornsea Offshore Wind Farm Project One.</p>
Progress in reducing volumes of waste to landfill.	<p>Waste quantity, type and disposal route (e.g. landfill, recycling) as monitored by DECC through EEMS.</p> <p>General trends in operator waste production and disposal routes publicised through annual OSPAR Environmental Management System (EMS) reporting requirements.</p> <p>Links: EMS Public statements</p>
Cultural Heritage	
No adverse impact upon the condition of designated sites and features (including impact on their setting) and minimal impact on all other recorded sites and features.	<p>Any plan activities which could interact with designated protected sites (e.g. Military remains, protected wrecks).</p>
Number of archaeological finds reported through best practice as a result of plan activities.	<p>Information collected by the Receiver of Wreck, relevant local Historic Environment Records and National Monuments Records.</p> <p>Link: Wreck and salvage law</p>

4.6 Production of the Environmental Report

Table 4.4, indicates the proposed Environmental Report document structure be divided into 7 sections not including a bibliography, glossary, non-technical summary and appendices.

Table 4.4: Proposed Report Section Contents

Report Section	Summary	
Non-technical summary	A standalone summary of the Environmental Report, its findings and conclusions, written in non-technical language.	
Section 1: Introduction	Describes the background to the draft plan/programme and its regulatory context, along with that of the SEA and ER.	Environmental Report
Section 2: Overview of the draft plan/programme & Relationship to Other Initiatives	Will provide 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 will also be described.	
Section 3: SEA approach	Describes the SEA process, its scope, objectives and assessment approach.	
Section 4: Environmental Information	Describes the environmental characteristics of the areas relevant to the SEA. The section will identify existing environmental problems and the possible evolution of the environmental baseline. The information will be organised by SEA topic for each Regional Sea. Detailed supporting information will be presented in an Appendix. Where appropriate the information will be presented as/supported by GIS outputs/maps.	
Section 5: Assessment	Provides details of the assessment methodology and documents the assessment of the draft plan/programme and its alternatives. Considers spatial issues, cumulative and transboundary impacts and identifies mitigation and enhancement measures to prevent, reduce or counteract any significant adverse effects identified during the assessment process. OESEA3 will cover a very large marine area comprising all UK waters with water depth from the intertidal to more than 2,400m and the draft plan/programme includes both hydrocarbon and renewable energy based elements. The assessment therefore has to address complex issues and multiple interrelationships, where a simplistic score based matrix assessment would be inadequate, and an evidence based consideration is proposed. In addition, significant use will be made of GIS tools to collate, process, analyse and present spatial information.	
Section 6: Recommendations and Monitoring	Provides overall findings and conclusions regarding the likely implications of the proposed licensing/leasing and alternatives, together with recommendations for mitigation and monitoring and gaps in understanding relevant to the process. Describes the approach to SEA monitoring.	
Section 7: Next Steps	Describes the consultation phase for the Environmental Report and proposed plan/programme and the process by which the plan/programme would be adopted.	
Bibliography	List of all sources cited in the assessment text and appendices.	
Glossary & abbreviations	-	
Appendix 1: Environmental Baseline	Underpins Section 4 and contains a series of 10 sub-appendices (A3a to A3j) describing the key characteristics in relation to biodiversity, habitats, flora and fauna; geology, substrates and coastal morphology; 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 drawing important points for each of the draft regional seas	
Appendix 2: Key issues and inputs to the SEA	Will include a matrix of key thematic issues to be addressed in the Environmental Report based on responses provided by consultation bodies/authorities and stakeholders to the initial scoping consultation as well as issues raised during assessment and stakeholder workshops	
Appendix 3: SEA Workshops	Will contains summaries of the SEA works which will be held to contribute to the SEA process and information base	
Appendix 4: Other initiatives	Describes in a hierarchy other initiatives, plans and programmes of relevance to the proposed plan/programme, the implications of these for the proposed plan/programme and the implications of the proposed plan/programme on these other plans and programmes.	
Appendix 5: Regulatory and other controls	Summarises the key environmental legislation and controls in relation to the offshore renewable energy, oil and gas (including gas storage) and CCS industries.	

5 SEA Consultation

The OESEA consultation process has been designed to be in keeping with the Cabinet Office guidance³⁶ on Consultation Principles for engaging stakeholders when developing policy and legislation (which replaced the 2008 Code of Practice on Consultations, see summary below).

Timing of Consultation:

Timeframes for consultation should be proportionate and realistic to allow stakeholders sufficient time to provide a considered response (note that this does not prevail over statutory or mandatory requirements).

Making information useful and accessible:

Policy makers should be able to demonstrate that they have considered who needs to be consulted and ensure that the consultation captures the full range of stakeholders affected.

Information should be disseminated and presented in a way likely to be accessible and useful to the stakeholders with a substantial interest in the subject matter. It should be in an easily understandable format, use plain language and clarify the key issues, particularly where the consultation deals with complex subject matter. Consideration should be given to more informal forms of consultation that may be appropriate (e.g. email or web-based forums, public meetings, working groups, focus groups, and surveys).

Transparency and Feedback:

The purpose of the consultation process should be clearly stated as should the stage of the development that the policy has reached. Sufficient information should be made available to stakeholders to enable them to make informed comments.

Relevant documentation should be posted online to enhance accessibility and opportunities for reuse. All consultations should be housed on the Government's single gov.uk web platform.

Policy makers should explain what responses they have received and how these have been used in formulating the policy, and such a response should usually be published within 12 weeks of the consultation closing. Departments should make clear at least in broad terms what future plans (if any) they have for engagement.

Practical Considerations:

Consultation exercises should not generally be launched during local or national election periods. Departments should be clear how they have come to the decision to consult in a particular way, and senior officials and ministers should be sighted on the considerations taken into account in order to enable them to ensure the quality of consultations.

³⁶ <https://www.gov.uk/government/publications/consultation-principles-guidance>

5.1.1 Consultation Process

There are several opportunities for consultees to provide input during the different phases of the SEA process as described below.

Consultation Question

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

Scoping

A copy of the scoping report will be sent to the relevant statutory consultation bodies/authorities listed below with a formal request for their input. Input from other stakeholders is also welcomed and during this period, the scoping report will also be available to view or freely download from the SEA pages of the gov.uk website³⁷. Users registered to receive SEA related alerts through govdelivery will be informed and an email alert will also be issued via an emailing advertising service. In accordance with the requirements of the relevant SEA Regulations, the period of consultation for this SEA scoping report will be five weeks. All feedback from the scoping consultation will be reviewed and, where appropriate, addressed in the Environmental Report. A report will be prepared of scoping feedback and a summary will be included as an Appendix of the Environmental Report. The scoping feedback will be used to inform the SEA process.

Workshops

It is proposed to hold a number of workshops during the conduct of the SEA. These will include expert assessment workshops, sectoral meetings and workshops, and regional stakeholder workshops.

Environmental Report

The OESEA3 Environmental Report and the draft plan/programme will be issued for formal public consultation for a period of 8 weeks, during the first part of 2016. During this period, OESEA3 and any supporting documents will be available to view or freely download from the SEA pages of the gov.uk website. The public will also be able to order CD copies if preferred, by email or by mail. An email alert will be sent to all registered users on the OESEA govdelivery list³⁸. Other stakeholders will be variously alerted by, for example, emailing advertising services. Notices will be inserted in national and regional newspapers to inform the wider public of the SEA consultation. Copies of the OESEA3 Environmental Report will be sent to statutory consultation bodies and authorities in the UK and to neighbouring states as required by Regulations.

Post Consultation

Following the consultation period, a post consultation report will be prepared which will present a summary of the issues raised and other comments received during the public consultation. Where appropriate, responses and clarifications to comments will be included which provide

³⁷ <https://www.gov.uk/offshore-energy-strategic-environmental-assessment-sea-an-overview-of-the-sea-process>

³⁸ Registration for the DECC OESEA govdelivery service may be found at:
<https://public.govdelivery.com/accounts/UKDECC/subscriber/new>

factual and technical clarifications. The post consultation report will be available to view of freely download from the SEA pages of the gov.uk website.

There are many considerations which DECC will take into account in making decisions regarding the draft plan/programme; the responses to the public consultation and the Environmental Report are important inputs to this process. A post adoption statement will be issued, describing *inter alia* how environmental considerations have been integrated into the plan or programme and how the Environmental Report and opinions expressed in response to the consultation has been taken into account in line with the requirements of the SEA Regulations.

Consultation Bodies

Since the 2004 Regulations were made, a number of the nominated consultation bodies/authorities have been subject to organisational/name change. The following are the current statutory consultation bodies/authorities for this SEA:

- Historic England (previously part of English Heritage)
- Natural England (previously English Nature and the Countryside Agency)
- Environment Agency
- Historic Scotland
- Scottish Natural Heritage
- Scottish Environment Protection Agency
- Cadw (Welsh Assembly Government's historic environment division)
- Natural Resources Wales (largely taking over the functions of Countryside Council for Wales, Forestry Commission Wales and the Environment Agency in Wales)
- Department of Environment (NI) (Northern Ireland Environment Agency)

In addition, the Joint Nature Conservation Committee, the Marine Management Organisation and Marine Scotland are included as consultees for this SEA. It is also proposed to include the wide range of interested stakeholders and the general public in the scoping consultation exercise. The plan scope and other aspects of this document have also been informed by the SEA Steering Group, meetings of which will take place through the SEA process. The SEA Steering Group³⁹ is composed of departmental representatives, conservation and other agencies, NGOs, industry representatives and independent experts.

³⁹ <https://www.gov.uk/government/groups/offshore-energy-sea-steering-group>

6 Input to Scoping and Next Steps

6.1 Scoping Input

For convenience the consultation questions are listed again below:

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?**

Please return any scoping responses⁴⁰ by close of business on 4th September 2015, via e-mail or letter, clearly marked “Offshore Energy SEA 3 Scoping”, and addressed to:

Email: oeep@decc.gsi.gov.uk

Postal address:

Offshore Energy SEA 3 Scoping
The Department of Energy and Climate Change
4th Floor Atholl House
86-88 Guild Street
Aberdeen AB11 6AR

Fax: 01224 254019

6.2 Next Steps

All feedback from the scoping consultation will be reviewed and, where appropriate, addressed in the Environmental Report. A report will be prepared of scoping feedback and a summary will be included as an Appendix of the Environmental Report. The scoping feedback will be used to inform the SEA process.

The Environmental Report will be published for a period of public consultation expected to be in early 2016.

⁴⁰ Confidentiality and data protection:

We will summarise all responses and place this summary on the OESEA3 section of the GOV.UK website. This summary will include a list of organisations that responded, but not people’s personal names, addresses or other contact details.

Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information legislation (primarily the Freedom of Information Act 2000, the Data Protection Act 1998 and the Environmental Information Regulations 2004).

If you want information that you provide to be treated as confidential please say so clearly in writing when you send your response to the consultation. It would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded by us as a confidentiality request.

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