Department of Energy & Climate Change

Offshore Oil & Gas Licensing
28th Seaward Round
West of Shetland

Blocks 165/5, 166/1, 166/2, 166/7, 175/29, 175/30, 176/26, 204/25c, 204/30b, 205/9, 205/10, 205/13, 205/19b, 205/26d, 206/5, 206/16b, 206/17, 206/21 and 207/1b

Habitats Regulations Assessment
Stage 2 - Appropriate Assessment

March 2015

Any enquiries regarding this publication should be sent to us at oep@decc.gsi.gov.uk

This document is also available from our website at www.gov.uk/decc.

Contents

1 Introduction

1.1 Background and purpose

On 24th January 2014, the Secretary of State for the Department of Energy and Climate Change (DECC) invited applications for licences in the 28th Seaward Licensing Round. The licensing Round forms part of a plan/programme adopted by the Secretary of State following completion of the Offshore Energy Strategic Environmental Assessment (DECC 2011). Applications for Traditional Seaward, Frontier Seaward and Promote Licences covering over 360 blocks/part Blocks were received.

To comply with obligations under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended), in summer 2014, the Secretary of State undertook a screening assessment to determine whether the award of any of the Blocks applied for would be likely to have a significant effect on a relevant site, either individually or in combination with other plans or projects (DECC 2014).

In doing so, the Department has applied the Habitats Directive test (elucidated by the European Court of Justice in the case of Waddenzee (Case C-127/02)) which test is[1]:

> Any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects.
>
> Where a plan or project not directly connected with or necessary to the management of the site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site. The assessment of that risk must be made in the light, *inter alia*, of the characteristics and specific environmental conditions of the site concerned by such a plan or project.

The screening assessment (including consultation with the statutory agencies/bodies) forming the first stage of the Habitats Regulations Assessment (HRA) process, identified 94 whole or part Blocks as requiring further assessment prior to decisions on whether to grant licences (DECC 2014). Because of the wide distribution of these Blocks around the UKCS, the Appropriate Assessments (AA) in respect of each potential licence award, are contained in five regional reports as follows:

- Southern North Sea
- Moray Firth

[1] Also see the Advocate General's Opinion in the recent 'Sweetman' case (Case C-258/11), which confirms those principles set out in the Waddenzee judgement.

- Northern and Central North Sea
- West of Shetland
- Irish Sea and St George's Channel

This report documents the further assessment of 19 Blocks to the West of Shetland.

1.2 West of Shetland Blocks

The West of Shetland Blocks applied for in the 28th Round and which are considered in this assessment are listed below and shown in Figures 1.1 and 1.2[2]. These Blocks were identified as requiring further assessment by the screening process (DECC 2014).

165/5	166/1	166/2	166/7	175/29	175/30
176/26	204/25c	204/30b	205/9	205/10	205/13
205/19b	205/26d	206/5	206/16b	206/17	206/21
207/1b					

1.3 Relevant Natura 2000 sites

The Natura 2000 sites considered in this assessment were identified based on their location in relation to the 19 Blocks and the foreseeable possibility of interactions. The sites considered include designated Natura 2000 sites (also referred to as 'European Sites' and including Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) and potential sites for which there is adequate information on which to base an assessment. Additionally, potential interactions between mobile species which are qualifying features of these sites, and work programme activities that may arise from licensing, are considered beyond site boundaries (e.g. foraging marine mammals, seabirds and migratory fish).

Guidance in relation to sites which have not yet been submitted to the European Commission is given by Circular 06/2005 (ODPM 2005) which states that: "*Prior to its submission to the European Commission as a cSAC, a proposed SAC (pSAC) is subject to wide consultation. At that stage it is not a European site and the Habitats Regulations do not apply as a matter of law or as a matter of policy. Nevertheless, planning authorities should take note of this potential designation in their consideration of any planning applications that may affect the site.*" Despite reference to the Habitats Regulations not applying as a matter of policy to such sites, in accordance with Scottish Planning Policy (Scottish Government 2014) and the Marine Policy Statement (HM Government 2011[3]), the relevant sites considered include classified and potential SPAs, designated and candidate SACs and Sites of Community Importance (SCIs).

---

[2] Figures do not include Blocks for which Promote licence applications are being considered. The screening assessment concluded that likely significant effects on European sites could not occur from the award of Promote licences and these Blocks were screened out. DECC will undertake HRA for the potential for likely significant effects on European sites in advance of decisions being taken on whether any of the 28th Round Promote licences should proceed to a second term when field operations could be carried out.

[3] The MPS indicates that listed Ramsar sites should also receive the same protection as European sites which have been classified (paragraph 3.1.3). The Scottish Planning Policy notes that, "...all Ramsar sites are also Natura 2000 sites, and/or Sites of Special Scientific Interest and are protected under the relevant statutory regimes."

In addition to the above designations, the Scottish Government has indicated that it intends to consult on the creation of 14 marine SPA sites which are currently at the draft (dSPA) stage. The sites are only subject to policy protection on ministerial approval to formally consult on them (expected in 2015) but have been included in the screening in their current form as they are likely to be subject to consultation within the 28th Round licensing timetable.

In addition to European sites, the characteristics of broadscale physical and ecological features in the area are described in the Offshore Energy SEA (DECC 2009, 2011), Charting Progress 2 (Defra 2010) and the OSPAR Quality Status Report (OSPAR 2010).

The relevant sites are shown in Figures 1.1 and 1.2, and summarised in Appendix A.

Figure 1.1: Location of West of Shetland Blocks and relevant SPAs

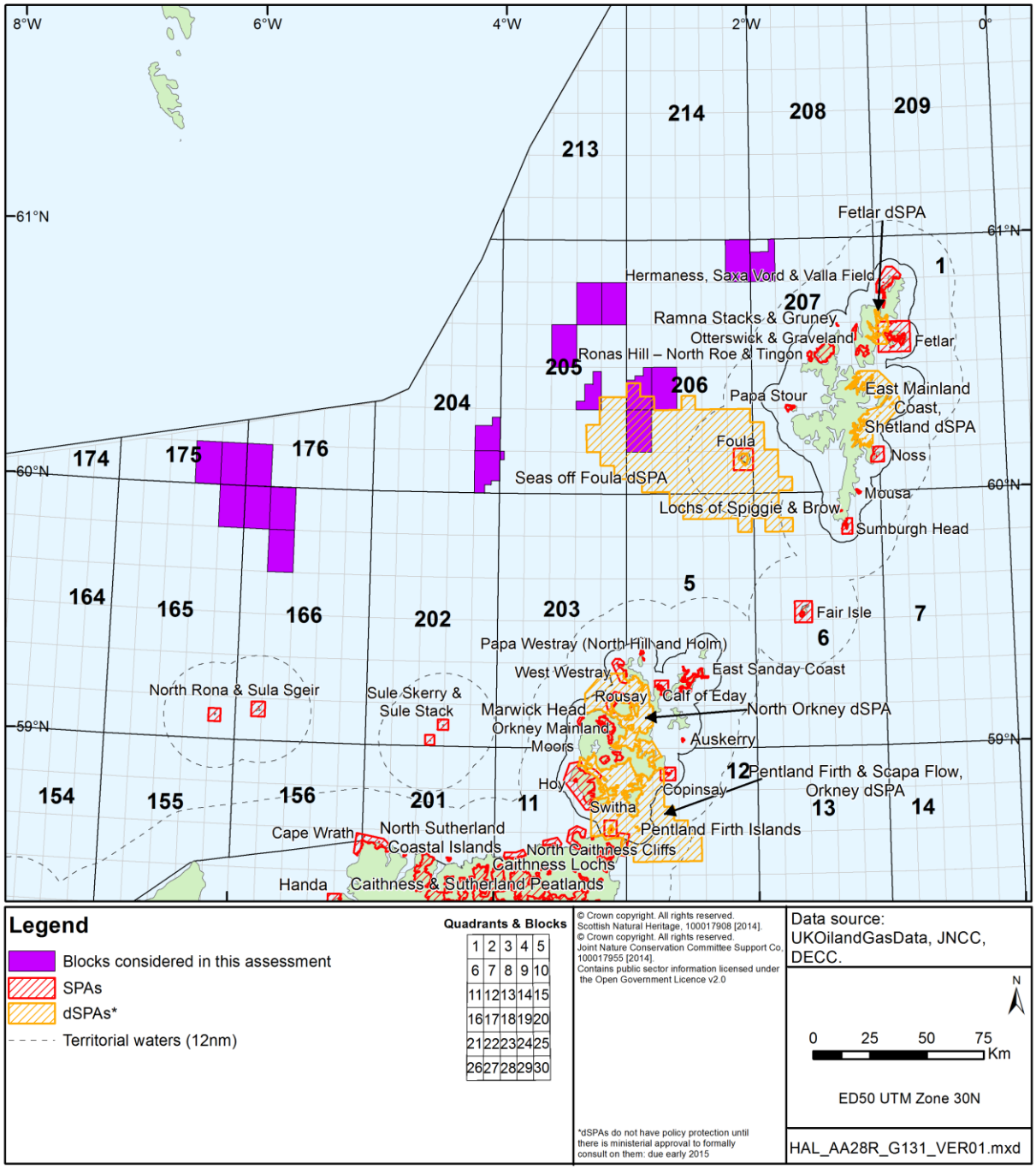
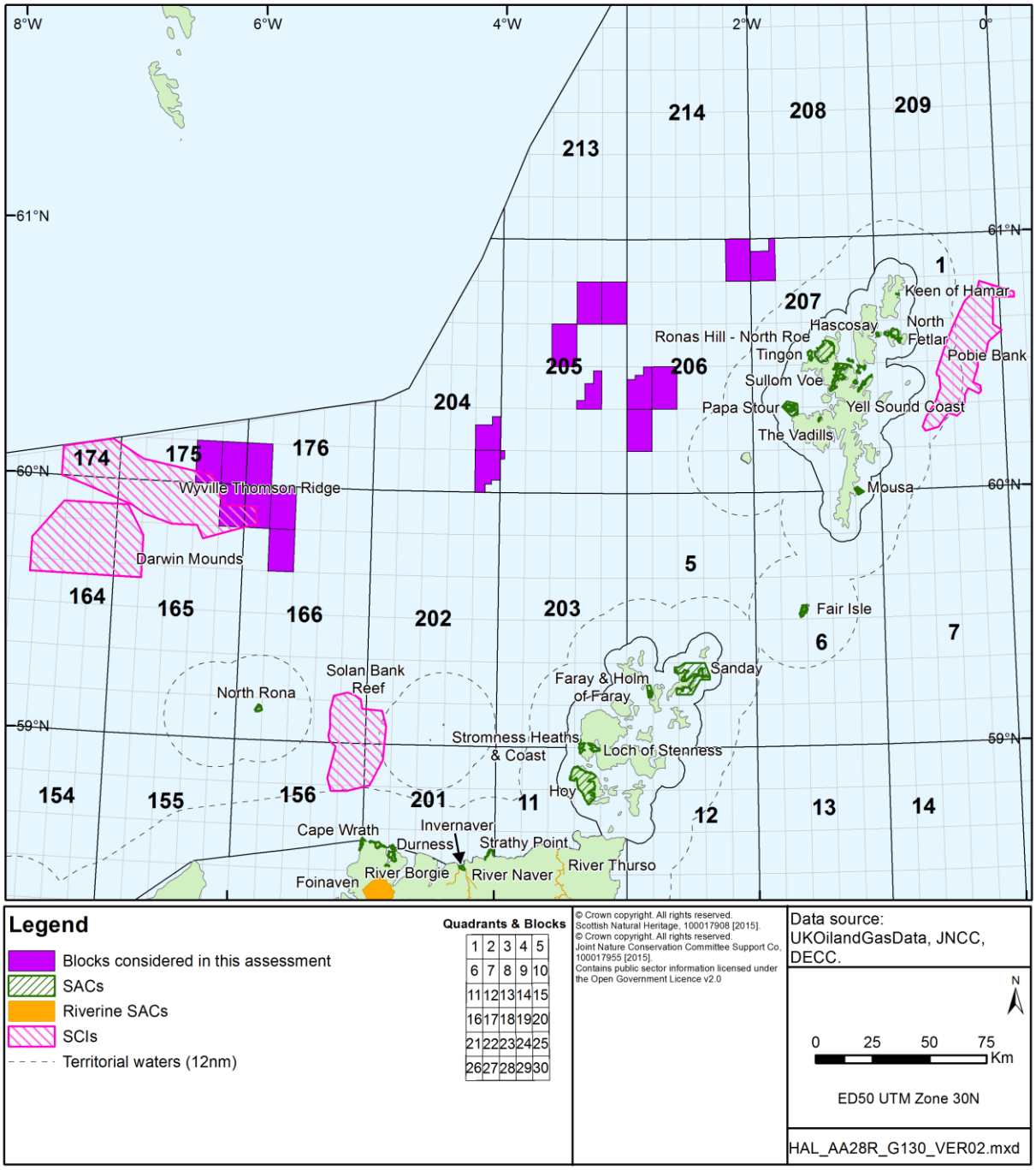


Figure 1.2: Location of West of Shetland Blocks and relevant SACs



2 Licensing and activity

2.1 Licensing

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 UK Continental Shelf (UKCS) are vested in the Crown and the *Petroleum Act 1998* (as amended) gives the Secretary of State 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.

Two types of Seaward Production Licences are relevant to the West of Shetland Block applications:

- Traditional Production Licences which 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. DECC 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).

The model clauses and terms and conditions which are attached to Licences are contained in secondary legislation.

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

2.2 Activity

As part of the licence application process, applicant companies provide DECC with details of work programmes they propose in the first term to further the understanding or exploration of the Blocks(s) in question. These work programmes are considered with a range of other factors in DECC's decision on whether to license the Blocks and to whom. There are two levels of drilling commitment relevant to the proposed work programmes for the West of Shetland Blocks:

- A **Contingent Drilling Commitment** is a commitment to the Secretary of State to drill a well, but it includes specific provision for DECC to waive the commitment in light of further technical information.
- A **Drill or Drop (D/D) Drilling Commitment** is a conditional commitment with the proviso, discussed above, that the licence is relinquished if a well is not drilled.

Note that Drill-or-Drop work programmes (subject to further studies by the licensees) will probably result in a well being drilled in less than 50% of the cases.

With respect to seismic data commitments, the proposed work programmes for the Blocks include: **shooting** seismic data by carrying out new 2D or 3D seismic survey; **obtaining** seismic data by purchasing or otherwise getting the use of existing data, and **reprocessing** existing data[4].

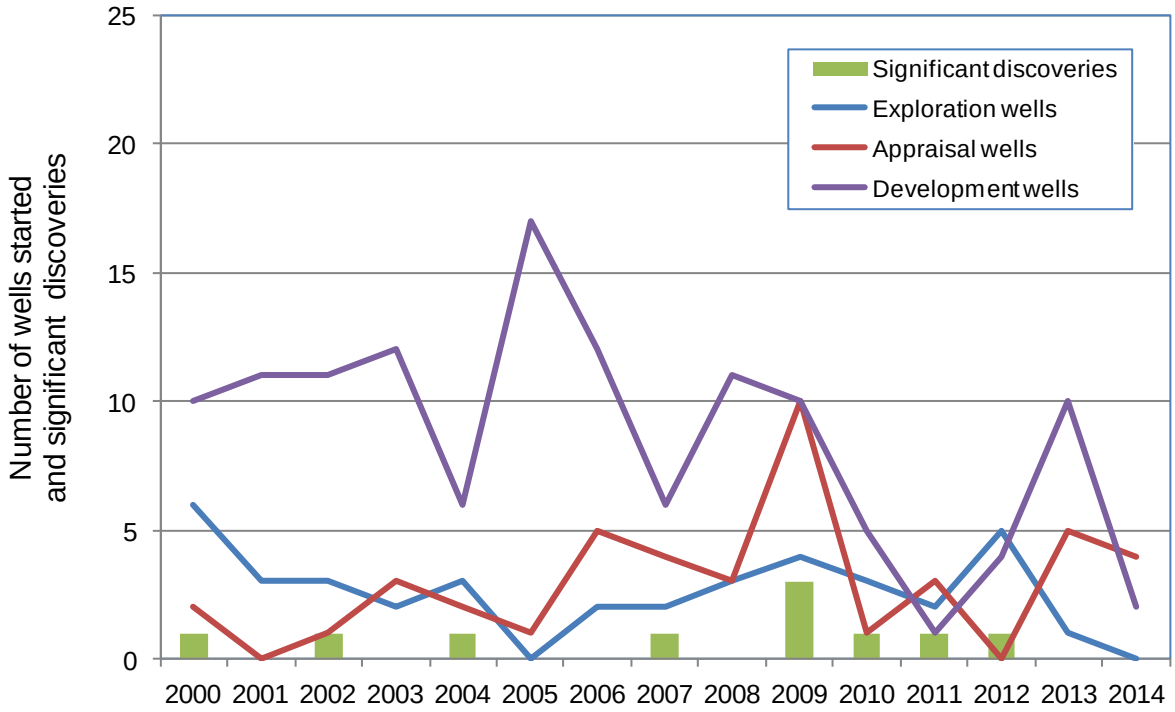
It is made clear in the application guidance that a Production Licence does not allow a licensee to carry out all petroleum-related activities from then on (this includes those activities outlined in initial work programmes). Field activities, associated with seismic survey or drilling, are subject to further individual controls by DECC (see Figures 2.3-2.4), and a licensee also remains subject to controls by other bodies such as the Health and Safety Executive. It is the licensee's responsibility to be aware of, and comply with, all regulatory controls and legal requirements.

The proposed work programmes for the first four-year (or six-year in the case of the Frontier Production Licence) period are detailed in the licence applications. For some activities, such as seismic survey, and accidental events such as oil spills, the impacts can occur some distance from the licensed Blocks and the degree of activity is not necessarily proportional to the size or number of Blocks in an area. In the case of direct physical disturbance, the licence Blocks being applied for are relevant.

On past experience, less activity actually takes place than is bid at the licence application stage. A proportion of Blocks awarded may be relinquished without any field activities occurring. Activity after the initial term is much harder to predict, as this depends on the results of the initial phase, which is, by definition, exploratory. 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. Depending on the expected size of finds, there may be further drilling to appraise the hydrocarbons (appraisal wells). For context, Figure 2.1 highlights the total number of exploration and appraisal wells started in the West of Shetland area each year since 2000 as well as the number of significant discoveries made in the area (associated with exploration activities).

4 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/274621/28R_Technical_guidance.pdf

Figure 2.1: Number of exploration, appraisal and development wells started and significant discoveries relevant to the West of Shetland since 2000



Note: The description "significant" generally refers to the flow rates achieved (or would have been reached) in well tests (15 mmcfgd or 1000 BOPD). It does not indicate the commercial potential of the discovery.
Source: https://www.gov.uk/oil-and-gas-wells#drilling-activity, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/278780/Significant_Discoveries_Jan_2014.pdf

Discoveries that are developed may require further drilling, wellhead infrastructure, pipelines and possibly production facilities such as platforms, although recent developments are mostly subsea tiebacks to existing production facilities rather than stand alone developments. For example, of the 7 current projects identified by DECC's Project Pathfinder (as of February 2015)[5] for Blocks within the West of Shetland area, 5 are planned as new subsea tie-backs to FPSOs or existing infrastructure. Of the other projects, one is planned as a new two platform development and 1 is the replacement of an existing FPSO and development of new wells. The nature, extent and timescale of development, if any, which may ultimately result from the licensing of the West of Shetland Blocks is uncertain; Figure 2.1 shows the number of development wells drilled since 2000. It is therefore regarded that, at this stage, a meaningful assessment of development level activity (e.g. pipelay, placement of jackets, subsea templates or floating installations) cannot be made. Moreover, once project plans are in place, subsequent permitting processes relating to exploration, development and decommissioning, would require assessment (including HRA) as appropriate, allowing the opportunity for further mitigation measures to be identified as necessary. In this way the opinion of the Advocate General in ECJ (European Court of Justice) case C-6/04, effects on Natura sites, *"must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure"* is addressed.

[5] https://itportal.decc.gov.uk/eng/fox/path/PATH_REPORTS/pdf

The approach used here has been to take the proposed activity for the Block as being the maximum of any application for that Block, and to assume that all activity takes place. The Blocks comprising individual licences and estimates of work commitments for the Blocks derived by DECC from the applications received are as follows:

Blocks	Initial term work programme	Licence type
165/5, 166/1, 166/2, 166/7, 175/29, 175/30, 176/26	Drill or drop well, obtain 2D	**Frontier:** After 3 years, must relinquish 75% of the licensed acreage. After 6 years, work programme must be completed and 50% of licensed acreage left relinquished.
204/25c	Drill or drop well, shoot 3D	**Traditional:** work programme must be carried out and 50% of block acreage relinquished within 4 years, otherwise licence will not continue to second term.
204/30b & 205/26d	Drill or drop well	
205/9 (Part) & 205/10	Drill or drop well, reprocess 3D	
205/13	Drill or drop well, reprocess 3D	
205/19b	Drill or drop well	
206/5 &207/1b	Drill or drop well, reprocess 3D	
206/16b, 206/17 & 206/21	1 Contingent well, shoot 3D	

Note: Reprocessing or obtaining seismic refers to use of existing seismic data rather than undertaking new seismic survey[6].

Figure 2.2 provides an overview of the plan process associated with the 28th Licensing Round and the various environmental requirements including HRA. Figures 2.3 and 2.4 outline the stages for subsequent activities and environmental requirements for the work programmes (drilling and seismic survey) indicated by applicants for the Blocks subject to assessment. These simplified flow diagrams highlight the regulatory requirements and environmental responsibilities at various stages in the development of the plan or exploration level activity, and further requirements for project level environmental assessment and HRA. All activities which could give rise to significant effects on the integrity of relevant sites are subject to regulatory control, including HRA as necessary with consultation with statutory nature conservation bodies. There are high level controls to prevent significant impacts, and site specific mitigation would be defined at the project level once the location and nature of activity were defined. High level controls are outlined in Table 2.1 against those sources of potential effect from activities associated with 28th Round licensing that were already identified in the HRA screening (DECC 2014) – also see Appendix B.

[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/274621/28R_Technical_guidance.pdf

Table 2.1: High level controls identified for potential sources of effect

Source of effect	High level controls
Physical disturbance	There is a mandatory requirement to have sufficient recent data to characterise the seabed in areas where activities are due to take place (e.g. rig placement). Survey information must be made available to the relevant statutory bodies on submission of a relevant permit application or Environmental Statement for the operation to be undertaken, and the identification of sensitive habitats by such survey (including those under Annex I of the Habitats Directive) may affect DECC's decision with regards to the application. Further mitigation (e.g. alternative well location or rig positioning) may need to be identified and implemented where necessary.
Marine discharges	Discharges from offshore oil and gas facilities have been subject to increasingly stringent regulatory controls over recent decades (see review in DECC 2011, Appendices 4 and 5), and oil and other contaminant concentrations in the major streams (drilling wastes and produced water) have been substantially reduced or eliminated (e.g. the discharge of oil based muds and contaminated cuttings is effectively prohibited), with discharges of chemicals and oil outside of regulatory standards or permit conditions constituting an offence. These are effectively controlled through permitting, monitoring and reporting (e.g. through the mandatory Environmental and Emissions Monitoring System (EEMS) and annual environmental performance reports). At the project level, discharges would be considered in detail in project-specific Environmental Statements and evaluated in further detail within subsequent chemical permit applications, using chemical risk assessments. HRAs (where necessary) may also be undertaken at each stage.
Underwater noise	Seismic operators are required to submit an application for consent to carry out a geological survey. As part of the application process, operators must justify that their proposed activity is not likely to cause a disturbance etc. under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended) and *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended). It is a condition of consents issued under Regulation 4 of the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (& 2007 amendments) for oil and gas related seismic surveys that the JNCC, *Guidelines for minimising the risk of disturbance and injury to marine mammals from seismic surveys,* are followed. Passive acoustic monitoring (PAM) may be required as a mitigation tool. DECC will take account of the advice provided by the relevant statutory nature conservation body in determining any consent conditions. Potential disturbance of certain species may be avoided by the seasonal timing of noisy activities, and periods of seasonal concern for individual Blocks on offer have been highlighted (see Section 2 of DECC's Other Regulatory Issues[7] which accompanied the 28th Round offer) for which licensees should expect to affect DECC's decision whether or not to approve particular activities. Licensees should therefore appropriately plan operations to avoid these sensitivities.

[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283487/28R_other_reg_issues.pdf

Source of effect	High level controls
Accidental spills	Oil Pollution Emergency Plans (OPEPs): regulatory requirements on operators to prepare spill prevention and containment measures, risk assessment and contingency planning – these are reviewed by DECC, Maritime and Coastguard Agency (MCA), JNCC and other relevant SNCBs/organisations. Additional conditions may be imposed by DECC through block-specific licence conditions (i.e. "Essential Elements"), and seasonal periods of concern for drilling, within which there is a presumption for drilling activity to be refused unless appropriate further mitigation measures can be agreed which are defined at the project level. MCA is responsible for a National Contingency Plan and maintains a contractual arrangement for provision of aerial spraying, with aircraft based at Birmingham International and East Midlands airports, and counter-pollution equipment (booms, adsorbents etc.). The UK Government announced in 2012 that an Emergency Towing Vessel for the waters around the Northern and Western Isles will be stationed in Orkney up to 2015 (the contract has now been extended to March 2016)[8]. The government has also been in discussions with the oil industry on the potential of a commercial call-out arrangement to use their vessels and BP have agreed to volunteer a vessel to help in an emergency should the MCA deem it appropriate[9].

[8] http://www.shetnews.co.uk/news/9565-sic-retaining-northern-isles-emergency-vessel-is-crucial
[9] https://www.gov.uk/government/news/moore-welcomes-bp-and-north-star-support-for-second-support-vessel

Figure 2.2: Stages of plan level environmental assessment

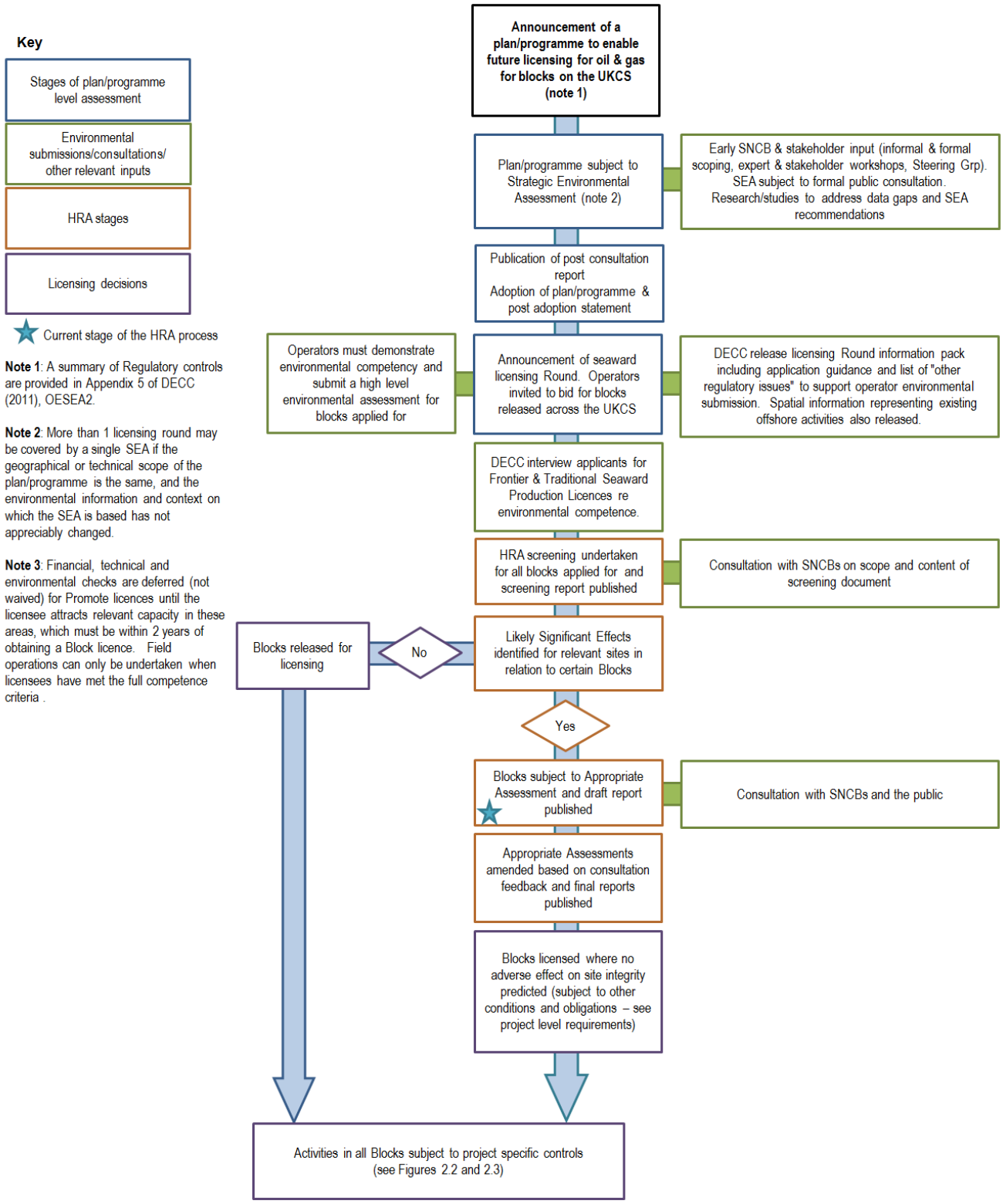
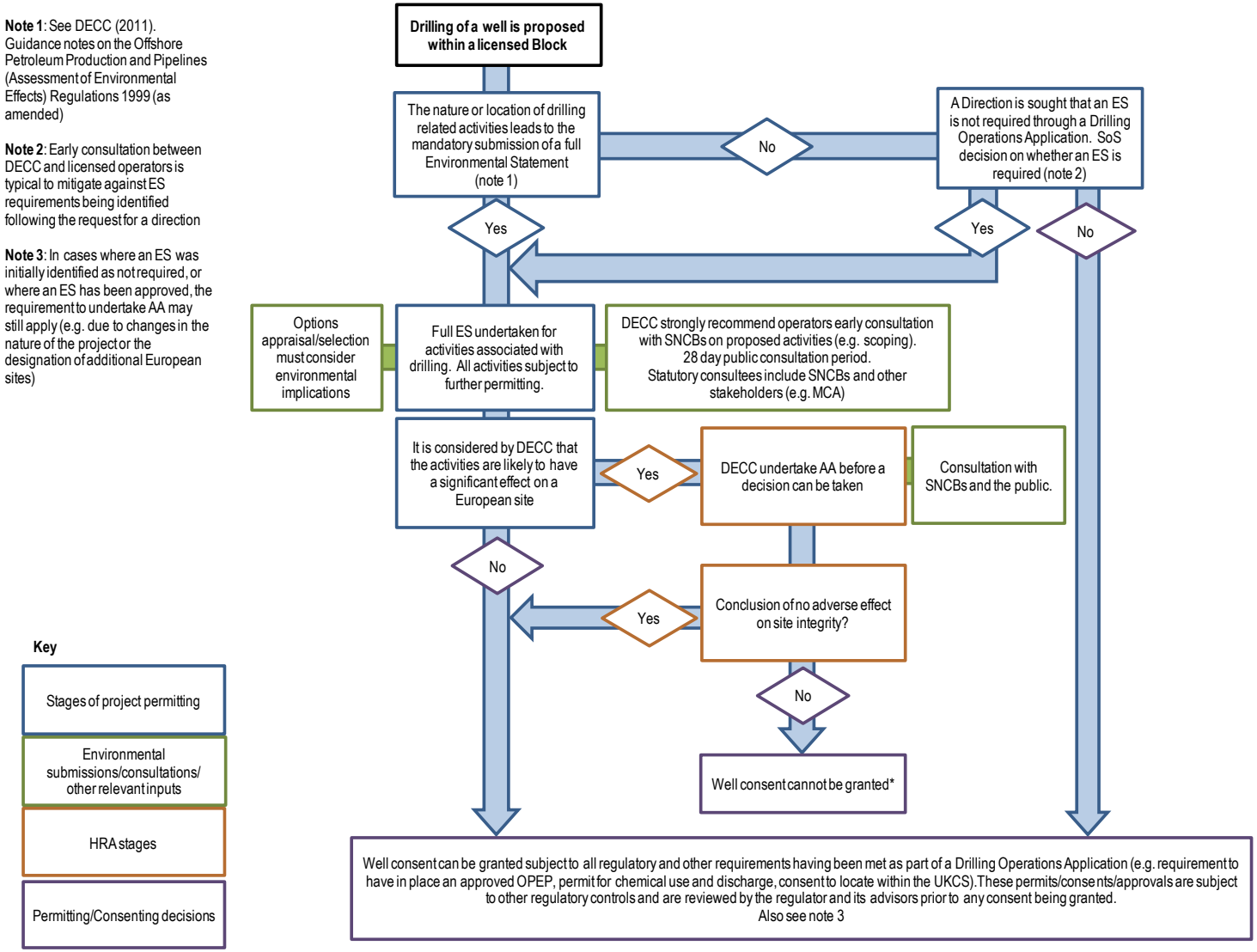
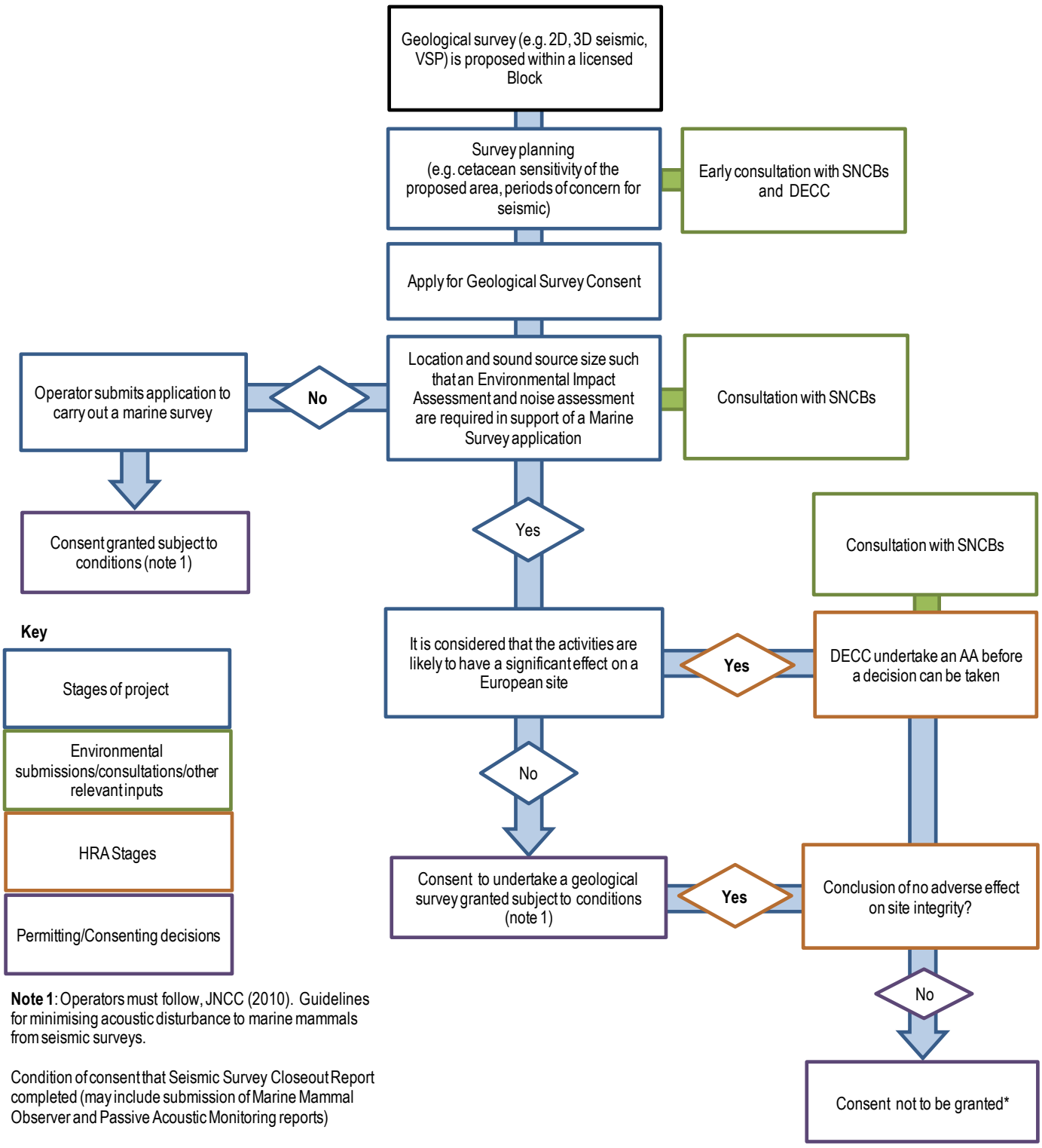


Figure 2.3: High level overview of exploration drilling environmental requirements



** Article 6(4) of the Habitats Directive provides a derogation which would allow a plan or project to be approved in limited circumstances even though it would or may have an adverse effect on the integrity of a European site (see: Defra 2012).*

Figure 2.4: High level overview of seismic survey environmental requirements



Note 1: Operators must follow, JNCC (2010). Guidelines for minimising acoustic disturbance to marine mammals from seismic surveys.

Condition of consent that Seismic Survey Closeout Report completed (may include submission of Marine Mammal Observer and Passive Acoustic Monitoring reports)

3 Appropriate assessment process

3.1 Process

In carrying out this AA so as to determine whether it is possible to grant licences in accordance with Regulation 5(1) of *The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended), DECC has:

- Considered, on the basis of the precautionary principle, whether it could be concluded that the integrity of relevant European Sites would not be affected. This impact prediction involved a consideration of the cumulative and in-combination effects.

- Examined, in relation to elements of the plan where it was not possible to conclude that the integrity of relevant sites would not be affected, whether appropriate mitigation measures could be designed which negated or minimised any potential adverse effects identified.

- Drawn conclusions on whether or not it is possible to go ahead with the plan.

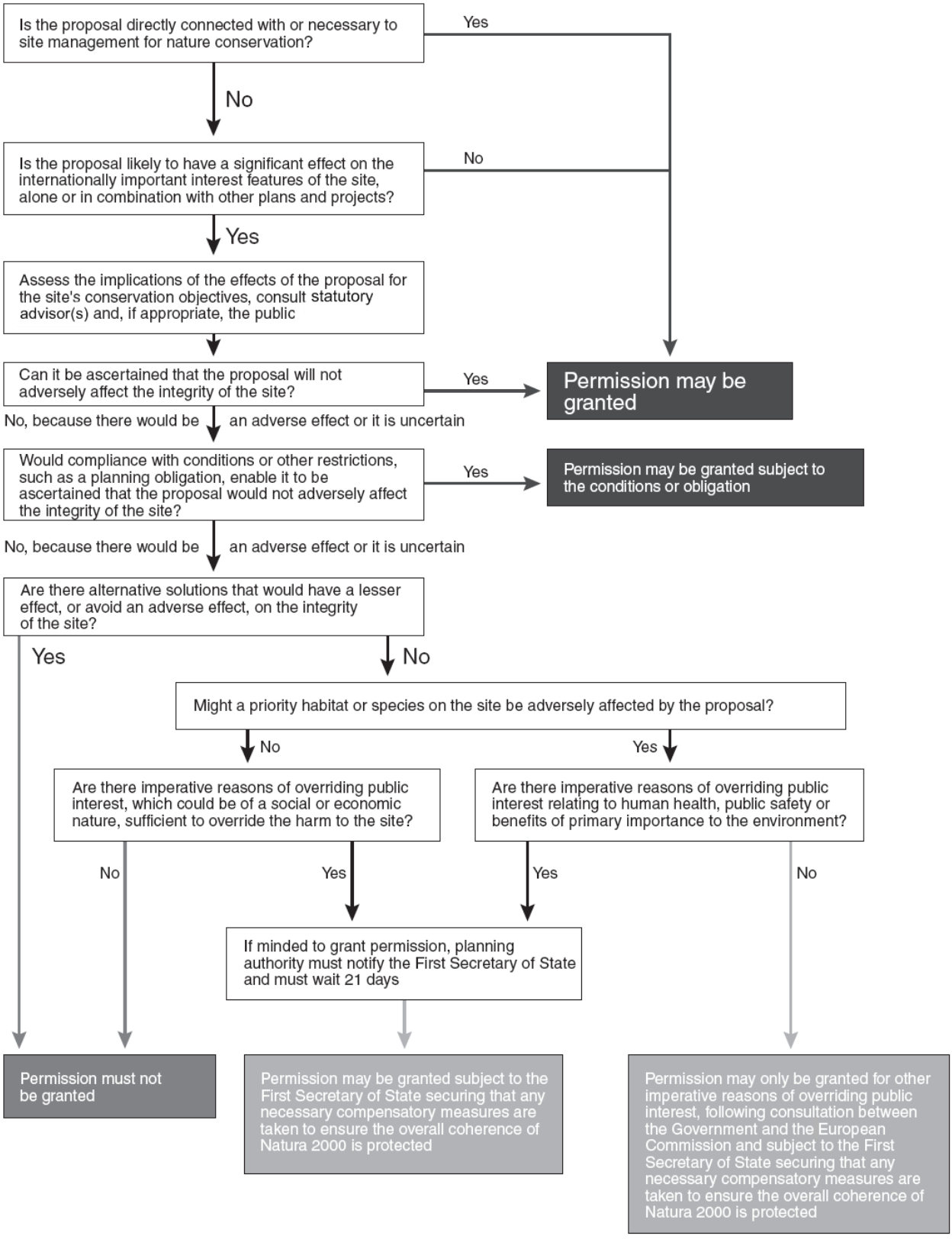
In considering the above, DECC used the clarification of the tests set out in the Habitats Directive in line with the ruling of the ECJ in the *Waddenzee* case (Case C-127/02), so that:

- Prior to the grant of any licence all activities which may be carried out following the grant of such a licence, and which by themselves or in combination with other activities can affect the site's conservation objectives, are identified in the light of the best scientific knowledge in the field.

- A licence can only be granted if DECC has made certain that the activities to be carried out under such a licence will not adversely affect the integrity of that site (i.e. cause deterioration to a qualifying habitat or habitat of qualifying species, and/or undermine the conservation objectives of any given site). That is the case where no reasonable scientific doubt remains as to the absence of such effects.

A flowchart summarising the process is shown in Figure 3.1.

Figure 3.1: Summary of procedures under the Habitats Directive for consideration of plans or projects affecting Natura 2000 sites



Note: 'First Secretary of State' in this case is the Secretary of State for DECC. 'Statutory advisor(s)' refers to the relevant statutory Government advisor(s) on nature conservation issues. Source: ODPM (2005).

3.2 Site integrity

The integrity of a site is defined by government policy, in the Commission's guidance and accepted by the courts (Cairngorms Judicial Review case) as being: '*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified/designated.*' This is consistent with the definitions of favourable conservation status in Article 1 of the Directive (JNCC 2002). As clarified by the European Commission (2000), the integrity of a site relates to the site's conservation objectives. These objectives are assigned at the time of designation to ensure that the site continues, in the long-term, to make an appropriate contribution to achieving favourable conservation status for the qualifying interest features. An adverse effect would be something that impacts the site features, either directly or indirectly, and results in disruption or harm to the ecological structure and functioning of the site and/or affects the ability of the site to meet its conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only with respect to habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3) of the Habitats Directive, provided that the coherence of the network is not affected. The AA must therefore conclude whether the proposed activity adversely affects the integrity of the site, in the light of its conservation objectives.

3.3 Assessment of effects on site integrity

The approach to ascertaining the absence or otherwise of adverse effects on the integrity of a relevant site is set out in Section 3.1 above. This assessment has been undertaken in accordance with the European Commission Guidance (EC 2000), and with reference to various other guidance and reports including the Habitats Regulations guidance notes (e.g. SEERAD 2000), Circular 06/2005 (ODPM 2005), and the Scottish Natural Heritage guidance (SNH 2015).

Appendix A lists and summarises the relevant sites as defined in Section 1.3. Appendix B then presents the results of a re-screening exercise of these sites to identify the potential for activities that could follow the licensing of the 19 Blocks in question to result in a likely significant effect. The DECC (2014) screening exercise considered generic exploration activity levels for each Block applied for (e.g. drilling and shooting seismic survey in every Block) in the 28th Round in advance of Block work programmes (Section 2.2) being confirmed. Appendix B presents a re-screening exercise in light of these work programmes. It should be noted that as work programme activity levels can only either be equal to or less than that used in the original screening process, the re-screening did not identify any additional sites to DECC (2014) for which likely significant effect should be considered. Where potential effects are identified in Appendix B, more detailed information on the relevant sites including their conservation objectives is provided in Appendix C.

For those sites where re-screening identified potential effects, detailed assessment is made in the following sections of the implications for the integrity of the relevant sites (in terms of their qualifying features, and the site's conservation objectives) were a licence (or licences) to be granted for the relevant Blocks. The assessment is based on the potential work programmes for the Blocks and likely hydrocarbon resources, along with the characteristics and specific environmental conditions of the relevant sites as described in Appendix C. As noted in Section 2.2, the proposed work programme is taken as the maximum of any application for the Blocks. Activities which may be carried out following the grant of a licence, and which by themselves or in combination with other activities can affect the conservation objectives of relevant sites are discussed under the following broad headings:

- Physical disturbance and drilling effects (Section 4)
- Underwater noise (Section 5)
- Accidental spills (Section 6)
- Cumulative and in-combination effects (Section 7)

Use has been made of advice prepared by the conservation agencies under the various Habitats Regulations, since this typically includes advice on operations that may cause deterioration or disturbance to relevant features or species. Advice given under Regulation 33[10] includes an activities/factors matrix derived from MarLIN (www.marlin.ac.uk) where applicable. Several of the "probable" effects highlighted in the MarLIN matrices are not inevitable consequences of oil and gas exploration and production, since through the regulatory Environmental Impact Assessment (EIA) and permitting processes they are mitigated by timing, siting (e.g. of rigs) or technology requirements (or a combination of one or more of these). There is a requirement that these options would also be evaluated in the environmental assessments necessary as part of activity consenting.

The conservation objectives for SAC and SPA features for sites where a likely significant effect has been identified are listed in Appendix C. These objectives and site conservation status have been considered during this AA. A site-specific consideration is made of the conservation objectives in relation to potential activities which may follow licensing of the Blocks.

[10] The Conservation (Natural Habitats, &c.) Regulations 1994.

4 Assessment of physical disturbance and drilling effects

4.1 Introduction

With respect to physical disturbance and drilling effects, the re-screening process (Appendix B) identified a number of sites where there was the potential for likely significant effects associated with proposed activities that could follow licensing of the West of Shetland Blocks (Figure 4.1). The potential effects are summarised below (Section 4.2), and considered against the conservation objectives of the relevant sites to determine whether they could adversely affect site integrity (Section 4.3).

4.2 Potential physical disturbance and drilling effects

4.2.1 Physical damage at the seabed

The main sources of physical disturbance of the seabed from oil and gas exploration and appraisal activities are:

- **Anchoring of semi-submersible rigs**. Semi-submersible rigs typically use between 8 and 12 anchors to hold position, the radius of which depends on the water depth, seabed conditions and anticipated metocean conditions. It was indicated in Environmental Statements (ESs) for developments in Blocks 206/8 (BP 2010) and 214/30 (Total 2014) that the area of seabed affected by the use of semi-submersible rigs, both using eight anchors, was 0.032km^2 and 0.11km^2 respectively, with the latter anchoring in comparatively deeper water (*ca*. 435m compared with *ca*. 140m), and therefore having a wider anchor spread and more anchor chain in contact with the seabed (catenary contact). The above ESs note that anchoring scars could persist in the short to medium term, with scars in Block 206/8 expected to recover within 5 years due to relatively strong seabed currents (0.6m/s). Water depths across the Blocks being considered in this AA are broadly comparable to these (150-500m depth), and a semi-submersible rig would typically be used to drill exploration wells. The extent of seabed disturbance is likely to be in the range described above. Those Blocks in or adjacent to the Wyville-Thomson Ridge (165/5, 166/2, 166/2, 175/29, 175/30, 176/26) have significantly greater water depths (*ca.* 780-1,000m), and dynamically positioned (DP) drill ships rather than anchored semi-submersible rigs could be used in these Blocks, though they are still within the working depth limits of some semi-submersible rigs.

- **Placement of jack-up rigs.** The water depths in the Blocks are considered too deep for a jack-up rig to be used.

- **Drilling of wells and wellhead removal**. The surface hole sections of exploration wells are typically drilled riserless, producing a localised (and transient) pile of surface-hole cuttings around the surface conductor. After installation of the surface casing (which will result in a small quantity of excess cement returns being deposited on the seabed), the

blowout preventer (BOP) is positioned on the wellhead housing. These operations (and associated activities such as ROV operations) may result in physical disturbance of the immediate vicinity (a few metres) of the wellhead. When an exploration well is abandoned, the conductor and casing are plugged with cement and cut below the mudline (sediment surface) using a mechanical cutting tool deployed from the rig and the wellhead assembly is removed. The seabed "footprint" of the well is therefore removed although post-well sediments may vary in the immediate vicinity of the well compared to the surrounding seabed (see for example, Jones *et al*. (2012)).

4.2.2 Drilling discharges

The extent and potential impact of drilling discharges have been reviewed by OESEA and OESEA2 (DECC 2009, 2011).

In contrast to historic oil based mud discharges[11], effects on seabed fauna of the discharge of cuttings drilled with water based muds (WBM) and of the excess and spent mud itself are usually subtle or undetectable, although the presence of drilling material at the seabed close to the drilling location (<500m) is often detectable chemically (see e.g. Daan & Mulder 1996). Modelling of WMB cutting discharges has indicated that deposition of material is generally thin and quickly reduces away from the well. Dispersion modelling of a WBM cuttings discharge of 3,160 tonnes of mud and cuttings from a well in Block 214/30a (water depth *ca.* 435m) predicted deposition in a 560m by 120m (0.85km^2) area. The thickest deposit of cuttings (203mm) was present at the discharge point, falling quickly to 5mm within *ca*. 50m of the well and then to 1mm or less over the remainder of the 0.85km^2 area. The model showed that majority of the WBM (the finer particles) remained suspended in the water column and did not settle in the vicinity (Total 2014). Jones *et al*. (2006, 2012) compared pre- and post-drilling ROV surveys of an exploration well in Block 206/1a in *ca*. 600m water depth and documented physical smothering effects within 100m of the well. Outside the area of smothering, fine sediment was visible on the seafloor up to at least 250m from the well. After 3 years, there was significant removal of cuttings particularly in the areas with relatively low initial deposition (Jones *et al.* 2012). The area impacted by complete cuttings cover had reduced from 90m to 40m from the drilling location, and faunal density within 100m of the well had increased considerably and was no longer significantly different from conditions further away.

OSPAR (2009) concluded that the discharge of drill cuttings and water-based fluids may cause some smothering in the near vicinity of the well location. Field experiments on the effects of water-based drill cuttings on benthos by Trannum *et al*. (2011) found after 6 months only minor differences in faunal composition between the controls and those treated with drill cuttings. This corresponds with the results of field studies where complete recovery was recorded within 1-2 years after deposition of water-based drill cuttings (Daan & Mulder 1996, Currie & Isaacs 2005).

The chemical formulation of WBM avoids or minimises the inclusion of toxic components, and the materials used in greatest quantities (barite and bentonite) are of negligible toxicity. The bulk of WBM constituents (by weight and volume) are on the OSPAR List of Substances/ Preparations Used and Discharged Offshore Which are Considered to Pose Little or No Risk to the Environment (PLONOR).

[11] OSPAR Decision 2000/3 on the Use of Organic-Phase Drilling Fluids (OPF) and the Discharge of OPF-Contaminated Cuttings came into effect in January 2001 and effectively eliminated the discharge of cuttings contaminated with oil based fluids (OBF) greater than 1% by weight on dry cuttings.

4.2.3 Other effects

Non-physical disturbance of seaduck and other waterbird flocks by vessel and aircraft traffic associated with hydrocarbon exploration and appraisal is possible, particularly in SPAs established for shy species (e.g. common scoter). Such disturbance can result in repeated disruption of bird feeding, loafing and roosting. For example, large flocks of common scoter were observed being put to flight at a distance of 2km from a 35m vessel, though smaller flocks were less sensitive and put to flight at a distance of 1km. Larger vessels would be expected to have an even greater disturbance distance (Kaiser *et al.* 2006). No SPAs with particularly sensitive seabirds are present in proximity to the West of Shetland Blocks. A number of Blocks overlap with the Seas off Foula dSPA (see Figure 4.1) although none of the potential qualifying features are particularly sensitive to disturbance by ship and helicopter traffic (Garthe and Hüppop 2004, Furness *et al*. 2013) and significant effects are not likely given the limited proposed drilling activities in the Blocks.

Since 2008, a number of dead seals (>76 animals) displaying corkscrew injuries (Bexton *et al*. 2012) have been found primarily on beaches in eastern Scotland, North Norfolk coast and Strangford Lough; the majority are adult harbour seals or juvenile grey seals (Thompson *et al*. 2010). In the first instance and in the absence of any evidence to suggest predation, concern focused on the potential for ship propellers to cause such injuries, especially as spiral lacerations consistent with those observed on carcasses were reproduced in scale model tests using ducted propulsion systems (Onoufriou & Thompson 2014); advice was produced by the statutory nature conservation bodies (SNCBs) to reflect this (SNCB 2012). In December 2014, 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 (Thompson *et al.* 2015). This follows observations in Germany of spiral-cut injuries inflicted by a male grey seal on young harbour seals (van Neer *et al.* 2015). Accordingly, the SNCBs' advice has been updated (SNCB 2015). 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.

4.3 Implications for site integrity of relevant sites

Table 4.1 below provides a consideration of potential physical and drilling impacts associated with the Block work programmes and the conservation objectives of relevant sites (identified by the re-screening process in Appendix B, see Figure 4.1).

Figure 4.1: Relevant sites and Blocks for physical disturbance and drilling effects

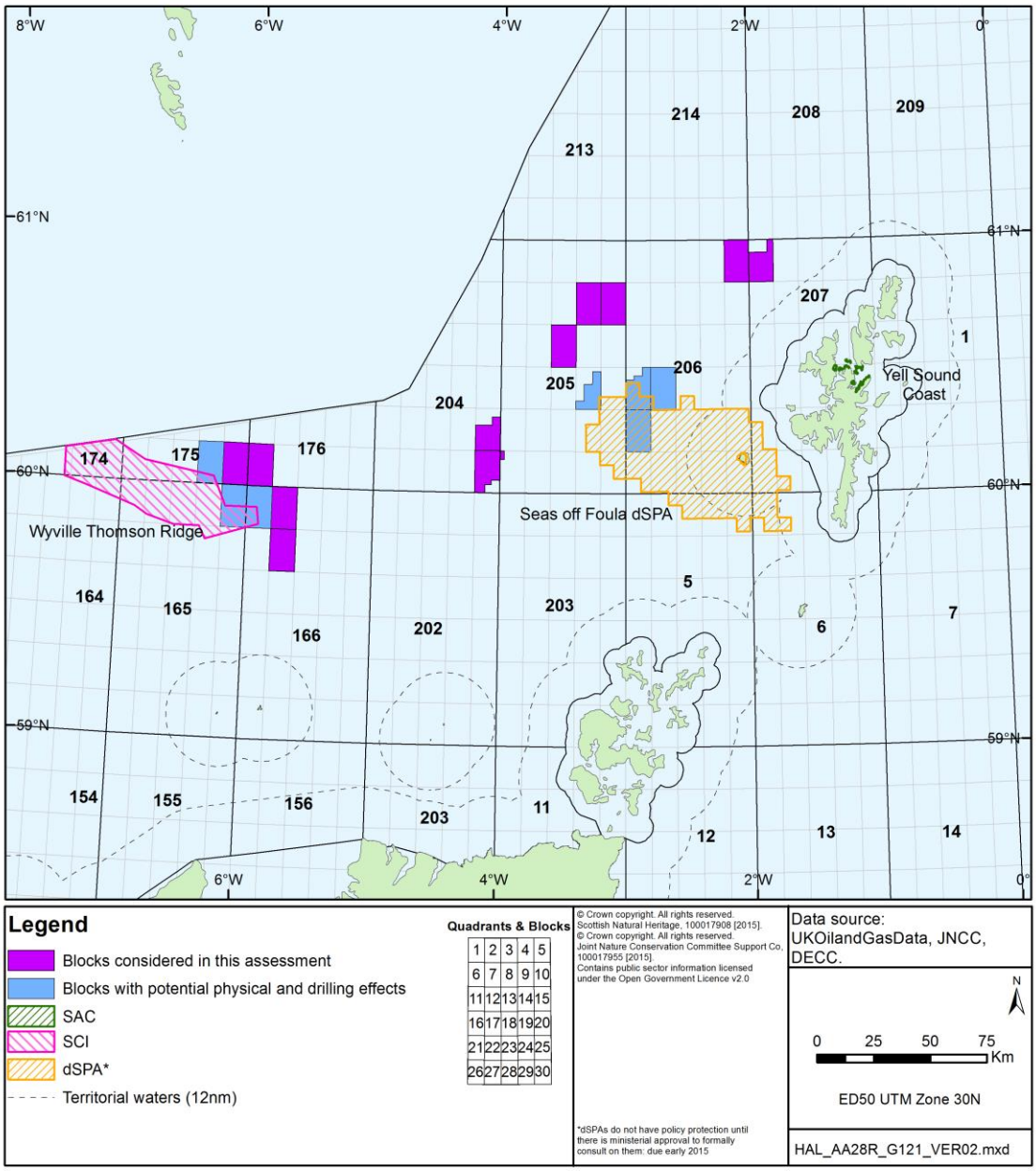


Table 4.1: Consideration of potential physical and drilling impacts and relevant site conservation objectives

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
SPAs		
Seas off Foula dSPA	Seabird aggregation including skua, fulmar, guillemot and puffin	**Conservation Objectives**: Conservation objectives will be drafted prior to formal consultation. The following consideration is based on the qualifying features for the draft site[12]. **Rig installation/placement** Blocks 205/19b, 206/16b, 206/17 and 206/21 partly overlap with the draft site boundary. Blocks are part of two licence applications with a drill or drop well proposed for 205/19b and a contingent well between the other 3 Blocks. Water depths over the Blocks are likely to be similar to those described for Block 206/8 (*ca*. 140m) and therefore the area of seabed affected by rig anchoring may be similar (*ca*. 0.032km^2, see Section 4.2.1). The potential physical damage to supporting habitats within the site is not likely to be significant given the relatively small and temporary seabed footprint of the rig and the large size of the dSPA. **Drilling discharges** Modelling of cuttings discharges in the area indicate that drilling discharges within the Blocks could result in seabed footprints which overlap with part of the site (see Section 4.2.2). Given the limited and temporary nature of these footprints due to the energetic nature of the region (see Section 4.2.2), the potential smothering of supporting habitats within the site is not likely to be significant.
Offshore SAC		
Wyville Thomson Ridge SCI	Reefs	**Conservation objectives:** Subject to natural change, restore the reef to favourable condition such that: • the natural environmental quality is restored; • the natural environmental processes are maintained; • the extent, physical structure, diversity and community structure and typical species representative of stony and bedrock reef within the Scottish continental shelf and Faroe-Shetland Channel are restored. **Rig installation/placement** Qualifying feature is highly sensitive to physical loss through removal and obstruction and physical damage through physical disturbance or abrasion (e.g. anchoring)[13]. In the water depths present over the Blocks partly within the site (*ca*. 800-900m – Blocks 165/5, 166/1, 175/29), the potential extent of seabed disturbance associated with installation of a semi-submersible rig is likely to be greater than the 0.11km^2 described for a rig location in 435m water depth, though DP drill ships could

[12] http://www.snh.gov.uk/docs/A1350044.pdf
[13] http://jncc.defra.gov.uk/pdf/WyvilleThomsonRidge_ConservationObjectives_AdviceonOperations%205.0.pdf

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		pose an alternative method of drilling (see Section 4.2.1). The likelihood and scale of impact will be determined by the proposed location of drilling activities, which are currently unknown, and additional mitigation measures may be required (see Section 4.4) to ensure site conservation objectives are not undermined. **Drilling discharges** Qualifying feature is moderately sensitive to smothering from drill cuttings. Discharge of drill cuttings and water-based fluids may cause smothering of habitats in the near vicinity of the well location. The impacts from such discharges are localised (see Section 4.2.2) and transient. The likelihood and scale of impact will be determined by the proposed location of drilling activities which are currently unknown and additional mitigation measures may be required (see Section 4.4) to ensure site conservation objectives are not undermined.

4.4 Mitigation

The routine sources of potential physical damage are assessed and controlled through a range of regulatory processes, such as EIA and the Drilling Operations Application (formerly PON15B) through the Portal Environmental Tracking System (PETS) and, where relevant, HRA to underpin those applications. Based on the results of the assessments including HRA, DECC may require additional mitigation measures to avoid or minimise significant adverse effects. Where this is not possible, DECC may refuse consent. Site surveys are required to be undertaken before drilling rig placement (for safety and environmental reasons). The results of such surveys allow for alteration of the location of activities (e.g. wellhead, jack-up rig and anchor positions) to ensure sensitive seabed surface or subsurface features are avoided. Such reports are used to underpin operator environmental submissions (e.g. Drilling Operations Applications, Environmental Statements) and survey information is made available to nature conservation bodies during the consultation phases of these assessments.

Drilling chemical use and discharge is subject to strict regulatory control. The use and discharge of chemicals must be risk assessed as part of permitting (e.g. Drilling Operations Application), and the discharge of chemicals which would be expected to have a significant negative impact would not be permitted.

With respect to non-physical disturbance of sensitive SPA qualifying features by activities which could arise from the proposed work programmes (e.g. rig/vessel presence and movement), available mitigation measures include strict use of existing shipping routes, timing controls on temporary activities to avoid sensitive periods. Risks to overall site integrity from these activities would be prevented by the existing legal framework for the respective activities (Figure 2.2), which includes HRA where necessary.

4.5 Conclusions

Likely significant effects identified with regards to physical effects on the seabed, marine discharges and other disturbance effects, when aligned with project level mitigation and relevant activity permitting, will not have an adverse effect on the integrity of the Natura 2000 sites considered in this assessment. There is a legal framework, via e.g. EIA regulations and those implementing the Habitats Directive, to ensure that there are no adverse effects on the integrity of Natura 2000 sites. These would be applied at the project level, at which point there will be sufficient definition to make an assessment of likely significant effects, and for applicants to propose project specific mitigation measures.

Taking into account the information presented above and in the Appendices, it is concluded that with mitigation, activities arising from the licensing of Blocks 165/5, 166/1, 166/2, 166/7, 175/29, 175/30, 176/26, 204/25c, 204/30b, 205/9, 205/10, 205/13, 205/19b, 205/26d, 206/5, 206/16b, 206/17, 206/21 and 207/1b, in so far as they may generate physical disturbance effects, will not cause an adverse effect on the integrity of relevant sites, though consent for activities will not be granted unless the operator can demonstrate that the proposed activities, which may include the drilling of a number of wells and any related activity including the placement of a mobile rig, will not have an adverse effect on the integrity of relevant sites.

5 Assessment of underwater noise effects

5.1 Introduction

With respect to underwater noise effects, the re-screening process (Appendix B) identified a number of sites where there was the potential for likely significant effects associated with proposed activities that could follow licensing of the West of Shetland Blocks (Figure 5.1). The potential effects are summarised below (Section 5.2), and considered against the conservation objectives of the relevant sites to determine whether they could adversely affect site integrity (Section 5.3).

5.2 Underwater noise effects

Potential effects of anthropogenic noise on receptor organisms range from acute trauma to subtle behavioural and indirect ecological effects, for example on prey species, complicating the assessment of significant effects. The sources, measurement, propagation, ecological effects and potential mitigation of noise associated with hydrocarbon exploration and production have been extensively reviewed and assessed in successive Offshore Energy SEAs (see DECC 2009, 2011).

5.2.1 Noise sources

Of those activities which could follow licensing, deep geological seismic survey (2D or 3D) is of primary concern for underwater noise effects:

- 2D seismic involves a survey vessel with a single source and a towed hydrophone streamer. The reflections from the subsurface strata provide an image in two dimensions (horizontal and vertical). Repeated parallel lines are typically run at intervals of several kilometres (minimum *ca*. 0.5km) and a second set of lines at right angles to the first to form a grid pattern. This allows imaging and interpretation of geological structures and identification of potential hydrocarbon reservoirs.

- 3D seismic survey is similar but uses more than one source and several hydrophone streamers towed by the survey vessel. Thus closely spaced 2D lines (typically between 25 and 50m apart) can be achieved by a single sail line. 3D survey airgun arrays are normally larger[14], commonly between 1,000 and 8,000 cubic inches, with typical broadband source levels of 248-259db re 1µPa.

Airgun noise is impulsive (i.e. non-continuous), with a typical duty cycle of 0.3% (i.e. one 25ms pulse every 10s) and slow rise time (in comparison to explosive noise). These characteristics complicate both the measurement of seismic noise "dose" and the assessment of biological effects (many of which have been studied in relation to continuous noise). Most of the energy produced by airguns is below 200Hz, although some high frequency noise may also be emitted (Goold 1996). Peak frequencies of seismic arrays are generally around 100Hz; source levels at

[14] OGP 2011 – An overview of marine seismic operations.

higher frequencies are low relative to that at the peak frequency but are still loud in absolute terms and relative to background levels.

Other noise sources associated with activities potentially resulting from licensing of the Blocks which are of a considerably lower magnitude include:

- Rig site surveys undertaken to identify seabed and subsurface hazards to drilling, such as wrecks and the presence of shallow gas. These use a range of techniques, including multibeam and side scan sonar, sub-bottom profiler, magnetometer and small airgun and shorter hydrophone streamer (with source sizes of 40-400 cubic inches[14]). The surveys typically cover 2-3km^2. The rig site survey vessel may also be used to characterise seabed habitats, biota and background contamination. Survey durations are usually of the order of four or five days.

- Vertical Seismic Profiling (VSP) sometimes conducted to assist with well evaluation by linking rock strata encountered in drilling to seismic survey data. A seismic source (airgun array, typically with a source size of up to ~500 cubic inches[14]) is deployed from the rig, and measurements are made using a series of geophones deployed inside the wellbore. VSP surveys are of short duration (one or two days at most).

The potential for significant effect is largely related to the anticipated type, extent and duration of seismic survey associated with proposed licensing.

5.2.2 Noise receptors and effects thresholds

This assessment only considers Annex II species for the purposes of Article 6(3) of the Habitats Directive (see Section 3.2) in so far as activities could undermine conservation objectives and result in adverse effects on site integrity, for instance by threatening the long-term viability of populations. Disturbance of European Protected Species (EPS) (i.e. those listed in Annex IV) is a separate consideration under Article 12 of the Habitats Directive, and is not considered in this assessment.

Marine mammals are regarded as the most sensitive to acoustic disturbance. This is due to their use of acoustics for echolocation and vocal communication and their possession of lungs which are sensitive to rapid pressure changes. Most concern in relation to seismic noise disturbance has been related to cetacean species. However, some pinnipeds are known to vocalise at low frequencies (100-300Hz) (Richardson *et al*. 1995), suggesting that they have good low frequency hearing and are therefore sensitive to acoustic disturbance.

Precautionary noise exposure criteria were developed by Southall *et al*. (2007) after a thorough review of best available science on marine mammal hearing. Injury criteria were defined as received levels of sound that corresponded to the estimated onset of permanent shift in hearing threshold or PTS. A dual-criterion approach based on both pressure[15] and energy[16] (whichever is exceeded first) was proposed. To incorporate consideration of differences between species in hearing bandwidth, the authors divided marine mammals into low, mid, high frequency

[15] pressure measurements are based on peak sound pressure levels or SPL expressed as dB re 1 µPa (peak)(flat)
[16] energy measurements are based on sound exposure level or SEL expressed as dB re 1 µPa^{2}s

cetaceans and pinnipeds and criteria were identified for each[17]. Based on these criteria, indicative spatial ranges of injury can then be estimated from sound propagation modelling. Sound from seismic surveys is commonly estimated to drop below threshold criteria for marine mammal injury (PTS) within the first 200m from the source (e.g. 22-130m in Kongsberg 2010); this is also reflected in the mitigation guidelines (JNCC 2010) with the requirement for a Marine Mammal Observers to make a visual assessment within 500 metres of the centre of the airgun.

Broadly applicable behavioural response criteria based on exposure alone have been much more difficult to extrapolate, mainly because behavioural responses are often found to be affected by individual history and by exposure context. For single pulses, Southall *et al*. (2007) assumed that significant behavioural disturbance could occur if noise exposure was sufficient to elicit a measurable transient effect on hearing or temporary threshold shift (TTS) onset. For multiple pulses (e.g. seismic survey), the expectation was that behaviour might be affected below TTS onset but given the high variability observed, no threshold could be identified. Instead, they ranked behaviour along a behavioural response severity scale and recommended its use to interpret actual observed behavioural responses[18].

Many species of fish are highly sensitive to sound and vibration (review in MMS 2004). Exposure to high sound pressure levels has been shown to cause long-term (>2 months) damage to sensory cells in fish ears (Hastings *et al*. 1996, McCauley *et al*. 2003). Other reported effects include threshold shifts (hearing loss), stress responses and other behaviour alterations (review in Popper *et al*. 2003). A number of field studies have observed displacement of fish and reduced catch rates, suggested to be attributable to behavioural responses to seismic exploration (e.g. Skalski *et al*. 1992, Engås *et al*. 1996, Hassel *et al*. 2004, Slotte *et al*. 2004). Atlantic salmon *Salmo salar* have been shown through physiological studies to respond to low frequency sounds (below 380Hz), with best hearing at 160Hz (threshold 95 dB re 1 µPa). Hence, their ability to respond to sound pressure is regarded as relatively poor with a narrow frequency span, a limited ability to discriminate between sounds, and a low overall sensitivity (Hawkins & Johnstone 1978, cited by Gill & Bartlett 2010).

Direct effects from seismic exploration noise on seabirds could occur through physical damage, or through disturbance of normal behaviour. Diving seabirds (e.g. auks) may be most at risk of acute trauma. The physical vulnerability of seabirds to sound pressure is unknown, although McCauley (1994) inferred from vocalisation ranges that the threshold of perception for low frequency seismic in some species (e.g. penguins, considered as a possible proxy for auk species) would be high, hence only at short ranges would individuals be adversely affected. Mortality of seabirds has not been observed during extensive seismic operations in the North Sea and elsewhere. A study investigated seabird abundance in Hudson Strait (Atlantic seaboard of Canada) during seismic surveys over three years (Stemp 1985). Comparing periods of shooting and non-shooting, no significant difference was observed in abundance of fulmar, kittiwake and thick-billed murre (Brünnich's guillemot).

[17] More recent studies on harbour porpoises (Lucke *et al*. 2009, Kastelein *et al*. 2012) have provided new evidence to suggest that this species and by extrapolation the high-frequency category, may have the lowest threshold for injury.

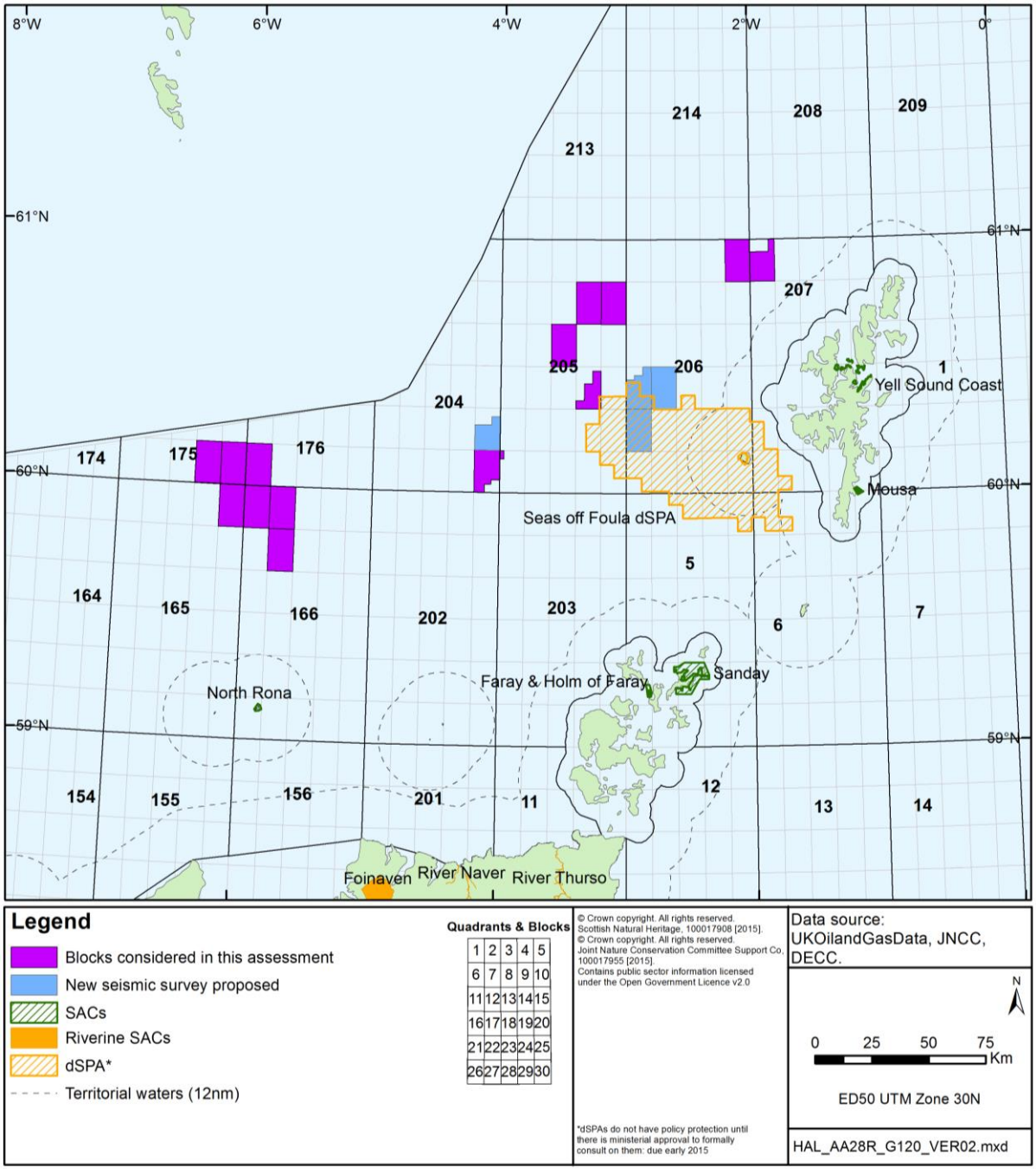
[18] In the UK, such an approach has been adopted in the guidance on the protection of marine European Protected Species (EPS) (JNCC 2010) where disturbance is interpreted as sustained or chronic disruption of behaviour scoring 5 or more.

5.3 Implications for site integrity of relevant sites

5.3.1 Special Areas of Conservation for marine mammals

Appendix B indicated that there was potential for likely significant effects from underwater noise associated with proposed seismic activities in Blocks 204/25c, 206/16b, 206/17 and 206/21 (the only Blocks where new 3D seismic is proposed) on seal qualifying features foraging outside of designated sites. Relevant SACs for grey seal (Faray and Holm of Faray SAC (*ca*. 100km from Block 206/21) and North Rona SAC (*ca*. 150km from Block 204/25c – both favourable maintained) and harbour seal (Yell Sound Coast SAC (*ca*. 80km from Block 206/17), Mousa SAC and Sanday SAC (*ca*. 100 and 95km respectively from Block 206/21 – all unfavourable recovering) are highlighted on Figure 5.1. A consideration of the potential implications for site integrity of relevant sites is provided below.

Figure 5.1: Relevant sites and Block for underwater noise effects



Seal tracking provides information on the foraging movements of both harbour (e.g. as reported in Sharples *et al*. 2005, 2008, 2012) and grey seals (e.g. Matthiopoulos *et al.* 2004, SCOS 2012, SMRU 2011) in the region. The harbour seal studies indicate high site fidelity to haul-out sites, but ranging over substantial distances at sea. A total of 30 harbour seals were tagged in Orkney and Shetland between October 2003 and March 2004, and of those, 15 harbour seals (7 females, 8 males) were captured in Yell Sound in the north and on the southeast coast of Shetland. Animals captured in the north remained largely within the confines of Yell Sound with some further ranging movements, primarily in and around northern Shetland. Three of the animals tracked made trips of more than 100km from haul-outs. Animals tagged in the southeast of Shetland made repeated trips within 50km from the haul-out, primarily to the south and east of Shetland (Sharples *et al.* 2008). Harbour seals forage widely around Orkney, with the greatest densities of animals observed in waters around the northern islands and in several discrete areas to the east (Sharples *et al*. 2008). Of the 15 seals tagged in Orkney, foraging was largely contained within 30-40km from haul-out sites, though one female repeatedly travelled between Orkney and Shetland, covering a distance of 220km in each direction, and one male travelled between Orkney and the mainland, a distance of 75km, hauling out at both locations (Sharples *et al.* 2008, 2012).

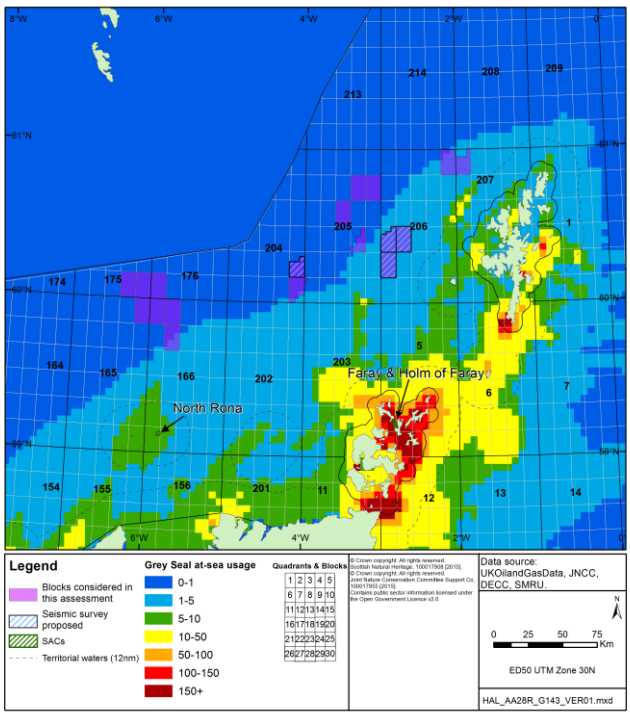
Models of marine usage show seal activity throughout most shelf seas of the area considered in this AA, with greatest activity around Orkney, Shetland, North Rona, the north mainland and west and south of the Outer Hebrides; activity in these areas represents some of the highest in UK waters (Matthiopoulos *et al.* 2004, SMRU 2011). Over 90% of the UK population of grey seals (see Lonergan *et al.* 2011 for UK estimates) breeds in Scotland, with Orkney having a notable colony (Faray and Holm of Faray SAC). A tagging study of 17 post-breeding female grey seals from North Rona SAC in 2003 indicated rapid dispersal from the site, with most seals travelling to the east and hauling out at Sule Skerry, though tracks also reached the Outer Hebrides, Orkney, Shetland and the Scottish mainland (see SMRU 2011).

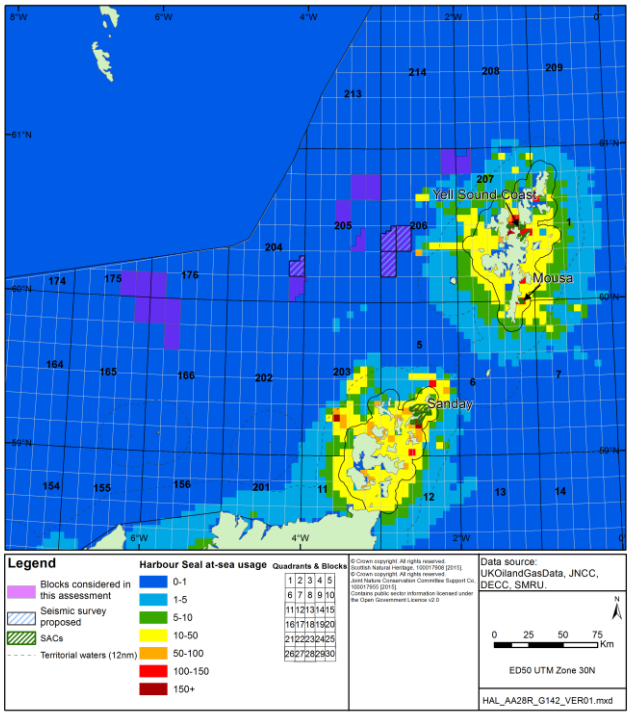
Maps showing the at-sea distribution of grey and harbour seals around the UK have been produced (Marine Scotland website[19]). The density maps (Figure 5.2) indicate that the West of Shetland area is of importance for seals. For both species, coastal waters close to haul out sites on Shetland and Orkney support moderate to very high densities of seals. The Blocks where seismic survey is proposed coincide with areas of low seal usage. A degree of caution must be used when interpreting the seal density data as it is based on limited telemetry data covering the period 1991-2011 (grey seal) and 1991-2012 (harbour seal).

[19] http://www.scotland.gov.uk/Topics/marine/science/MSInteractive/Themes/seal-density

Figure 5.2: Estimated at-sea usage by seals in the West of Shetland area

a) Grey seals **b) Harbour seals**





With respect to the seal qualifying features, if significant ecological effects on prey species were to occur, even at considerable distances from designated sites, these could influence the population of the qualifying feature. However, noise levels suggested to cause injury to fish (a primary prey species) would not extend beyond a few tens of metres around the noise source. The range over which non-injurious disturbance effects on fish might occur is not possible to define, although available evidence suggests that the extent of any such disturbance of prey species is highly unlikely to undermine the conservation objectives in relation to sites for grey or harbour seals.

DECC will expect the operator to provide sufficient information on the potential impact of the proposed activity on relevant sites and their qualifying features in their application for 3D seismic survey operations in Blocks 204/25c, 206/16b, 206/17 and 206/21. DECC may undertake an HRA to determine whether the proposals will have an adverse impact on the site integrity that would undermine the site conservation objectives. Depending on the outcome of the assessment DECC may require additional mitigation measures or where this is not possible, refuse consent.

Noise levels associated with other activities potentially resulting from licensing of the Blocks such as rig site survey, VSP, drilling and vessel movements, are of a considerably lower magnitude (see Section 5.2.1) than those resulting from a deep geological seismic survey, and are not expected to have an adverse effect on the integrity of the sites.

5.3.2 Special Areas of Conservation for migratory fish

The potential for underwater noise effects was identified for a number of riverine SAC sites: Foinaven SAC (freshwater pearl mussel - unfavourable recovering), River Borgie SAC (freshwater pearl mussel - unfavourable declining, Atlantic salmon - unfavourable recovering),

River Naver SAC (freshwater pearl mussel - unfavourable no change, Atlantic salmon - unfavourable recovering), and River Thurso (Atlantic salmon - unfavourable recovering) (see Figure 5.1). Salmonids play a critical role in the life cycle of the freshwater pearl mussel *Margaritifera margaritifera*. Any potential impacts on viability of the Atlantic salmon population, its distribution or supporting habitats, should also be considered in the context of the freshwater pearl mussel.

Atlantic salmon leave rivers to enter the marine environment during spring-summer as smolts, before migrating to feeding areas in Nordic Seas and West Greenland (Malcolm *et al.* 2010). Following 1-3 years at sea, adult salmon return to their home rivers primarily during summer months. Due to their low densities in the West of Shetland area and the highly localised range of noise levels likely to cause injury to fish, the potential for acoustic disturbance effects is restricted to disruption to their migration from, and to, the designated rivers. The most sensitive period for Atlantic salmon is likely to be during the peak smolt run (spring-summer), rather than when adult salmon are returning to rivers. This is because Atlantic salmon return to natal rivers throughout the year, whereas the smolt run is more seasonally defined.

Seismic survey is proposed for Blocks 204/25c, 206/16b, 206/17 and 206/21 which are a considerable distance (over 170km) from any of the SACs designated for migratory fish. Seismic survey activities are therefore not expected to have an adverse effect on the integrity of the riverine SACs.

Noise levels associated with other activities potentially resulting from licensing of the Blocks such as rig site survey, VSP, drilling and vessel movements, are of a considerably lower magnitude than those resulting from a deep geological seismic survey, and are not expected to adversely affect site integrity.

5.3.3 Special Protection Areas

Re-screening of relevant SPAs in light of the proposed work programmes for the Blocks (Appendix B) indicated the potential for likely significant effects with respect to underwater noise for the Seas off Foula dSPA.

Detailed information on the Seas off Foula dSPA including conservation objectives is not yet available. Of the qualifying features (great skua, fulmar, Arctic skua, guillemot and puffin), guillemot and puffin are perhaps the most sensitive to underwater noise resulting from seismic survey given deep diving foraging methods. From Section 5.2.2, there is very little information on the potential impact of seismic survey on seabirds. Stemp (1985) observed no significant difference in the abundance of fulmar, kittiwake and thick-billed murre (Brünnich's guillemot) when comparing periods of shooting and non-shooting during seismic surveys in Hudson Strait. McCauley (1994) inferred that only at short ranges could individuals be adversely affected. The dSPA covers offshore aggregations of the qualifying features and overlaps with a number of Blocks (206/16b, 206/17 and 206/21) where seismic survey is proposed. The likelihood and scale of potential impact will be determined by the proposed location and timing of activities and mitigation measures (see Section 5.4) may be required to ensure site conservation objectives are not undermined (although not applicable until site confirmed for progression by Scottish Ministers and undergoes formal consultation, probably in 2015).

5.4 Regulation and mitigation

Both planning and operational controls cover underwater noise resulting from activities on the UKCS, specifically including geophysical surveying. An application for a Geological Survey, which is supported by an Environmental Impact Assessment, is made through DECC's Portal

Environmental Tracking System (PETS) using a standalone Master Application Template (MAT) and Geological Survey Subsidiary Application Template (SAT) (see Figure 2.3). Consultations with Government Departments and other interested parties are conducted as standard prior to issuing consent, and JNCC and Marine Scotland (MS) may request additional risk assessment, specify timing or other constraints, or advise against consent. Any proposed activity with a potentially significant acoustic impact on a designated SAC or SPA would also be subject to the requirement for HRA.

It is a condition of consents issued under Regulation 4 of the *Petroleum Activities (Conservation of Habitats) Regulations 2001* (& 2007 Amendments) for oil and gas related seismic surveys that the JNCC Seismic Guidelines are followed. European Protected Species (EPS) disturbance licences can also be issued under the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended).

The guidelines require visual monitoring of the area by a Marine Mammal Observer (MMO) prior to seismic survey being undertaken to determine if cetaceans are in the vicinity, and a slow and progressive build-up of sound to enable animals to move away from the source. Passive Acoustic Monitoring (PAM) may also be required. Seismic operators are required, as part of the application process, to justify that their proposed activity is not likely to cause a disturbance etc. under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended) and *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended). This assessment should consider all operational activities including shooting during hours of darkness or in poor visibility.

In their latest guidelines, JNCC (2010) advise that operators adopt mitigation measures which are appropriate to minimise the risk of an injury or disturbance offence[20] and stipulate, whenever possible, the implementation of several best practice measures, including:

- If marine mammals are likely to be in the area, only commence seismic activities during the hours of daylight when visual mitigation using Marine Mammal Observers (MMOs) is possible.

- Only commence seismic activities during the hours of darkness, or low visibility, or during periods when the sea state is not conducive to visual mitigation, if a Passive Acoustic Monitoring (PAM) system is in use to detect marine mammals likely to be in the area, noting the limitations of available PAM technology (seismic surveys that commence during periods of darkness, or low visibility, or during periods when the observation conditions are not conducive to visual mitigation, could pose a risk of committing an injury offence) – the use of PAM as a mitigation tool will be required where JNCC and other SNCBs deem it appropriate.

- Plan surveys so that the timing will reduce the likelihood of encounters with marine mammals. For example, this might be an important consideration in certain areas/times, e.g. during seal pupping periods near SACs for harbour seals or grey seals.

- Provide trained MMOs to implement the JNCC guidelines.

[20] Defined under Regulation 39 1(a) and 1(b) (respectively) of the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended).

- Use the lowest practicable power levels to achieve the geophysical objectives of the survey.

- Seek methods to reduce and/or baffle unnecessary high frequency noise produced by the airguns (this would also be relevant for other acoustic energy sources).

Like any offshore activity, seismic surveys are considered on a case-by-case basis, and DECC have the discretion to issue consents with conditions specific to activity taking place and the sensitivities within the area. In addition to the above measures, JNCC provide more specific advice for areas of high importance for marine mammals such as the West of Scotland, these include.

- The MMO should not have a dual role (e.g. Fisheries liaison), be experienced as a marine mammal observer and therefore be familiar with the JNCC guidelines.

- A proven (previously used successfully) PAM system should be used, operated by an experienced user.

- Consideration should be given as to whether one MMO and one PAM operative are adequate for the specifics of the survey.

- JNCC will advise that two MMOs should be used when daylight hours exceed approximately 12 hours per day (Between 1st April and 1st October north of 57° latitude), or the survey is in an area considered particularly important for marine mammals.

In addition to marine mammal sensitivities, disturbance to populations of Atlantic salmon and other qualifying anadromous species can be mitigated through timing of seismic survey to avoid migratory periods and consequently significant disturbance can be avoided. In particular JNCC[21] highlighted the sensitive post-smolt migration period for Atlantic salmon between April and May, and that mitigation, including a presumption against seismic survey at this time, is considered.

5.5 Conclusions

Significant effects arising from underwater noise were only considered possible for SPAs with deep-diving seabirds and SACs with marine mammals and fish as qualifying features. Although seismic survey, drilling and other oil industry noise is detectable by marine mammals, waterbirds and their prey, there is no evidence that such noise presents a risk to the viability of populations in UK waters and specifically not within designated Natura 2000 sites (see Defra 2010). An adverse effect on site integrity would require disturbance to the qualifying species and/or the distribution and viability of the population of the site which may arise from direct mortality, behavioural response with implications for reproductive success (e.g. disturbance at fixed breeding locations) or reduced long-term ecological viability (e.g. sustained displacement from foraging grounds). In the localised areas of Natura 2000 sites designated for marine mammals (and where marine mammals utilise space outside such sites), acoustic disturbance from seismic survey activity resulting from proposed licensing would be intermittent and there is no evidence that cumulative effects of previous survey effort have been adverse. Despite

[21] JNCC's response to the 26th and 27th Seaward licensing Round.

considerable scientific effort, no causal link, or reasonable concern in relation to population viability has been found.

Bearing in mind the information presented above and in the Appendices, it is concluded at the currently available level of definition, the proposed licensing of the Blocks would not be expected to cause an adverse effect on the integrity of the relevant sites by undermining the conservation objectives relating to any specific qualifying feature, taking account of the following:

- Should it be proposed that 3D seismic surveys be undertaken in Blocks 204/25c, 206/16b, 206/17 and 206/21 (as indicated by the work programmes), further HRA may be required to assess the potential for adverse effects on the integrity of sites once the area of survey, source size, timing and proposed mitigation measures are known and can form the basis for a definitive assessment.

- The utilisation of areas outside the designated SAC boundaries is not well understood, but the known extensive range of seals, and available population monitoring indicates that neither previous activities, nor those associated with proposed licensing will undermine the conservation objectives for qualifying species.

- Individual activities (e.g. drilling, seismic) require individual consents which will not be granted unless the operator can demonstrate that the proposed activities which may include 3D seismic surveys, will not adversely affect the site integrity of relevant sites. These activities will be subject to activity level EIA and HRA (where appropriate).

6 Assessment of accidental spill effects

6.1 Introduction

With respect to accidental spill effects, the re-screening process (Appendix B) identified a number of sites where there was the potential for likely significant effects associated with proposed activities that could follow licensing of the Blocks (Figure 6.2). The potential effects are summarised below (Section 6.2), and considered against the conservation objectives of the relevant sites to determine whether they could adversely affect site integrity (Section 6.3).

Oil spills can have potentially adverse environmental effects, and are accordingly controlled by a legal framework aimed at minimising their occurrence, providing for contingency planning, response and clean up, and which enables prosecutions. It is not credible to conclude that an oil spill could not occur as a result of 28th Round licensing, in spite of the regulatory controls and other preventative measures in place.

The potential for oil spills associated with exploration and production, the consequences of accidental spillages, and the prevention, mitigation and response measures implemented have been assessed and reviewed in successive SEAs covering the UKCS area under consideration in the 28th Round, including the Offshore Energy SEA2 (DECC 2011a)[22]. Previous SEAs have concluded that given the UK regulatory framework and available mitigation and response, in relation to objective risk criteria (such as existing exposure to risk as a result of shipping), the incremental risk associated with exploration and production (E&P) is moderate or low.

The following section provides a high-level overview of risks, regulation, contingency planning and response capabilities; followed by an assessment of risks presented to relevant sites (Section 6.3) by activities likely to result from the proposed licensing of the 19 West of Shetland Blocks in the 28th Round.

6.2 Spill risk and potential ecological effects

Risk assessment, under the terms of OPRC, includes considerations of probability and consequence, generally comprising an evaluation of: historical spill scenarios and frequency, fate of spilled oil, trajectory of any surface slick, and potential ecological effects. These considerations are discussed below.

6.2.1 Historical spill frequency

Oil spills on the UKCS have been subject to statutory reporting since 1974 under PON1 (formerly under CSON7); annual summaries of which were initially published in the “Brown Book” series, now superseded by on-line data available from the DECC website. Discharges,

[22] Note that a large number of site- and activity-specific risk assessments have also been carried out as a component of Environmental Assessments and under the relevant legislation implementing the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) (see the *Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998*).

spills and emissions data from offshore installations are also reported by OSPAR (e.g. OSPAR 2009). DECC data indicates that the most frequent types of spill from mobile drilling rigs have been organic phase drilling fluids (and base oil), diesel and crude oil. Topsides couplings, valves and tank overflows; and infield flowlines and risers are the most frequent sources of spills from production operations, with most spills being <1 tonne.

Since the mid-1990s, the reported number of spills has increased consistent with more rigorous reporting of very minor incidents (e.g. the smallest reported spill in 2013 was 0.000001 tonnes). However, the underlying trend in spill quantity (excluding specifically-identified large spills) suggests a consistent annual average of around 100 tonnes. In comparison, oil discharged with produced water from the UKCS in 2013 totalled 2,177 tonnes (DECC website[23]).

An annual review of reported oil and chemical spills in the UKCS is made on behalf of the Maritime and Coastguard Agency (MCA) by the Advisory Committee on Protection of the Sea (e.g. Dixon 2013). This includes all spills reported by POLREP reports[24] by the MCA and PON1 reports to DECC – the latter are published monthly on the DECC website[25]. In 2012 a total of 246 releases were attributed to oil and gas installations operating in the open sea. The 2012 annual total was the lowest recorded since 2004 and 33 fewer than the mean annual total of 279 releases reported between 2000 and 2011. Analysis of oil types showed that 37% of reported releases were lubrication and hydraulic oils, followed by fuel oils at 24% and crude oils at 17%. The corresponding statistics from the 2011 survey were 32%, 33% and 23% respectively. The majority of spills were small, with some 94% of releases being less than 455 litres (100 gallons).

Well control incidents (i.e. “blowouts” involving uncontrolled flow of fluids from a wellbore or wellhead) have been too infrequent on the UKCS for a meaningful analysis of frequency based on UK data. A review of blowout frequencies cited in UKCS Environmental Statements as part of the OESEA2 gives occurrence values in the range 1/1,000-10,000 well-years. Analysis of the SINTEF Offshore Blowout Database which is based on blowout data from the US Gulf of Mexico, UKCS and Norwegian waters for period 1980 to 2005, provided blowout frequencies (per drilled well) for exploration drilling of normal oil[26] ($2.5x10^{-4}$) and gas[27] wells ($3.6x10^{-4}$), as well as deep high pressure high temperature[28] oil ($1.5x10^{-3}$) and gas ($2.2x10^{-3}$) wells (OGP 2010). Accident statistics for offshore units on the UKCS estimated an annual average frequency of blowouts[29] for mobile drilling units of $6.6x10^{-3}$ per unit year for the period between 2000 and 2007 (based on analysis of a total of 455 unit years, Oil and Gas UK 2009).

6.2.2 Trajectory and fate of spilled oil

The main oil weathering processes following a surface oil spill are spreading, evaporation, dispersion, emulsification, dissolution, oxidation, sedimentation and biodegradation. The anticipated reservoir hydrocarbon type in the West of Shetland Blocks is primarily oil but

[23] https://www.gov.uk/oil-and-gas-uk-field-data#oil-discharged-with-produced-water
[24] POLREP (pollution reports) relate to those issued in accordance with the Bonn Agreement, to alert Contracting Parties to relevant pollution events.
[25] https://www.gov.uk/oil-and-gas-environmental-data
[26] A well where the formation has an estimated gas/oil ratio less than 1,000.
[27] A well where the formation has an estimated gas/oil ratio exceeding 1,000.
[28] A well with an expected shut-in pressure equal to or above 690 bar (10,000psi) and/or bottom hole temperatures equal to or above 150°C.
[29] An uncontrolled flow of gas, oil or other fluids from the reservoir, i.e. loss of 1.barrier (i.e. hydrostatic head) or leak and loss of 2. barrier, i.e. BOP/ Down Hole Safety Valve (DHSV).

condensate or gas may also be found. Therefore the potential risk of crude oil spills has been considered. The persistence of spilled crude oil depends on the characteristics of the oil, but typically is of the order of days to weeks. Diesel spills generally evaporate and disperse without the need for intervention. A major diesel spill of *ca.* 1,000 tonnes (i.e. the typical inventory of a drilling rig) would disperse naturally in about 8 hours and travel some 24km in conditions of a constant unidirectional 30 knot wind[30].

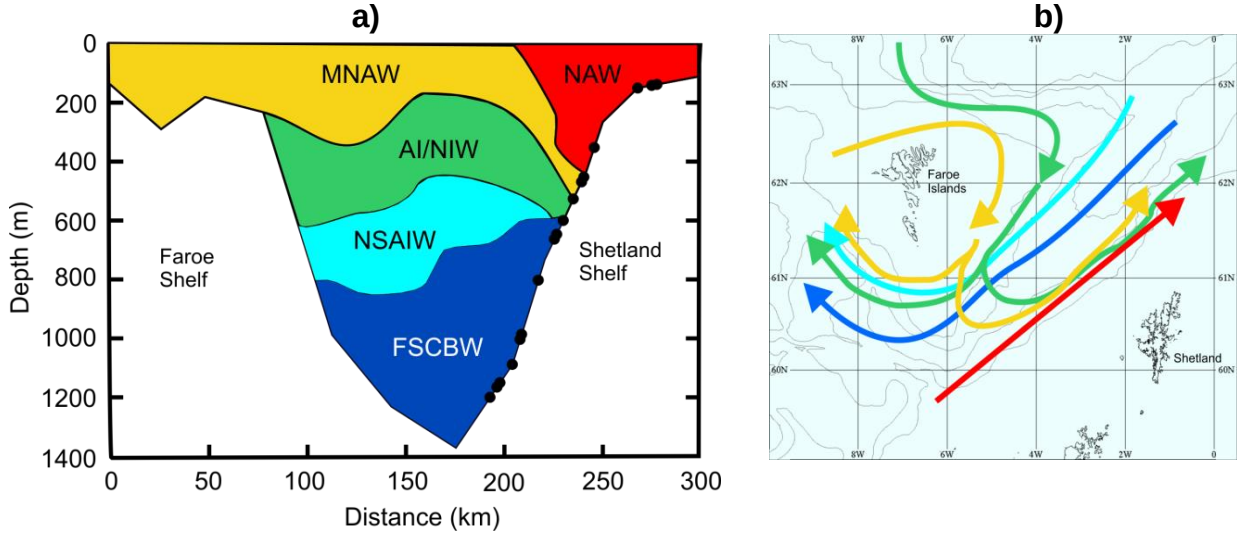
Coincident with these weathering processes, surface and dispersed oil will be transported as a result of tidal (and other) currents, wind and wave action. The Blocks under consideration are on the edge of the shelf of the Faroe-Shetland Channel, in the strong northeast flowing branch of Atlantic Water Inflow into the Nordic Seas (Figure 6.1b). Generally, any oil slick front will be wind-driven on a vector equivalent to current velocity plus approximately 3% of wind velocity. Although strong winds can come from any direction and in any season, the predominant winds are from the south and southwest which for the West of Shetland Blocks would push spilled oil towards the northern islands of Shetland and the open Norwegian Sea.

Along the western coasts of Shetland and Orkney, the combination of exposure to prevailing winds and deep, open offshore waters produces a high energy wave regime (annual mean significant wave height of 2.7m, ranging from a summer mean of 1.8m to a winter mean of 3.75m) (BERR 2008). Waves and turbulence at the sea surface can cause all or part of a slick to break up into fragments and droplets of varying sizes. These become mixed into the upper levels of the water column. Some of the smaller droplets will remain suspended in the sea water while the larger ones will tend to rise back to the surface, where they may either coalesce with other droplets to reform a slick or spread out to form a very thin film. The oil that remains suspended in the water has a greater surface area than before dispersion occurred. This encourages other natural processes such as dissolution, biodegradation and sedimentation to occur. The speed at which an oil disperses is largely dependent upon the nature of the oil and the sea state, and occurs most quickly if the oil is light and of low viscosity and if the sea is very rough (ITOPF website[31]).

The West of Shetland area is dominated by complex hydrography and bathymetry, making it a very dynamic environment. The UK sea area to the west of Shetland can be divided into the continental shelf (0-200m water depth), the continental slope (200 to 1,000m water depth) and the Faroe-Shetland Channel (>1,000m water depth). Within the continental slope and Faroe-Shetland Channel a number of different water masses occupy different depths of the water column (Figure 6.1a), with intermediate to shallow depth currents predominantly flowing in a north-east direction and deeper currents flowing to the south-west (Figure 6.1b, see SEA 4 for further details).

[30] Current OPEP Guidance (DECC 2012) indicates that trajectory modelling must be carried out using a 30 knot onshore wind to determine the potential timing of beaching for hydrocarbon releases. Separate (stochastic) modelling is required to determine possible beaching probabilities and locations.
[31] International Tanker Owners Pollution Federation (ITOPF) website http://www.itopf.com/marine-spills/fate/weathering-process/

Figure 6.1: Water masses and ocean current circulation in the Faroe-Shetland Channel



Notes: a) Black circles represent sites with oil spill modelling results shown in Table 6.1. NAW = North Atlantic Water; MNAW = Modified North Atlantic Water; AI/NIW = Atlantic Intermediate/North Icelandic Water; NSAIW = Norwegian Sea Arctic Intermediate Water; FSCBW = Faroe-Shetland Channel Bottom Water. b) Colours represent water masses shown in Figure 6.1a.
Source: After Turrell et al. (1999)

To support environmental assessments of individual drilling or development projects, modelling is carried out for a major crude oil release, corresponding to a blowout (i.e. a worst case scenario based on expected well flow rates and nature of the crude oil, however unlikely that scenario might be), and for smaller diesel or fuel oil releases, which are expected to be less persistent. Also in response to the Deepwater Horizon spill, operators are required to consider and provide evidence of planning for the eventuality that a relief well may need to be drilled (e.g. time to acquire a suitable rig, time to drill the well etc.). A review of Environmental Statements prepared over 15 years for Blocks to the West of Shetland was undertaken. Table 6.1 summarises relevant oil spill modelling, e.g. deterministic estimates of time to beach for a number of different spill scenarios and hydrocarbon types. From Table 6.1, the time to beach for different locations within Quadrants 204, 206 and 206 (of most relevance to the 28th Blocks) can be summarised by the following ranges:

	Time to beach (hours)				
Quadrants	**Shetland**	**Orkney**	**Caithness**	**Faroes**	**Norway**
204	42-198	45-51	75	53-94	193
205	40-46	48	-	122	-
206	25-39	118-130	118-130	122-444	408
Likelihood of beaching	1-60%	1-42%	0-10%	0-<5%	0-60%

The sites for which oil spill modelling has been undertaken represent the full depth of the water column (black dots on Figure 6.1a) and all of the water masses and currents shown in Figure 6.1b. Estimates suggest that beaching from a spill would not occur for at least 25h from any of the West of Shetland Blocks under consideration. Stochastic and deterministic modelling results for diesel spills (as required under current OPEP guidelines) suggest that there was either an insignificant (<1%) or zero percentage chance of beaching occurring, generally with full dispersion occurring in open water.

It should be noted that the above beaching estimates are using worst case scenarios of unconstrained blowouts with no intervention, combined with constant winds from one direction over a significant period of time, which is improbable. In 2011, Exercise Sula tested the UKs response capability to a deep water drilling spill to the west of Shetland based on a blowout event from a well in Block 204/10 (1,090m water depth) 86 miles from Shetland. The exercise effectively tested the UK response system, the National Contingency Plan (NCP) and individual response organisations (including the MCA, DECC, SOSREP, Shetland Islands Council and Scottish Standing Environment Group) which would be involved in a spill to the west of Shetland. Independent assessors concluded that the UK pollution response system could effectively respond to a deep water drilling incident to the west of Shetland in the timescales involved.

6.2.3 Potential ecological effects

The most vulnerable components of the ecosystem to oil spills in offshore and coastal environments are seabirds and marine mammals due to their close association with the sea surface. Seabirds are affected by oil pollution in several ways, including oiling of plumage resulting in the loss of insulating properties and the ingestion of oil during preening. Pollution of the sea by oil, predominantly from merchant shipping, can be a major cause of seabird mortality.

Fortunately, there is little experience of major oil spills in the vicinity of seabird colonies in the UK. In January 1993 the *Braer* ran aground at Garth's Ness in Shetland and began leaking Norwegian Gulfaks crude oil, spilling a total 85,000 tonnes of oil. 207 birds were received at the cleaning centre set up to deal with oiled birds, of these 23 were successfully rehabilitated, while an estimated 31 out of 34 seals were successfully rehabilitated. There was difficulty in determining the number of birds that died as a result of the oil as some would never have been found and stormy weather at the time of the spill caused a high mortality of storm victims that became oiled after death. 1,538 dead birds were found on the beaches including shag (857), black guillemot (203), kittiwake (133), and long-tailed duck (96), as well as great northern diver (13), eider (70) and great black-backed gull (45). There was a clear excess of females over males found. The main groups of breeding seabirds affected by the spill were locally resident species, as summer visitors were not in Shetland waters at the time of the spill. In general the 1993 breeding season was successful for most species that may have been affected by the oil spill, with the exception of shag and black guillemot (SOTEAG 1993, DTI 2003). The stormy weather during the *Braer* spill resulted in the rapid dispersion of the oil in the water column. Long term effects on wildlife have proved to be less than first feared with the most notable impact on breeding populations of resident seabirds closest to the spill (SOTEAG 1993).

The impact of the Macondo (Deepwater Horizon) well blowout on birds offshore is difficult to quantify due to the low resolution of antecedent seabird surveys and the paucity of observed carcasses during the oil spill response, potentially due to the rapid decomposition rates of bird carcasses in the relatively warm seas, opportunistic scavenging (e.g. by tiger sharks), and due to *in situ* burning of surface oil slick (Haney *et al.* 2014a). Modelling (Haney *et al.* 2014a, b) estimated mortality of 200,000 in coastal and open waters immediately after the blowout, when considered across the range of species known to be affected by the spill, would represent <10% of their breeding population. When considering those birds exposed in coastal and estuarine environments, Haney *et al.* (2014b) estimated that bird mortality was approximately 700,000. Within coastal waters, mortality was estimated to have mainly affected four species: northern gannet *Morus bassanus* (8%), brown pelican *Pelecanus occidentalis* (12%), royal tern *Thalasseus maximus* (13%) and laughing gull *Leucophaeus atricilla* (32%). Both studies suggest future work is required to understand the demographic consequences to the Gulf's coastal birds from this large marine spill.

Table 6.1: Review of representative worst case deterministic and stochastic oil spill modelling for West of Shetland exploration wells and developments

Block	Water depth (m)	Spill type	Spill size	Model used & conditions	Time to beach (deterministic modelling)	Likelihood of beaching (stochastic modelling)	Date of model run[1]
204/10	1,090	Blowout, Foinaven type crude	646.6 tonnes (720m^3) over 24hrs	OSIS 3, 30 knot onshore winds	Shetland 45hrs Faroes 56hrs	UK, Faroes <1%	2002 & 2008
204/10a	1,000	Blowout, Foinaven type crude	12,563.9 tonnes (13,991m^3) over 24hrs 175,907.4 tonnes (195,888m^3) over 14 days	OSIS 4.5, 30 knot onshore winds	Shetland 62hrs Shetland 62hrs Norway 193hrs Faroes 74hrs	Shetland 5 - 30% Norway <10% NW Shetland 60% S Shetland 30%	2011
204/14 & 204/15	*ca.* 800	Instantaneous release at surface of Foinaven crude	898 tonnes (1,000m^3)	OSIS 2.2.3, 30 knot winds to variety of surrounding coasts	Foula 40hrs Shetland 42hrs Orkney 45hrs Faroes 53hrs	-	1998
204/16	*ca*. 1,000	Blowout, Foinaven type crude	26.9 tonnes/hr (30m^3/hr) 24hr period total 646.6 tonnes (720m^3)	OSIS 3, 30 knot wind to Shetland & Faroe	Foula 46hrs Shetland 67hrs Faroes 62hrs	-	2002
204/17	983	Blowout, type of crude not stated	4,800m^3 instantaneous Stochastic modelling of total spill of 15,000m^3 over 120hrs	OSIS 3, 30 knot onshore winds	Foula 48hrs Shetland 63hrs Orkney 51hrs Faroes 59hrs	Shetland 5 to <10% Orkney, Faroe mainland Scotland 1 to <5%	2003
204/18b	982	Blowout, Brae Central type crude	1,835 tonnes (2,146.4m^3) a day for 10 days. Total 18,352 tonnes (21,464.3m^3)	OSIS 4.2, 30 knot onshore winds	Shetland 64hrs Faroe 94hrs	Total probability of beaching is 32% with the highest individual beaching probability 3.6% at Island of Westray, Orkney.	2011
204/20	350-500	Blowout, Schiehallion type crude	258,868 tonnes (287,280m^3) over a 90 day period,	OSCAR 5, 30 knot onshore winds	Shetland (summer) 105hrs Shetland (winter) 198hrs	Scotland, Orkney, Norway 0-10%	2010
204/21	*ca*. 800	Blowout, Brent type crude	Total 601.2 tonnes (720m^3) over 24 hrs	OSIS 3, 30 knot wind to Orkney & Faroe	Orkney 51hrs Faroe 63hrs	-	2002
205/21a	156	Blowout, type of crude not stated	Total 720 tonnes over 24hrs	OSIS 3.1.1, 30 knot onshore winds	Foula 40hrs Shetland 46hrs	Foula 1 to 10% Shetland 1 to 10% Orkney 1 to 5%	2009
205/26a	136	Instantaneous release, Arabian heavy type crude	2,000 tonnes (2,254.8m^3)	OSIS 3.1.1, 30 knot onshore winds	Orkney 48hrs Faroe 122hrs	Orkney 42%	2008

Block	Water depth (m)	Spill type	Spill size	Model used & conditions	Time to beach (deterministic modelling)	Likelihood of beaching (stochastic modelling)	Date of model run[1]
206/8	140	Blowout, Clair type crude	31,850 tonnes (35,000m^3) over 14 days	OSIS 3, 30 knot onshore wind	Shetland 25hrs worst case (but in winds <13knots would not beach) Orkney 118-130hrs Faroes 122-133hrs Mainland Scotland 118-130hrs	-	2001
206/8	140	Blowout, Clair type crude Pipeline rupture of Clair crude	261,424.8 tonnes (287,280m^3) of crude 3,094 tonnes (3,400m^3) of crude	OSCAR	Blowout: Shetland 36hrs (39hrs in winter) UK-Faroe median line 168hrs Faroes 444hrs (although 0% beaching probability) Norway min.17 days (typically 58 days) Pipeline rupture: Shetland 14hrs UK-Faroe median line 201hrs	3% Shetland 0% Orkney 0% Faroe 0% Mainland Scotland 10-60% Norway	2010
208/11	1,167	Blowout, Alwyn type condensate	46,236.6 tonnes (57,652m^3) over 14 days	OSIS, 30 knot towards Shetland and Faroes	Shetland 55 hours Faroes disperses after 18 days and crosses the median line after 36 hours	-	2012
208/17	668	Blowout, Shah Deniz type condensate	134,155.8 tonnes (169,175m^3) over 35 days	OSIS, 30 knot wind towards Shetland and Faroe	Shetland 50hrs Faroes 43hrs to cross median line, disperses after 38 days	Shetland 2-10% Norway 2%	2012
213/25	1,178	Instantaneous surface release, Foinaven type crude	898 tonnes (1,000m^3)	OSIS, 30 knot onshore winds to variety of surrounding coasts	Shetland 35hrs Orkney 70hrs Caithness 133hrs	-	1998
213/26	1,200	Blowout, Don type crude	1,166 tonnes over 6 hrs	OSIS, 30 knot wind towards a variety of coastlines	Faroe 77hrs Norway 167hrs Shetland 59hrs	Faroe, Norway, Shetland <10%	2005

Block	Water depth (m)	Spill type	Spill size	Model used & conditions	Time to beach (deterministic modelling)	Likelihood of beaching (stochastic modelling)	Date of model run[1]
213/26	1,100	Blowout, Rosebank crude type	13,828.9 tonnes/day (16,463m^3/day) decreasing to 2,719.1 tonnes/day (3,237m^3/day) Total over 120 days is 924,690.5 tonnes (1,100,822m^3)	OSCAR, 30 knot wind towards a variety of coastlines	Shetland 22 days Fair Isle 131 days Orkney 142 days Norway (Smöla and Fröya) 66 days Norway mainland 66 days	Shetland 21% Fair Isle 2% Orkney 1% Norway (Smöla and Fröya) 15% Norway mainland 7%	2013
213/27	*ca.* 1,200	Blowout, Foinaven type crude	1,116 tonnes (1242.8m^3) over 6 hrs	OilMap 30 knot wind towards a variety of coastlines	Faroes 103hrs Shetland 269hrs Norway 118hrs Orkney 269hrs	Faroe, Norway, Shetland, Orkney 1-10%	2005
213/27	1,150	Blowout, Rosebank type crude	1,166 tonnes (1388.1m^3)	OSIS, 30 knot wind towards a variety of coastlines	Faroes 109hrs Shetland 58hrs	Shetland 21%	2004
214/30a	435	Blowout, Malampaya type condensate	2,000 barrels (318m^3)	OSIS, 30 knot wind towards a variety of coastlines	Shetland disperses within 19km and 10 hours Faroes disperses within 16km	N/A	2009
217/15	1569	Spill of Rosebank type crude	1,176 tonnes (1,400m^3) of crude	OSIS, 30knot wind towards a variety of coastlines	Faroes 144hrs Shetland 146hrs Orkney 176hrs Norway 145hrs	Overall probability of 8%	2010

Note: [1]In a letter to industry (23rd December 2010), DECC advised that oil spill models undertaken to inform OPEPs should be run for a minimum of 10 days using the worst-case hydrocarbon release rates during that period, and until none of the liquid hydrocarbons released during that period remains on the sea surface (i.e. until it has naturally dissipated or beached). If the minimum 10-day release period does not clearly identify the potential areas at risk, then the release period must be extended. Among other letters, this was in response to the Deepwater Horizon incident, and therefore models after December 2010 would have been run for those minimum periods identified above.

As the major breeding areas for most wildfowl and wader species are outside the UK (in the high Arctic for many species), population dynamics are largely controlled by factors including breeding success (largely related to short-term climate fluctuations) and migration losses. Other significant factors include lemming abundance on Arctic breeding grounds (e.g. white-fronted goose). Variability in movements of wintering birds, associated with winter weather conditions in continental Europe, can also have a major influence on annual trends in UK numbers, as can variability in the staging stops of passage migrants.

Oil spill risks to marine mammals have been reviewed by successive SEAs[32] for previous licensing Rounds and in their supporting technical reports (e.g. Hammond *et al*. 2004, Hammond *et al*. 2008).

Generally, marine mammals are considered to be less vulnerable than seabirds to fouling by oil, but they are at risk from hydrocarbons and other chemicals that may evaporate from the surface of an oil slick at sea within the first few days, and any accidental ingestion or breathing of oily fumes could cause physiological stress (Law *et al.* 2011). Symptoms from acute exposure to volatile hydrocarbons include irritation to the eyes and lungs, lethargy, poor coordination and difficulty with breathing. Individuals may then drown as a result of these symptoms (Hammond *et al*. 2002).

The effects of the Macondo blowout on marine mammals in the Gulf of Mexico were evaluated using an area known have received heavy and prolonged oiling (Barataria Bay, Louisiana) and a control site (Sarasota Bay, Florida) (Schwacke *et al.* 2013). Disease conditions in Barataria Bay dolphins were significantly greater in prevalence and severity than those in Sarasota Bay dolphins, as well as those previously reported in other wild dolphin populations. Many disease conditions observed in Barataria Bay dolphins were uncommon but consistent with petroleum hydrocarbon exposure and toxicity (Schwacke *et al.* 2013). The mortality signal from the Macondo blowout is made less clear by an ongoing[33] Unusual Mortality Event (UME) declared by NOAA Fisheries that covers the broader northern Gulf of Mexico region. This UME began two months prior to the Macondo blowout, and since that time the frequency of strandings has fluctuated both spatially and temporally. The timing and underlying pathologies for the strandings are being examined as part of the UME investigation to understand the potential differing causal factors, including the Macondo spill.

Grey and harbour seals come ashore regularly throughout the year between foraging trips and additionally spend significantly more time ashore during the moulting period (February-April in grey seals and August-September in harbour seals) and particularly the pupping season (October-December in grey seals and June-July in harbour seals). Animals most at risk from oil coming ashore on seal haulout sites and breeding colonies are neonatal pups, which rely on their prenatal fur and metabolic activity to achieve thermal balance during their first few weeks of life, and are therefore more susceptible than adults to external oil contamination.

Direct mortality of seals as a result of contaminant exposure associated with major oil spills has been reported, e.g. following the Exxon Valdez oil spill in Alaska in 1989. Animals exposed to oil over a period of time developed pathological conditions including brain lesions. Additional pup mortality was reported in areas of heavy oil contamination compared to un-oiled areas.

[32] See: Offshore Energy Strategic Environmental Assessment (SEA): An overview of the SEA process.
[33] http://www.nmfs.noaa.gov/pr/health/mmume/cetacean_gulfofmexico.htm

Coastal otter populations are also vulnerable to fouling by oil, should it reach nearshore habitats. They are closely associated with the sea surface and reliant upon fur rather than blubber for insulation.

Fish are at greatest risk from contamination by oil spills when the water depth is very shallow. In open waters deeper than 10m, the likelihood that contaminant concentrations will be high enough to affect fish populations is very small, even if chemical dispersants are used. In shallow or enclosed waters (note that chemical dispersants are not generally appropriate for use in such areas[42]), high concentrations of freshly dispersed oil may kill some fish and have sublethal effects on others. Juvenile fish, larvae and eggs are most sensitive to the oil toxicity (Law *et al.* 2011). Available evidence suggests that salmon smolts utilise shallow water depths (1-6m) and that adults show varying behaviour, swimming generally close to the surface (0-40m depth), with occasional deeper dives – e.g. Holm *et al.* (2005, cited by Malcolm *et al.* 2010) noted dive depths of between 85 and 280m. The most sensitive period for Atlantic salmon is likely to be during the peak smolt run, rather than when adult salmon are returning to rivers. This is because Atlantic salmon return to natal rivers throughout the year, whereas the smolt run is more seasonally defined (April and May). It should be noted that salmonids play a critical role in the life cycle of the freshwater pearl mussel.

Benthic habitats and species may be sensitive to deposition of oil associated with sedimentation, or following chemical dispersion. The proportion of a surface spill that is deposited to the seabed might be expected to increase as a result of high turbulence and suspended solids concentrations in the water column, both associated with storm conditions in shallow water. Studies of seabed infauna following the *Braer* spill (Kingston *et al*. 1995), which occurred under such conditions, found no significant changes in benthic community structure, as characterised by species richness, individual abundance and diversity, which could be related to the areas of seabed affected by the spill. This may have been because *Braer* oil was of low toxicity, or because the sampling programme was carried out too soon after the spill to enable the full effects of its impact to be detected. In recognition of this as part of the DECC SEA programme further sampling of the study area was undertaken, ten years after the spill, results from which have indicated a substantial decline in sediment hydrocarbon concentrations.

In contrast, evidence from the Florida barge spill (Buzzards Bay, Massachusetts, September 1969, in which 700m^3 of diesel fuel were released) suggests that in certain circumstances, contamination from oil spills could be long-term. Monitoring immediately following the spill suggested rapid recovery (reviewed by Teal & Howarth 1984), while subsequent studies (sampling in 1989) indicated that substantial biodegradation of aromatic hydrocarbons in saltmarsh sediments had occurred (Teal *et al.* 1992). However, thirty years after the spill, significant oil residues remain in deep anoxic and sulphate-depleted layers of local salt marsh sediments (Reddy *et al.* 2002, Peacock *et al.* 2005). The ecological consequences of this residual contamination are unclear, although there is potential for remobilisation of sediment-bound contaminants through bioturbation or storm events (in which case, aerobic biodegradation would be expected to be rapid).

The concentration of petroleum hydrocarbons in sediments was measured in three Louisiana estuaries before Macondo well oil entered the wetlands, and nine times afterwards, from September 2010 to June 2013 (Turner *et al*. 2014). The average concentrations of alkanes and PAHs were 604 and 186 times the pre-spill values respectively (Turner *et al*. 2014). The concentrations of alkanes and PAHs in June 2013 were about 1% and 5%, respectively, of the February 2011 concentrations, but were higher than in the May 2010 baseline. The concentration of alkanes has declined rapidly and baseline conditions for alkanes may be

reached in 2015 (Mahmoudi *et al.* 2013). Work undertaken offshore in proximity to the blowout location (see Montagna *et al.* 2013), revealed that benthic effects (e.g. faunal abundance and diversity) was greatest within 3km of the Macondo wellhead covering an area of around 24km^2 with a zone of 'moderate effects' observed to extend up to 17km towards the southwest and 8.5km towards the northeast of the wellhead, covering an area of around 148km^2. Recovery time is unknown, but is through likely to take decades due to slow metabolic rates and hydrocarbon degradation speeds at depth. White *et al*. (2012) and Fisher *et al*. (2014) investigated 13 deepwater coral sites, most of which did not show evidence of impacts from the spill. Despite extensive survey and sampling, no compelling evidence of acute impact from the spill at any coral sites between 400 and 850m depth or more than 30km from Macondo has led Fisher *et al*. (2014) to suggest that this is the footprint of acute impact to deepwater coral communities from the blowout.

6.3 Implications for site integrity of relevant sites

Table 6.2 below provides a consideration of potential accidental spill impacts associated with the Block work programmes and the conservation objectives of relevant sites in the West of Shetland area (identified by the re-screening process in Appendix B, see Figure 6.2). As described in Appendix B, the geographic range of relevant sites included in the assessment has been broadened beyond the strict application of the screening criteria to take account of both the sensitivity and range of some of the qualifying features within the West of Shetland area. The potential for an accidental spill to impact the qualifying features of any site will be determined by the location and timing of drilling activities, which are presently unknown, and will be subject to further detailed assessment as part of project-level EIA.

6.3.1 Consideration of mobile qualifying species

A number of the sites considered in Table 6.2 support qualifying features which may forage considerable distances and could thus be vulnerable to accidental spills in 28th Round Blocks distant from the site. Relevant qualifying features of the sites include fulmar, kittiwake, guillemot, puffin, gannet and great skua, and their seasonal distribution and density in the area was reported in Pollock *et al.* (2000) as part of work undertaken by the Atlantic Frontier Environment Network (AFEN), and this has been used to inform the consideration of potential effects on mobile species from spills in this AA. Important areas of seabird activity outside designated sites have also been identified around the UK coast as part of an ongoing process to identify possible marine SPAs (Kober *et al*. 2010, 2012). Important areas were identified through application of the UK SPA selection guidelines to the European Seabirds at Sea data (1980-2006, Figure 6.2). Relevant offshore areas supporting important numbers of birds were identified for a number of breeding birds and supported the identification of draft SPAs, including for great skua and puffin (Seas off Foula dSPA), guillemot and Arctic tern (Pentland Firth and Scapa Flow, Orkney dSPA). The Seas off Foula dSPA overlaps with a number of the West of Shetland Blocks (205/19b, 206/16b, 206/17 and 206/21), and an oil spill in any of these Blocks could impact birds foraging from coastal SPAs, although mitigation is possible (see Section 6.4).

As described in Section 5.3.1, the west of Shetland area is of importance for both grey and harbour seals with coastal waters close to haul out sites on Shetland and Orkney supporting moderate to very high densities of seals. Although none of these areas coincide with West of Shetland Blocks, an oil spill within any of the Blocks, particularly those closer to Shetland and Orkney, could impact seals foraging from coastal SAC sites, although mitigation is possible (see Section 6.4).

Figure 6.1: Relevant sites and Blocks for accidental spill effects

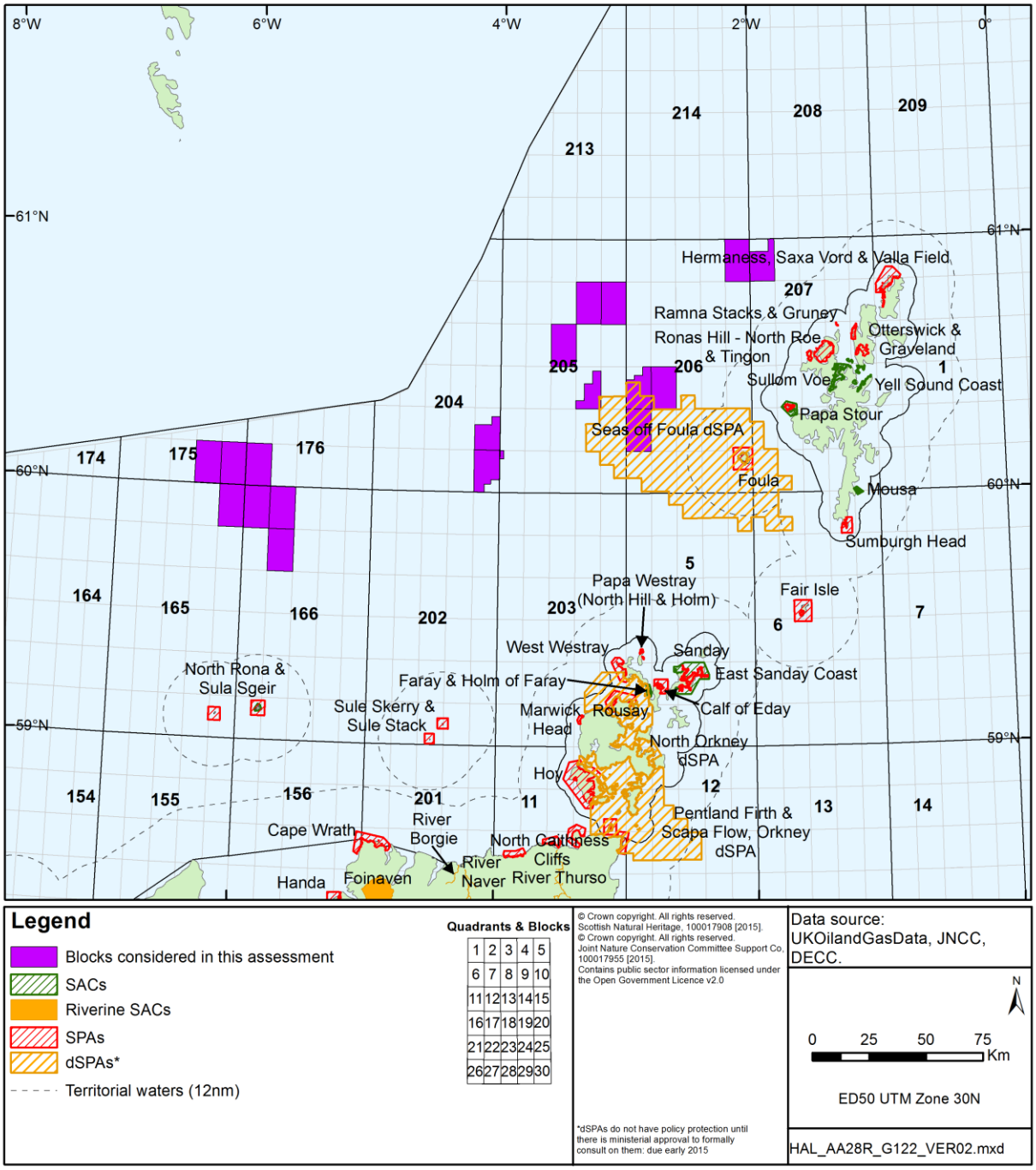


Figure 6.2: Important seabird areas relevant to the West of Shetland Blocks

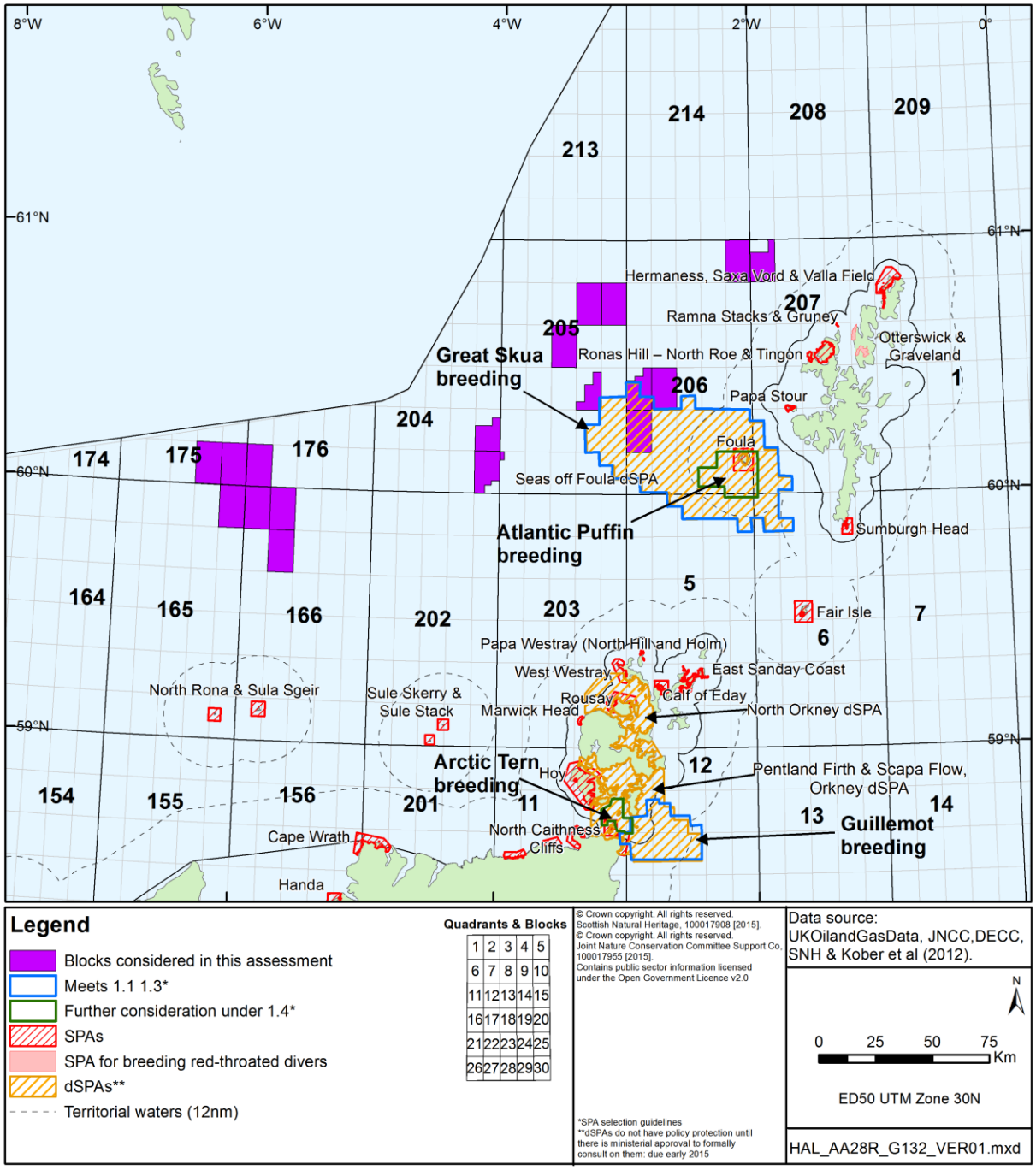


Table 6.2: Consideration of potential accidental spill impacts and relevant site conservation objectives

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
SPAs		
SHETLAND		
Relevant worst case spill modelling (Table 6.1): A crude oil blowout in Block 206/8 predicted to reach Shetland in between 25-36 hours (estimate from 2 separate models) with stochastic modelling indicating a low (3%) likelihood of beaching.		
Sumburgh Head	Breeding tern Seabird assemblage	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (206/21) is *ca*. 91km from the site. Qualifying features have a high (e.g. guillemot) to moderate (e.g. kittiwake, fulmar, Arctic tern) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Foula	Breeding tern, seabirds and diver. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (206/17) is *ca*. 31km from the site. Qualifying features have a very high (e.g. red throated diver, great skua), high (e.g. Arctic skua, auks, shag) to moderate (e.g. kittiwake, fulmar, Arctic tern) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Seas off Foula dSPA	Seabird aggregation – skua, fulmar, guillemot and puffin	**Conservation objectives:** Conservation objectives will be drafted prior to formal consultation. The following consideration is based on the qualifying features for the draft site. **Consideration** A number of Blocks (205/19b, 206/16b, 206/17, 206/21) are within or partly overlap with site. Qualifying features have a very high (e.g. great skua), high (e.g. Arctic skua, auks, shag) to moderate (e.g. fulmar, auks) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		objectives are not undermined (although not applicable until site confirmed for progression by Scottish Ministers and undergoes formal consultation, probably in 2015). See also relevant text on mobile qualifying features in Section 6.3 above.
Papa Stour	Breeding tern and waders	**Conservation objectives:** As for Foula SPA above. **Consideration** Closest Block (206/17) is *ca*. 48km from the site. Qualifying Arctic tern feature has a moderate vulnerability to surface pollution (Williams *et al.* 1994), whilst waders have a relatively low vulnerability to the direct effects of oil spills - the primary concern for waders during oil spills is the effects of the oil and the clean-up on their feeding and roosting resources (Law e*t al.* 2011). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Ronas Hill – North Roe and Tingon	Breeding diver, skua and birds of prey	**Conservation objectives:** As above. **Consideration** Closest Block (207/1b) is *ca*. 35km from the site. Qualifying features have a very high (e.g. red throated diver, great skua) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Ramna Stacks and Gruney	Breeding Leach's petrel	**Conservation objectives:** As above. **Consideration** Closest Block (207/1b) is *ca*. 32km from the site. Qualifying feature is likely to have a moderate vulnerability to surface pollution. The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Otterswick and Graveland	Breeding diver	**Conservation objectives:** As above. **Consideration** Closest Block (207/1b) is *ca*. 40km from the site. Qualifying feature has a very high vulnerability to surface pollution (Williams *et al*. 1994) although site has a limited marine component. The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Hermaness, Saxa Vord and Valla Field	Breeding diver, seabirds and skua. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (207/1b) is *ca*. 44km from the site. Qualifying features have a very high (e.g. red-throated diver, great skua), high (e.g. gannet, auks, shag) to moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Fair Isle	Breeding tern, seabirds and Fair	**Conservation objectives:** As above.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
	Isle wren. Seabird assemblage	**Consideration** Closest Block (206/21) is *ca*. 91km from the site. Qualifying features have a very high (e.g. great skua), high (e.g. gannet, auks, shag, Arctic skua) to moderate (e.g. fulmar, kittiwake, Arctic tern) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
ORKNEY		
Relevant worst case spill modelling (Table 6.1): A crude spill in Block 205/26a was predicted to reach Orkney in *ca*. 48h with stochastic modelling indicating a 42% likelihood of beaching. Similarly, a crude spill in Block 204/24 could reach Orkney in 48h.		
Hoy	Breeding peregrine, red-throated diver and skua. Breeding seabirds, seabird assemblage	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (204/30b) is *ca*. 125km from the site. Qualifying features have a very high (e.g. great skua, red-throated diver), high (e.g. Arctic skua, auks, great black-backed gull), and moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Marwick Head	Breeding seabirds. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (204/30b) is *ca*. 108km from the site. Qualifying features have a high (e.g. guillemot) and moderate (e.g. kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Rousay	Breeding terns and seabirds	**Conservation objectives:** As above. **Consideration** Closest Block (204/30b) is *ca*. 105km from the site. Qualifying features have a high (e.g. guillemot, Arctic skua) to moderate (e.g. fulmar, Arctic tern, kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		location and timing of drilling activities and mitigation measures (see Section 6.4) may be required to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
North Orkney dSPA	Overwintering waterfowl, breeding tern, shag	**Conservation Objectives**: Conservation objectives will be drafted prior to formal consultation. The following consideration is based on the qualifying features for the draft site. **Consideration** Closest Block (204/30b) is *ca*. 95km from the site. Potential qualifying features have a very high (e.g. divers), high (shag, red-breasted merganser) to moderate (e.g. Arctic tern, long-tailed duck, eider) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) may be required to ensure site conservation objectives are not undermined (although not applicable until site confirmed for progression by Scottish Ministers and undergoes formal consultation, probably in 2015).
West Westray	Breeding terns and seabirds. Seabird assemblage	**Conservation objectives:** As Rousay SPA above. **Consideration** Closest Block (204/30b) is *ca*. 93km from the site. Qualifying features have a high (e.g. auks, Arctic skua) to moderate (e.g. fulmar, Arctic tern, kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Papa Westray (North Hill and Holm)	Breeding tern and skua	**Conservation objectives:** As Rousay SPA above. **Consideration** Closest Block (206/21) is *ca*. 87km from the site. Qualifying features have a high (e.g. Arctic skua) to moderate (e.g. Arctic tern) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Calf of Eday	Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (206/21) is *ca*. 100km from the site. Qualifying features have a high (e.g. guillemot, cormorant, great black-backed gull) to moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
East Sanday Coast	Overwintering waders	**Conservation objectives:** As above. **Consideration** Closest Block (206/21) is *ca*. 96km from the site. Overwintering waders have a relatively low vulnerability to the direct effects of oil spills - the primary concern for waders during oil spills is the effects of the oil and the clean-up on their feeding and roosting resources (Law e*t al.* 2011). The potential for an accidental spill to impact the population of qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		Section 6.4) may be required to ensure site conservation objectives are not undermined.
Pentland Firth and Scapa Flow, Orkney dSPA	Overwintering divers and waterfowl, shag, guillemot, breeding terns	**Conservation Objectives**: Conservation objectives will be drafted prior to formal consultation. The following consideration is based on the qualifying features for the draft site. **Consideration** Closest Block (204/30b) is *ca*. 125km from the site. Qualifying features have a very high (e.g. divers), high (shag, red-breasted merganser, guillemot) to moderate (e.g. Arctic tern, long-tailed duck, eider) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined (although not applicable until site confirmed for progression by Scottish Ministers and undergoes formal consultation, probably in 2015).
NORTH COAST OF SCOTLAND		
Relevant worst case spill modelling (Table 6.1): A crude spill in Block 204/24 was predicted to reach Caithness in *ca*. 76h. Similarly, a crude spill in Block 204/14 could reach Caithness in 75h.		
North Rona and Sula Sgeir	Breeding seabirds and gulls. Seabird assemblage	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (166/7) is *ca*. 57km from the site. Qualifying features have a high (auks, gannet, great black-backed gull) to moderate (e.g. fulmar, kittiwake, Leach's petrel, storm petrel) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Sule Skerry and Sule Stack	Breeding seabirds. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (166/7) is *ca*. 91km from the site. Qualifying features have a high (auks, gannet, shag) to moderate (e.g. Leach's petrel, storm petrel) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
Handa	Breeding seabirds. Seabird assemblage	**Conservation Objectives**: Conservation objectives will be drafted prior to formal consultation. The following consideration is based on the qualifying features for the draft site. **Consideration** Closest Block (166/7) is *ca*. 142km from the site. Qualifying features have a high (auks, great skua) to moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Cape Wrath	Breeding seabirds. Seabird assemblage	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (166/7) is *ca*. 116km from the site. Qualifying features have a high (auks) to moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
North Caithness Cliffs	Breeding seabirds, peregrine	**Conservation objectives:** As above. **Consideration** Closest Block (204/30b) is *ca*. 152km from the site. Qualifying features have a high (auks) to moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
SACs		
SHETLAND		
Relevant worst case spill modelling (Table 6.1): A crude oil blowout in Block 206/8 predicted to reach Shetland in between 25-36 hours (estimate from 2 separate models) with stochastic modelling indicating a low (3%) likelihood of beaching.		
Papa Stour	Reefs, sea caves	**Conservation objectives:** To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying habitat

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		that the following are maintained in the long term: • Extent of the habitat on site • Distribution of the habitat within site • Structure and function of the habitat • Processes supporting the habitat • Distribution of typical species of the habitat • Viability of typical species as components of the habitat • No significant disturbance of typical species of the habitat **Consideration** Closest Block (206/17) is *ca*. 48km from the site. Qualifying features are likely to have a moderate sensitivity to toxic contamination from an accidental oil spill. The lack of substrata that could retain a persistent oil contamination (apart from some organisms) means that any impacts are only likely to be due to the acute effects of the dispersed oil (Law *et al.* 2011). The potential for an accidental spill to cause deterioration of the qualifying habitats will be determined by the location of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Sullom Voe	Inlets and bays, coastal lagoons, reefs	**Conservation objectives:** As above. **Consideration** Closest Block (206/17) is *ca*. 80km from the site. Advice for the site[34] indicates that oil spills and clean-up techniques (e.g. the use of dispersants, mechanical clean-up) have the potential to cause deterioration of qualifying interests through direct impact, or toxic chemicals causing lethal or sublethal effects on marine biota, which would cause subsequent changes in community structure. The coastal lagoon qualifying feature is not generally vulnerable to surface oil pollution due to limited access (Law *et al.* 2011). The potential for an accidental spill to cause deterioration of the qualifying habitats will be determined by the location of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
Yell Sound Coast	Otter, harbour seal	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within the site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species

[34] http://www.snh.gov.uk/docs/B16620.pdf

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		• No significant disturbance of the species **Consideration** Closest Block (206/17) is *ca*. 80km from the site. Accidental discharge of oil has the potential to cause deterioration to seal haul outs[35] with the pupping season (June to July) likely to be when seals are most vulnerable. The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Mousa	Reefs, sea caves, harbour seal	**Conservation objectives:** For Annex II Species To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within the site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (206/21) is *ca*. 100km from the site. Given the geographic location of the site with respect to the Blocks, an accidental spill is unlikely to have a significant effect on the habitat qualifying features. Harbour seal qualifying feature likely to be of moderate vulnerability and an accidental oil spill could impact the seal qualifying feature whilst foraging outside of the site. The potential for an accidental spill to impact the conservation objectives will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
ORKNEY		
Relevant worst case spill modelling (Table 6.1): A crude oil blowout in Block 205/26a is predicted to reach Orkney in 48 hours with stochastic modelling indicating a 42% likelihood of beaching.		
Faray and Holm of Faray	Grey seal	**Conservation objectives:** As above. **Consideration** Closest Block (206/21) is *ca*. 100km from the site. Qualifying feature of moderate vulnerability to oil spills although more vulnerable (particularly pups) during pupping season (October to December). The potential for an accidental spill to impact the population of the qualifying features, their distribution or cause disturbance will be determined by the location and

[35] http://www.snh.gov.uk/docs/B16635.pdf

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Sanday	Reefs, sandbanks, mudflats and sandflats, harbour seal	**Conservation objectives:** For Annex I Habitats To avoid deterioration of the qualifying habitat thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying habitat that the following are maintained in the long term: • Extent of the habitat on site • Distribution of the habitat within site • Structure and function of the habitat • Processes supporting the habitat • Distribution of typical species of the habitat • Viability of typical species as components of the habitat • No significant disturbance of typical species of the habitat For Annex II Species To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within the site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (206/21) is *ca*. 95km from the site. Harbour seal feature is likely to be of moderate vulnerability to oil spills although more vulnerable (particularly pups) during pupping season (June to July). Qualifying habitats are likely to be moderately sensitive to toxic contamination from an accidental oil spill with sheltered areas including mudflats and sandflats likely to be more sensitive. The potential for an accidental spill to cause deterioration of the habitat features or impact the population of the qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
NORTH COAST OF SCOTLAND		
North Rona	Sea cliffs, sea caves, reefs, grey seal	**Conservation objectives:** As above. **Consideration** Closest Block (166/7) is *ca*. 59km from the site. Sea cliffs qualifying feature not generally vulnerable to surface oil pollution. With respect to sea caves and reefs, advice for the site[36] indicates that oil spills and clean-up techniques (e.g. the use of dispersants, mechanical clean-up) have the potential to cause deterioration of qualifying interests through direct impact, or toxic chemicals causing lethal or sublethal effects on marine biota, which would cause subsequent changes in community structure. Similarly, accidental discharge of oil has the potential to cause deterioration to seal haul outs with the pupping season (October to December) likely to be when seals are most vulnerable. The potential for an accidental spill to cause deterioration of the habitat features or impact the population of the qualifying features, their distribution or cause disturbance will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined. See also relevant text on mobile qualifying features in Section 6.3 above.
Riverine SACs		
Relevant worst case spill modelling (Table 6.1): A crude spill in Block 204/24 was predicted to reach Caithness in *ca*. 76h. Similarly, a crude spill in Block 204/14 could reach Caithness in 75h.		
Foinaven	Standing freshwater, heaths, grasslands, scree, rocky slope, bogs, freshwater pearl mussel, otter	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features. To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species • Distribution and viability of freshwater pearl mussel host species • Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species **Consideration** Closest Block (166/7) is over 140km from the site. Habitat qualifying features are not vulnerable to an oil spill. The most sensitive period for Atlantic salmon (freshwater pearl mussel feature's host species) is likely to be during the peak smolt run (spring-summer), rather than when adult salmon are returning to rivers. The potential for an accidental spill to impact the distribution and viability of the qualifying feature's host species will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
River Borgie	Freshwater pearl	**Conservation objectives:**

[36] http://www.snh.gov.uk/docs/B16639.pdf

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
	mussel, Atlantic salmon	To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features. To ensure for the qualifying species that the following are maintained in the long term: • Population of the species, including range of genetic types for salmon, as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species • Distribution and viability of freshwater pearl mussel host species • Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species **Consideration** Closest Block (166/7) is *ca*. 149km from the site. The most sensitive period for Atlantic salmon (freshwater pearl mussel feature's host species) is likely to be during the peak smolt run (spring-summer), rather than when adult salmon are returning to rivers. The potential for an accidental spill to impact the Atlantic salmon population or their distribution and viability will be determined by the location and timing of drilling activities and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.
River Naver	Freshwater pearl mussel, Atlantic salmon	**Conservation objectives:** As above. **Consideration:** As for River Borgie above.
River Thurso	Atlantic salmon	**Conservation objectives:** To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features. To ensure for the qualifying species that the following are maintained in the long term: • Population of the species, including range of genetic types, as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Consideration** Closest Block (204/30b) is *ca*. 159km from the site. As for River Borgie above.

6.4 Mitigation

The likelihood of a large oil spill is extremely low (blowout occurrence frequency in the range of 1/1,000-10,000 well years, see Section 6.2.1). All of the proposed work programmes indicate a drill or drop or a contingent well. The potential for spills to cause deterioration or significant disturbance of qualifying features will be determined by the location and timing of activities which are currently unknown (Note: oil spills are an accidental event and not a planned activity). Therefore, a detailed assessment of the potential for effects of a particular operation cannot be made at this time, but would be fully assessed as part of project-level EIA.

Following licensing, specific exploration drilling activities require permitting (see Figure 2.3) and those considered to present a risk to relevant sites would be evaluated by DECC under mandatory contingency planning and permitting procedures which will allow project specific mitigation measures to be defined (including conditions attached to consents/permits or potentially consent/permit refusal). In all cases, rigorous spill prevention, response and other mitigation measures are required of operators and monitored by the regulator for offshore exploration and production. Detailed potential effects of such a release on Natura 2000 sites would be considered at the project level.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities, which may include the drilling of wells, will not have an adverse effect on the integrity of relevant Natura 2000 sites.

Spill prevention and mitigation measures are implemented for offshore exploration and production *inter alia* through the *Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation) Regulations 1998* and the *Offshore Installations (Emergency Pollution Control) Regulations 2002*. The required measures include spill prevention and containment measures, risk assessment and contingency planning. Under the Regulations, all operators of an offshore installation or oil handling facility must have an Oil Pollution Emergency Plan (OPEP) in place. The plans are reviewed by DECC, MCA and relevant environmental consultees, such as the relevant Devolved Authority (e.g. Marine Scotland), the Joint Nature Conservation Committee, the relevant inshore statutory nature conservation body, e.g. Scottish Natural Heritage, and other relevant organisations. An OPEP will only be approved by DECC following consultation and satisfactory operator response to any comments. Approval of an OPEP does not constitute approval of the operations covered by the plan. Operators are responsible for ensuring compliance with all other regulatory requirements. OPEPs set out the arrangements for responding to incidents with the potential to cause marine pollution by oil, with a view to preventing such pollution or reducing or minimising its effect. Additional requirements can be imposed by DECC through block-specific licence conditions (i.e. “Essential Elements”). Operators are required to follow international and UK best practice when responding to oil spills (i.e. consistent with DECC’s OPEP requirements) and must have in place the capability to employ response strategies for a spill of any severity. The minimum requirements for a response to spills of various sizes are shown in Table 6.3.

Table 6.3: Guidance on minimum standards required for oil pollution incident response

Estimated Oil Quantity (tonnes)	Dispersant combat rate (tonnes/hr)	Oil Type[1]	Aerial Surveillance Capability	Response Times	
				For Block Specific Vulnerability[2] of 1 (very high)	All other Vulnerability Categories (low to high)
0 to 25	10	2; 3 and 4	Within 4 hours	Monitor and dispersant within 1 hour	Monitor and dispersant available but no "within 1 hour requirement"
25 to 100		2, 3 and 4		Monitor and dispersant within 2 hours	Monitor and dispersant available but no "within 2 hour requirement"
100 to 500	50	2; 3 and 4		Monitor and dispersant within 6 hours	Monitor and dispersant within 6 hours
>500	>50	2; 3 and 4		Monitor and dispersant within 18 hours	Monitor and dispersant within 18 hours

Notes: [1]Oil type based on ITOPF groups, [2] based on JNCC (1999), see Table 7.1)
Source: DECC OPEP Guidance, July 2012

In June 2013 the EU published the Directive on the safety of offshore oil and gas operations. The objective of this Directive is to reduce as far as possible the occurrence of major accidents related to offshore oil and gas operations and to limit their consequences. DECC and HSE are jointly leading the transposition of the Directive as it contains requirements relating to licensing, environmental protection, emergency response and liability, in addition to safety. The Directive has to be implemented by 19th July 2015. A consultation on the UK's proposed approach to implement the offshore safety Directive closed in September 2014. While the required content of OPEPs remains largely consistent with existing guidance, there are a number of proposed amendments to the *Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation) Regulations 1998*[37] and updates to OPEP[38] guidance to fulfil specific requirements of the Directive.

Activity level management measures (e.g. which should be implemented through an accredited Environmental Management System) can help to reduce the potential for spills of oil and chemicals of all sizes through, for instance, inventories of environmentally critical equipment, related maintenance schedules, training and good practice. During onshore emergency pollution control exercises, DECC may request a list of personnel responsible for responding to oil pollution incidents and evidence of training. DECC Environmental Inspectors may conduct an offshore inspection of the installation and gather evidence to prove compliance with exercise requirements, and may check training records for offshore personnel to ensure compliance with training requirements. Offshore, primary responsibility for oil spill response lies with the relevant Operator and their third party accredited pollution responders, although the Secretary of State's

[37] Draft Regulations were provided as part of the consultation process in July 2014: http://www.hse.gov.uk/consult/condocs/cd272.htm

[38] Amendments to the guidance include: requirement for non-production installations to hold an approved OPEP, references to the inventory of response equipment and an assessment of the effectiveness of oil spill response measures, changes to who is required to hold an OPEP (e.g. well operator, installation operator), changes to the nomenclature of different OPEP types, amended worst case modelling requirements, the timeline associated with certain OPEP reviews – see: http://www.hse.gov.uk/osdr/guidance-regulations.htm

Representative may intervene if necessary. The MCA is responsible for a National Contingency Plan and maintains a contractual arrangement for provision of aerial spraying, with aircraft based at East Midlands and if necessary, Inverness. Within two days, aircraft can deliver sufficient dispersant to treat a 16,000 tonne spill within 50 miles of the coast anywhere around the UK. MCA holds 1,400 tonnes of dispersant stockpiled in 14 locations around the UK, in addition to counter-pollution equipment (booms, adsorbents etc.) which can be mobilised within 2-12 hours depending on incident location. The UK Government announced in 2012 that an Emergency Towing Vessel for the waters around the Northern and Western Isles will be stationed in Orkney up to 2015 (the contract has now been extended to March 2016)[39]. The government has also been in discussions with the oil industry on the potential of a commercial call-out arrangement to use their vessels[40] and BP have agreed to volunteer a vessel to help in an emergency should the MCA deem it appropriate[41].

For activities in proximity to sensitive shorelines, the Department's guidance (DECC 2012) specifies that the risk of shoreline contamination be determined through an appropriate risk assessment, and operators with oil spill scenarios that could impact the shoreline must have access to appropriate oil spill response resources suitable for shoreline clean-up operations. Additional resources are required for installations operating in any Block wholly or partly within 25 miles of the coastline dependent on the hydrocarbon inventory and the oil pollution incident scenarios identified, including:

- The presence near the facility at all times of a vessel:
    - with the capability of spraying dispersant[42] within 30 minutes of an oil pollution incident notification
    - has a stock of dispersant sufficient to deal with an oil pollution incident of 25 tonnes, and if required, have the capability (equipment and capacity) of recovering any oil likely to be lost from the installation under a Tier 1[43] scenario
- In the event of a Tier 2 incident, Tier 2 resources must be available on scene within half the time taken for the oil to reach shore in 30 knot wind conditions

[39] http://www.shetnews.co.uk/news/9565-sic-retaining-northern-isles-emergency-vessel-is-crucial
[40] Scotland Office website - http://www.scotlandoffice.gov.uk/scotlandoffice/17322.html
[41] https://www.gov.uk/government/news/moore-welcomes-bp-and-north-star-support-for-second-support-vessel\
[42] Chemical dispersant use is generally inappropriate in shallow sheltered waters, in water depths of less than 20 metres and in waters extending up to 1.15 miles (equivalent to 1 nautical mile) beyond the 20 metre contour, or on refined oil products such as diesel, gasoline or kerosene which should disperse naturally prior to reaching the coast or any sensitive environments. The use of chemical dispersants will, therefore, be dependent upon several factors including the quantity of oil, oil type, sea temperature, time of year, prevailing weather and environmental sensitivities.
[43] Oil pollution incidents are classified according to the response levels they are most likely to require and not the volume of oil pollution, unless this is supported by a location specific risk assessment. For example, if a pollution incident requires the use of resources from a regional centre, this would be used to classify the necessary response level, irrespective of its size.
For consistency with the National Contingency Plan, the following Tier definitions apply:
- Tier 1 Local (within the capability of the operator on site);
- Tier 2 Regional (beyond the in-house capability of the operator);
- Tier 3 National (requiring national resources).

- Details of resources to deal with a Tier 3 incident (i.e. an oil pollution incident that cannot be controlled by Tier 1 or 2 resources), including sources of transport and delivery system

- A Shoreline Protection Strategy Plan

In addition to loss of well control, risk of oil and diesel loss resulting from collision is considered for drilling activities. A consent to locate a drilling rig is required in advance of drilling (see Figure 2.3), which is subject to consultation with relevant stakeholders (e.g. the MCA, MoD). Such consent requires vessel traffic surveys and also a collision risk assessment where there is considered to be a significant navigational risk, and requires the movement and location of the rig to be notified to other users of the sea (e.g. through notices to mariners). A statutory 500m safety zone is established around the rig when in the field, and a standby and/or guard vessel is also located next to the rig during drilling operations to ensure that vessels do not enter the safety zone, and to provide emergency response.

Whilst the indemnity and insurance group of OSPRAG concluded that the current Offshore Pollution Liability Association Limited (OPOL) level of US $250 million is appropriate in the majority of scenarios, in certain limited cases spill clean up and compensation costs could result in claims above this limit. Guidance issued by Oil & Gas UK (OGUK) in November 2012 outlined a new process by which operators assess the potential cost of well control, pollution remediation and compensation, with a subsequent requirement to demonstrate to DECC financial capability to address these potential consequences. DECC released a guidance note to industry[44] effective from January 1st 2013 on the demonstration of financial responsibility before consent may be granted for exploration and appraisal wells. It was noted in this document that, though not constituting DECC guidance, considerable weight would be given to operators who can show that they have met the criteria set out in the OGUK guidance. DECC require that an operator must demonstrate the cost of well control and the cost of financial remediation and compensation from pollution at the time of OPEP submission, and verify this responsibility by, for instance: insurance, parent company guarantee, reliance on credit/financial strength rating of the operator.

6.5 Conclusions

Individual relevant sites have been categorised in terms of potential sensitivity/vulnerability, based on location in relation to known hydrocarbon prospectivity (crude oil) of the proposed licence Blocks and therefore the nature and magnitude of credible risks. Two categories of vulnerability were identified:

- Those sites considered to be at potential risk (see Table 6.2 including relevant qualifying features foraging outside of sites), with the possibility of impacts in the event of a significant accidental spill of crude oil, bunker or lube oil (i.e. where site conservation objectives are at risk of being undermined).

- Many sites are considered not to be at risk from accidental oil spills associated with activities in the Blocks, due to their distance from the Blocks and relative sensitivity of the features.

[44] DECC Guidance Note To UK Offshore Oil and Gas Operators On The Demonstration Of Financial Responsibility Before Consent May Be Granted for Exploration and Appraisal Wells On The UKCS (December 2012).

The incremental risk associated with activities resulting from the proposed licensing (i.e. additional to existing risk; primarily associated with shipping and other maritime activities) is low. This results from the combination of low probability and low severity (since most spills would be small in volume). The overall risks of a major crude oil spill (see Section 6.2.1), which would require catastrophic loss of well control, are quantitatively and qualitatively comparable to those considered ALARP (As Low As Reasonably Practicable) under the relevant UK health and safety regulations. The activities which could reasonably be expected to follow from the proposed licensing would not have a significant effect on the existing risks associated with other activities (see Section 7 for in-combination effects).

Oil spills can have potentially adverse effects, and are controlled in direct proportion to this by a legal framework that minimises their occurrence, provides for contingency planning, response and clean up, and which creates an offence of such spills to enable prosecutions. It is not possible to say that in spite of the regulatory controls and other preventative measures, an accidental oil spill will never occur as a result of activities which may follow licensing; however, as such spills are not intended or planned activities, a risk-based assessment is appropriate.

Following licensing, specific exploration drilling activities require permitting (see Figure 2.3) and those considered to present a risk to relevant sites would be evaluated by DECC under mandatory contingency planning and permitting procedures which will allow mitigation measures to be defined (including conditions attached to consents/permits or potentially consent/permit refusal). In all cases, rigorous spill prevention, response and other mitigation measures are required of operators and monitored by the regulator for offshore exploration and production.

Given the availability of prevention and mitigation measures which are applied prior to consenting any activity including project specific safety, oil spill risk assessment, response, inspection and other monitoring, and the requirement for project specific permitting, DECC considers that the granting of licences for Blocks 165/5, 166/1, 166/2, 166/7, 175/29, 175/30, 176/26, 204/25c, 204/30b, 205/9, 205/10, 205/13, 205/19b, 205/26d, 206/5, 206/16b, 206/17, 206/21 and 207/1b, in so far as they may result in accidental hydrocarbon releases, would not adversely affect the integrity of relevant sites.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities, which may include the drilling of a number of wells, will not adversely affect the integrity of Natura 2000 sites.

7 Cumulative and in-combination effects

7.1 Introduction

Potential incremental, cumulative, synergistic and secondary effects from a range of operations, discharges, emissions (including noise), and accidents were considered in the Offshore Energy SEAs (DECC 2009, 2011; see also OSPAR 2000, 2010). There are a number of potential interactions between activities that may follow licensing and those existing or planned activities in the West of Shetland, for instance in relation to renewable energy, fishing and shipping. Many of these activities are subject to SEA and other strategic level and individual permitting or consenting mechanisms; and in future to marine spatial planning consistent with the Marine Policy Statement. A draft Scottish National Marine Plan was consulted upon in 2013 and Planning Aid Scotland was appointed in May 2014 to undertake an independent investigation of the proposals contained in the draft National Marine Plan. The draft Plan sets out strategic objectives for the Scottish marine area including important marine activities such as renewable energy, aquaculture, conservation, recreation and tourism, ports, harbours and shipping. The plan was laid before the Scottish Parliament on the 11th December 2014 for 40 days of scrutiny. Final considerations, adoption and publication of the plan and the related SEA post-adoption statement are due in spring 2015.

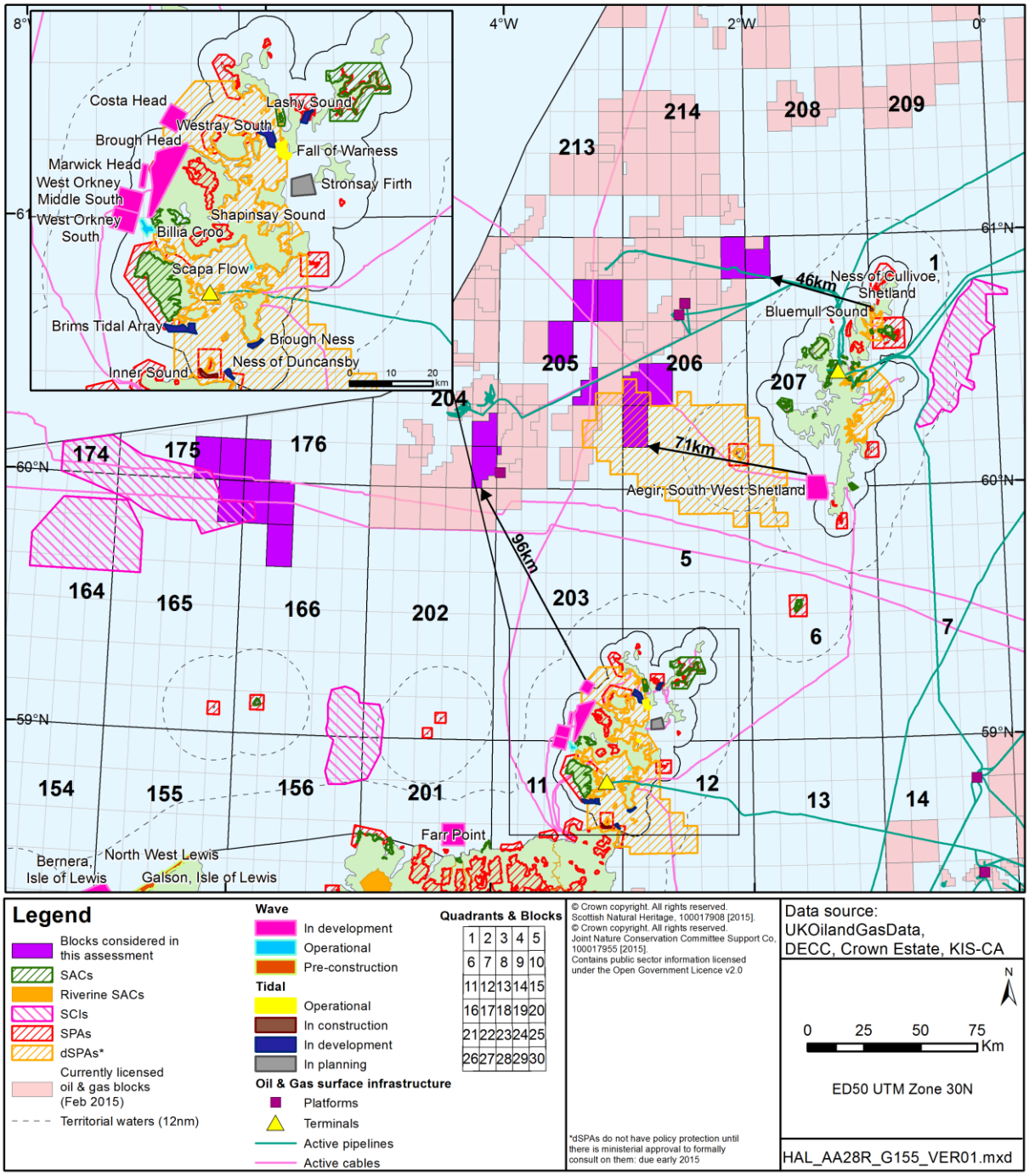
7.2 Sources of potential effect

There are no current plans[45] for the development of commercial wind farms in the West of Shetland area. Marine renewable energy is in the early stages of development but there are a number of projects planned, particularly around Orkney (Figure 7.1). The European Marine Energy Centre (EMEC) has a number of test wave and tidal energy devices within the Orkney archipelago. The closest marine renewable energy developments to the West of Shetland Blocks are two small tidal turbines being installed in the Ness of Cullivoe and Bluemull Sound at the island of Yell, Shetland (*ca*. 46km from the closest Block, 207/1b). The first turbine was commissioned in 2014 and has a 30kW capacity. Off the southwest Shetland coast, the Aegir Wave Farm shown on Figure 7.1 has recently been cancelled by the developer (February 2015).

In March 2010, The Crown Estate entered into agreements for lease for projects with a potential capacity of up to 1600MW in the Pentland Firth and Orkney waters. A number of projects were given leases and, subject to consent, will be developed within the next 15 years. The MeyGen Tidal Energy Project Phase 1 was granted consent in February 2014 and will comprise the installation of four 1.5MW turbines. Onshore construction activities started in January 2015 with first power expected to be delivered in 2016[46]. These marine renewable developments are at least 96km from the West of Shetland Blocks (Costa Head to Block 204/30b) and are unlikely to have in-combination effects with activities that could follow licensing of the Blocks.

[45] http://www.scotland.gov.uk/Topics/marine/Licensing/marine/scoping
[46] http://atlantisresourcesltd.com/media-centre/meygen-news/352-construction-of-onshore-facilities-starts-today-at-meygen-site.html

Figure 7.1: Location of current projects and existing oil and gas infrastructure relevant to the West of Shetland Blocks



7.3 Underwater noise

Seismic survey (proposed for Blocks 204/25c, 206/16b, 206/17 and 206/21) and other noise producing activities (e.g. rig site survey, VSP) that might follow the proposed licensing are anticipated to be widely separated in space and time. Therefore, any acoustic disturbance to marine mammals with the potential to cause displacement from foraging areas will be short-term and infrequent. SMRU (2007) note that "The effects of repeated surveys are not known, but insignificant transient effects may become important if potentially disturbing activities are repeated and/or intensified." There is the potential for cumulative noise impacts where concurrent and sequential activities result in long-term exposure to elevated noise levels within the wider area.

In addition to those activities which may follow licensing of the West of Shetland Blocks, there are a variety of other existing (e.g. oil and gas production (see Figure 7.1), fishing, shipping, military exercise areas) and planned (e.g. oil and gas exploration and production) noise-producing activities in overlapping or adjacent areas. Despite this, DECC is not aware of any projects or activities which are likely to cause cumulative and in-combination effects that, when taken in-combination with the likely number and scale of activities proposed by the work programmes (see Section 2.2), would adversely affect the integrity of the relevant sites. This is due to the presence of effective regulatory mechanisms which ensure that operators, DECC and other relevant consenting authorities take such considerations into account during activity permitting. These mechanisms generally allow for public participation in the process, and this will be strengthened by regulations amending the offshore EIA regime which may come into force 2015/2016. These will reflect Directive 2014/52/EU (amending the EIA Directive) which also provides for closer co-ordination between the EIA and Habitats Directives, with a revised Article 3 indicating that biodiversity within EIA should be described and assessed "*with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC".*

With respect to the ongoing process to implement the Marine Strategy Framework Directive, the first stage (reported in previous 27th Round AA documents) was for Member States to carry out an initial assessment of the current status of their seas, determine specific characteristics of Good Environmental Status (GES) for their marine waters and set out specific environmental targets and indicators to underpin this (based on the 11 descriptors of GES given in the Directive). The UK completed this first stage in December 2012 with the publication of the Marine Strategy Part One. The second stage, to be completed by July 2014, was for Member States to establish and implement monitoring programmes to measure progress towards GES. The final stage is the implementation of management measures to achieve GES by 2020. These have to be developed by 2015 and implemented by 2016. A consultation on the UK's proposed programme of measures is currently underway and will close in April 2015[47]". The UK Marine Strategy Part Two provides summaries of the UK Monitoring programmes for the 11 descriptors of GES that are now in place.

Of particular relevance are the proposed monitoring programmes for underwater noise (Descriptor 11). For context, the Marine Strategy Part One defined the UK characteristics of

[47] https://consult.defra.gov.uk/marine/msfd-programme-of-measures

GES for noise (covering impulsive sound, caused primarily by activities such as oil and gas seismic activity and pile driving for wind farms) as:

- Loud, low and mid frequency impulsive sounds and continuous low frequency sounds introduced into the marine environment through human activities do not have adverse effects on marine ecosystems: Human activities potentially introducing loud, low and mid frequency impulsive sounds into the marine environment are managed to the extent that no significant long term adverse effects are incurred at the population level or specifically to vulnerable/threatened species and key functional groups. Continuous low frequency sound inputs do not pose a significant risk to marine life at the population level, or specifically to vulnerable/threatened species and key functional groups e.g. through the masking of biologically significant sounds and behavioural reactions.

Due to the high level of uncertainty about the effects of noise, it was not possible for experts to recommend a specific target for either impulsive sounds or ambient sounds which they believed to be equivalent to GES. Instead, an operational target was developed for impulsive sounds and a surveillance indicator developed for ambient sounds:

- To establish a 'noise registry' to record, assess and manage the distribution and timing of anthropogenic sound sources measured over the frequency band 10Hz to 10kHz, exceeding the energy source level 183 dB re 1 μPa^2 m^2s; or the zero to peak source level of 224 dB re 1 μPa^2 m^2 over the entire UK hydrocarbon licence block area.

- Surveillance indicator to monitor trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1µPa RMS; average noise level in these octave bands over a year) measured by observation stations.

Marine Strategy Part Two indicates that with respect to impulsive sounds, a noise registry is being developed that will record in space and time noise generating activities such as seismic surveys and pile driving.

DECC is cognisant of the ongoing efforts to implement the MSFD. DECC will review the results of the ongoing process closely with respect to the consenting of relevant activities which may result from future licensing, as well as other activities which generate noise in the marine environment.

7.4 Other potential in-combination effects

7.4.1 Physical damage/change to features and habitats

Potential sources of physical disturbance to the seabed, and damage to biotopes, associated with oil and gas activities that could result from licensing were described in Section 4.2 and include the anchoring of semi-submersible drilling rigs and wellhead placement and recovery.

No 28th Round Blocks overlap with areas identified for marine renewable projects (see Figure 7.1). Existing oil and gas infrastructure in the area is limited (Figure 7.1) and a review of current oil and gas projects (as of February 2015) published by DECC's Project Pathfinder[48] indicated

[48] https://itportal.decc.gov.uk/eng/fox/path/PATH_REPORTS/pdf

that of the seven projects for Blocks West of Shetland, no projects were likely to have in-combination effects on Natura 2000 sites with respect to activities that could follow licensing of the West of Shetland Blocks given their location with respect to the Blocks and sites. No relevant decommissioning projects were identified by Project Pathfinder.

7.4.2 Physical presence

Physical presence of offshore infrastructure and support activities may potentially cause behavioural responses in fish, birds and marine mammals. Previous SEAs have considered the majority of such behavioural responses resulting from interactions with offshore oil and gas infrastructure (whether positive or negative) to be insignificant; in part because the number of surface facilities is relatively small (of the order of a few hundred) and because the majority are at a substantial distance offshore. This is particularly true west of Shetland.

Shipping densities over the Blocks are very low or low, and any additional vessels associated with drilling will represent a small incremental increase to existing traffic. For instance typical supply visits to rigs while drilling may be in the order of 2 to 3 per week. At this stage, any increased probability of a shipping collision associated with this modest increase in traffic cannot be assessed in a meaningful way (e.g. due to a lack of knowledge of individual rig location, ports to be used for supply and vessel traffic at individual rig locations). The siting of any rig will require individual consenting at the activity level (including vessel traffic survey and a collision risk assessment where there is considered to be a significant navigational risk), charting, advertising through notices to mariners, and fisheries liaison. Activities are typically restricted to within a statutory 500m safety zone around the rig, and the presence of the rig and standby vessel would be temporary (days to a few months).

7.4.3 Marine discharges

Previous discharges of WBM cuttings in the UKCS have been shown to disperse rapidly and to have minimal ecological effects (Section 4.3). Dispersion of further discharges of mud and cuttings could lead to localised accumulation in areas where reduced current allows the particles to accumulate on the seabed. However, in view of the scale of the proposed activity, extent of the region, the water depths and currents, this is considered unlikely to be detectable and to have negligible cumulative ecological effect (DECC 2011).

7.5 Conclusions

Available evidence for the West of Shetland area indicates that past oil and gas activity and discharges has not led to adverse impacts on the integrity of relevant sites in the area. Any activities relating to the work programmes, and any subsequent development that may occur if site appraisal is successful, will be judged on its own merits and in the context of wider development in the area (i.e. any potential incremental effects). The current controls on terrestrial and marine industrial activities, including oil and gas operations that could follow licensing, can be expected to prevent significant in-combination effects affecting relevant sites.

The competent authorities will assess the potential for in-combination effects during HRA of project specific consent applications; this process will ensure that mitigation measures are put in place such that subsequent to licensing, specific projects (if consented) will not result in adverse effects on integrity of relevant sites. Therefore it is concluded that the in-combination effects from activities arising from the licensing of Blocks 165/5, 166/1, 166/2, 166/7, 175/29, 175/30, 176/26, 204/25c, 204/30b, 205/9, 205/10, 205/13, 205/19b, 205/26d, 206/5, 206/16b, 206/17,

206/21 and 207/1b with those from existing and planned activities in the West of Shetland area will not adversely affect the site integrity of relevant sites.

8 Overall conclusion

Taking account of the evidence and assessment presented above, the report determines that the plan/programme will not have an significant adverse effect on the integrity of the relevant sites (identified in Section 1.3), and recommends the granting of consent by the Secretary of State for the award of licences covering Blocks 165/5, 166/1, 166/2, 166/7, 175/29, 175/30, 176/26, 204/25c, 204/30b, 205/9, 205/10, 205/13, 205/19b, 205/26d, 206/5, 206/16b, 206/17, 206/21 and 207/1b. This is because there is certainty, within the meaning of the ECJ Judgment in the *Waddenzee* case, that implementation of the plan will not adversely affect the integrity of relevant European Sites (as described in Sections 4.3, 5.3 and 6.3.), taking account of the mitigation measures that can be imposed through existing permitting mechanisms on the planning and conduct of activities (as described in Sections 4.4, 5.4 and 6.4).

These mitigation measures are incorporated in respect of habitat, diadromous fish, bird and marine mammal interest features through the range of legislation and guidance (see https://www.gov.uk/oil-and-gas-offshore-environmental-legislation) which apply to developer activities which could follow plan adoption. Where necessary, project-specific HRA based on detailed project proposals would be undertaken by the competent authority before the granting of a permit/consent. The competent authority needs to be satisfied that the proposed activity will not result in adverse effects on integrity of relevant sites.

Even where a site/interest feature has been screened out in the plan level assessment, or where a conclusion of no adverse effect on integrity has been reached at plan level, project level HRA will be necessary if, for example, new relevant sites have been designated after the plan level assessment; new information emerges about the nature and sensitivities of interest features within sites, new information emerges about effects including in-combination effects; or if plan level assumptions have not been met at the project level.

9 References

BERR (2008). Atlas of UK marine renewable energy resources. Report No. R.1432. Report to the Department for Business, Enterprise & Regulatory Reform. ABP Marine Environmental Research, UK.DECC SEA online atlas.

Bexton S, Thompson D, Brownlow A, Barley J, Milne R & Bidewell C (2012). Unusual Mortality of Pinnipeds in the United Kingdom Associated with Helical (Corkscrew) Injuries of Anthropogenic Origin. *Aquatic Mammals* **38**: 229-240.

BP (2010). Clair Ridge Development Environmental Statement. BP Exploration Operating Company, Farburn Industrial Estate, Dyce, Aberdeen, UK.

Currie DR & Isaacs LR (2005). Impact of exploratory offshore drilling on benthic communities in the Minerva gas field, Port Campbell, Australia. *Marine Environmental Research* **59**: 217–233

Daan R & Mulder M (1996). On the short-term and long-term impact of drilling activities in the Dutch sector of the North Sea. *ICES Journal of Marine Science* **53**: 1036-1044.

DECC & HSE (2014). Consultation Document: Consultation on the implementation of Directive 2013/30/EU on the safety of offshore oil and gas operations and amending Directive 2004/35/EC, and on the review of offshore Approved Codes of Practice and the updating of onshore UK oil and gas safety legislation to cover emerging energy technologies, 286pp.

DECC (2009). Offshore Energy Strategic Environmental Assessment, Environmental Report. Department of Energy and Climate Change, UK, 307pp plus appendices.

DECC (2011). Offshore Energy Strategic Environmental Assessment 2, Environmental Report. Department of Energy and Climate Change, UK, 443pp plus appendices.

DECC (2012). Guidance notes to operators of UK offshore oil and gas installations (including pipelines) on Oil Pollution Emergency Plan requirements, 58pp.

DECC (2014). Offshore Oil & Gas Licensing 28th Seaward Round Habitats Regulation Assessment. Stage 1 – Block and Site Screenings. Department of Energy and Climate Change URN 14D/319, 59pp + appendices.

DECC (2015). Guidance Notes for Preparing Oil Pollution Emergency Plans for Offshore Oil & Gas Installations and Relevant Oil Handling Facilities. Department of Energy and Climate Change, February 2015, 66pp.

Defra (2010). Charting Progress 2: An assessment of the state of UK seas. Published by the Department for Environment Food and Rural Affairs on behalf of the UK Marine Monitoring and Assessment Strategy community, London, 194pp.

Defra (2012). Habitats and Wild Birds Directives: guidance on the application of article 6(4) Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures December 2012, 10pp.

Dixon T (2013). Annual survey of reported discharges attributed to vessels and offshore oil and gas installations operating in the United Kingdom pollution control zone 2012. Advisory Committee on Protection of the Sea (ACOPS). 82pp.

DTI (2003). Strategic Environmental Assessment Area North and West of Orkney and Shetland. Report to the Department of Trade and Industry, 257pp.

EC (2000) Managing NATURA 2000 Sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, 69pp.

Engås A, Løkkeborg S, Ona E & Soldal AV (1996). Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*). *Canadian Journal of Fisheries and Aquatic Sciences* **53**: 2238-2249.

Fisher CR, Hsing, PY, Kaiser CL, Yoerger DR, Roberts HH, Shedd WW, Cordes EE, Shank TM, Berlet SP, Saunders MG, Larcom EA & Brooks JM (2014). Footprint of *Deepwater Horizon* blowout impact to deep-water coral communities. *Proceedings of the National Academy of Sciences* **111**: 11744-11749.

Furness RW, Wade HM & Masden EA (2013). Assessing vulnerability of marine bird populations to offshore wind farms. *Journal of Environmental Management* **119**: 56-66.

Garthe S & Hüppop O (2004). Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology* **41**: 724-734.

Gill AB & Bartlett M (2010). Literature review on the potential effects of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel. Scottish Natural Heritage Commissioned Report No.401, 43pp.

Goold JC (1996). Acoustic assessment of populations of common dolphin, *Delphinus delphis*, in conjunction with seismic surveying. *Journal of the Marine Biological Association of the UK* **76**: 811-820.

Hammond PS, Gordon JCD, Grellier K, Hall AJ, Northridge SP, Thompson D & Harwood J (2002). Background information on marine mammals relevant to Strategic Environmental Assessments 2 and 3. Sea Mammal Research Unit, 78pp.

Hammond PS, Northridge SP, Thompson D, Gordon JCD, Hall AJ, Murphy SN & Embling CB (2008). Background information on marine mammals for Strategic Environmental Assessment 8. Report to the Department for Business, Enterprise and Regulatory Reform. Sea Mammal Research Unit, St. Andrews, Scotland, UK, 52pp.

Hammond PS, Northridge SP, Thompson D, Gordon JCD, Hall AJ, Sharples RJ, Grellier K & Matthiopoulos J (2004). Background information on marine mammals relevant to Strategic Environmental Assessment 5. Report to the DTI from Sea Mammal Research Unit, University of St. Andrews, UK, 73pp.

Haney JC, Geiger HJ & Short JW (2014a). Bird mortality from the Deepwater Horizon oil spill. I. Exposure probability in the offshore Gulf of Mexico. *Marine Ecology Progress Series* **513**: 225–237.

Haney JC, Geiger HJ & Short JW (2014b). Bird mortality from the Deepwater Horizon oil spill. II. Carcass sampling and exposure probability in the coastal Gulf of Mexico. *Marine Ecology Progress Series* **513**: 239–252.

Hassel A, Knutsen T, Dalen J, Skaar, K, Løkkeborg S, Misund OA, Øivind Ø, Fonn M & Haugland EK (2004). Influence of seismic shooting on the lesser sandeel (*Ammodytes marinus*). *ICES Journal of Marine Science* **61**: 1165-1173.

Hastings MC, Popper AN, Finneran JJ & Lanford PJ (1996). Effect of low frequency underwater sound on hair cells of the inner ear and lateral line of the teleost fish *Astronotus ocellatus*. *Journal of the Acoustical Society of America* **99**: 1759-1766.

HM Government (2011). UK Marine Policy Statement. HM Government, Northern Ireland Executive, Scottish Government, Welsh Assembly Government. 51pp.

JNCC (1999). Seabird vulnerability in UK waters: block specific vulnerability. Joint Nature Conservation Committee, Aberdeen, UK, 66pp.

JNCC (2002). JNCC committee meeting - December 2002. JNCC 02 D07. http://jncc.defra.gov.uk/PDF/comm02D07.pdf

JNCC (2010). JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from seismic surveys. August 2010. Joint Nature Conservation Committee, Aberdeen, UK, 16pp.

Jones DOB, Gates AR & Lausen B (2012). Recovery of deep-water megafaunal assemblages from hydrocarbon drilling disturbance in the Faroe−Shetland Channel. *Marine Ecology Progress Series* **461**: 71–82.

Jones DOB, Hudson IR & Bett BJ (2006). Effects of physical disturbance on the cold-water megafaunal communities of the Faroe-Shetland Channel. *Marine Ecology Progress Series* **319**: 43-54.

Kaiser MJ, Galanidi M, Showler DA, Elliott AJ, Caldow RWG, Rees EIS, Stillman RA & Sutherland WJ (2006). Distribution and behaviour of common scoter *Melanitta nigra* relative to prey resources and environmental parameters. *Ibis* **148**: 110-128.

Kastelein RA, Gransier R, Hoek L & Olthuis J (2012). Temporary threshold shifts and recovery in a harbour porpoise (Phocoena phocoena) after octave-band noise at 4kHz. *Journal of the Acoustic Society of America* **132**: 3525-3537.

Kingston PF, Dixon IMT, Hamilton S & Moore DC (1995). The impact of the Braer oil spill on the macrobenthic infauna of the sediments off the Shetland Islands. *Marine Pollution Bulletin* **30**: 445-459.

Kober K, Webb A, Win I, Lewis L, O'Brien S, Wilson LJ & Reid J (2010). An analysis of the numbers and distribution of seabirds within the British Fishery Limit aimed at identifying areas that qualify as possible marine SPAs. JNCC Report 431. JNCC Peterborough.

Kober K, Wilson LJ, Black J, O'Brien S, Allen S, Win I, Bingham C & Reid JB (2012). The identification of possible marine SPAs for seabirds in the UK: the application of Stage 1.1-1.4 of the SPA selection guidelines. JNCC Report No. 461, 88pp.

Kongsberg (2010). Underwater noise propagation modelling and estimate of impact zones for seismic operations in the Moray Firth. Kongsberg Maritime Limited Final Report 37399 – FR1 (C), March 2010. Prepared for the University of Aberdeen. 62pp.

Law RJ, Kirby MF, Moore J, Barry J, Sapp M & Balaam J (2011). PREMIAM – Pollution Response in Emergencies Marine Impact Assessment and Monitoring: Post-incident monitoring guidelines. Science Series Technical Report, Cefas, Lowestoft,146: 164pp.

Lonergan M, Duck CD, Thompson D, Moss S & McConnell B (2011). British grey seal (*Halichoerus grypus*) abundance in 2008: an assessment based on aerial counts and satellite telemetry. *ICES Journal of Marine Science* **68**: 2201-2209.

Lucke K, Siebert U, Lepper PA & Blanchet M-A (2009). Temporary shift in masked hearing thresholds in a harbor porpoise (*Phocoena phocoena*) after exposure to seismic airgun stimuli. *Journal of the Acoustical Society of America* **125**: 4060-4070.

Mahmoudi N, Porter TM, Zimmerman AR, Fulthorpe RR, Kasozi GN, Silliman BR & Slater GF (2013). Rapid degradation of *Deepwater Horizon* spilled oil by indigenous microbial communities in Louisiana saltmarsh sediments. *Environmental Science and Technology* **47**: 13303-13312.

Malcolm IA, Godfrey J & Youngson AF (2010). Review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment: Implications for the development of marine renewables. Scottish Marine and Freshwater Science Volume 1 No 14.

Matthiopoulos J, McConnell B, Duck C & Fedack M (2004). Using satellite telemetry and aerial counts to estimate space use by grey seals around the British Isles. *Journal of Applied Ecology* **41**: 476-491.

McCauley RD (1994). Seismic surveys. In, Swan, JM, Neff, JM and Young, PC (Eds) Environmental implications of offshore oil and gas developments in Australia. The findings of an independent scientific review. Australian Petroleum Exploration Association, Sydney, NSW. 696pp.

McCauley RD, Fewtrell J & Popper AN (2003). High intensity anthropogenic sound damages fish ears. *Journal of the Acoustical Society of America* **113**: 638-642.

MMS (2004). Geological and geophysical exploration for mineral resources on the Gulf of Mexico Outer Continental Shelf. Final programmatic environmental assessment. Report no. MMS 2004-054. Report to the U.S. Department of the Interior Minerals Management Service, New Orleans, 487pp.
http://www.ocsbbs.com/2004-054.pdf

Montagna PA, Baguley JG, Cooksey C, Hartwell I, Hyde LJ, Hyland JL, Kalke RD, Kracker LM, Reuscher M & Rhodes ACE (2013). Deep-sea benthic footprint of the Deepwater Horizon blowout. *PLoS ONE* **8**(8): e70540.

ODPM (2005). Government circular: Biodiversity and geological conservation - statutory obligations and their impact within the planning system. ODPM Circular 06/2005. Office of the Deputy Prime Minister, UK, 88pp.

OGP (2010). Ship/installation collisions. Report No. 434-16, 21pp.

Oil and Gas UK (2009). Accident statistics for offshore units on the UKCS 1990-2007 Issue 1 April 2009, 127pp.

Onoufriou J & Thompson D (2014). Testing the hypothetical link between shipping and unexplained seal deaths: Final report. Sea Mammal Research Unit report to Scottish Government, 33pp.

OSPAR (2000). Quality Status Report 2000. OSPAR Commission, London.
http://www.ospar.org/eng/html/qsr2000/QSR2000welcome3.htm

OSPAR (2009). Assessment of impacts of offshore oil and gas activities in the North-East Atlantic. OSPAR Commission, 40pp.

OSPAR (2010). Quality Status Report 2010. OSPAR Commission, London, 176pp.

Peacock EE, Nelson RK, Solow AR, Warren JD, Baker JL, & Reddy CM (2005). The West Falmouth oil spill: 100 kg of oil persists in marsh sediments. *Environmental Forensics* **6**:273-281.

Pollock CM, Mavor R, Weir CR, Reid A, White RW, Tasker ML, Webb A & Reid JB (2000). The distribution of seabirds and marine mammals in the Atlantic Frontier, north and west Scotland. Joint Nature Conservation Committee report, 90pp plus appendices.

Popper AN, Fewtrell J, Smith ME & McCauley RD (2003). Anthropogenic sound: Effects on the behavior and physiology of fishes. *Marine Technology Society Journal* **37**: 35-40.

Reddy CM, Eglinton TI, Hounshell A, White HK, Xu L, Gaines RB & Frysinger GS (2002). The West Falmouth oil spill after thirty years: the persistence of petroleum hydrocarbons in marsh sediments. *Environmental Science and Technology* **36**: 4754 -4760.

Richardson WJ, Greene CR Jr, Malme CI & Thomson DH (1995). *Marine Mammals and Noise.* Academic Press, San Diego, US, 576pp.

Schwarke LH, Smith CR, Townsend FI, Wells RS, Hart LB, Balmer BC, Collier TK, De Guise S, Fry MM, Guillette LJ Jr., Lamb SV, Lane SM, McFee WE, Place NJ, Tumlin MC, Ylitalo GM, Zolman ES & Rowles TK (2013). Health of common bottlenose dolphins (*Tursiops truncatus*) in Barataria Bay, Louisiana, following the *Deepwater Horizon* oil spill. *Environment Science & Technology* **48**: 93-103.

SCOS (2012). Scientific Advice on Matters Related to the Management of Seal Populations: 2012. Special Committee on Seals, 174pp.

Scottish Government (2014). Scottish Planning Policy, 81pp.

SEERAD (2000). Nature conservation: implementation in Scotland of EC directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ("the Habitats and Birds Directives"). June 2000. Revised guidance updating Scottish Office circular no. 6/199.

Sharples RJ, Cunningham L & Hammond PS (2005). Distribution and movement of harbour seals around the UK. Briefing paper by the Sea Mammal Research Unit (SMRU), Gatty Marine Laboratory, University of St Andrews, for the Special Committee on Seals (SCOS) report: Scientific advice on matters related to the management of seal populations, pp.66-69. http://www.scotland.gov.uk/Resource/Doc/921/0020956.pdf

Sharples RJ, Matthiopoulos J & Hammond PS (2008). Distribution and movements of harbour seals around the coast of Britain. Report to the Department of Energy and Climate Change (DECC). Sea Mammal Research Unit, St. Andrews, UK, 65pp.

Sharples RJ, Moss SE, Patterson TA & Hammond PS (2012). Spatial variation in foraging behaviour of a marine top predator (*Phoca vitulina*) determined by a large-scale satellite tagging program. PLoS ONE **7**(5): e37216.

Skalski JR, Pearson WH & Malme CI (1992). Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes* spp.). *Canadian Journal of Fisheries and Aquatic Science* **49**: 1343-1356.

Slotte A, Hansen K, Dalen J & Ona E (2004). Acoustic mapping of pelagic fish distribution and abundance in relation to a seismic shooting area off the Norwegian west coast. *Fisheries Research* **67**: 143-150.

SMRU (2007). Potential impact of oil and gas exploration and development on SACs for bottlenose dolphins and other marine mammals in the Moray Firth and Cardigan Bay/Pembrokeshire. Report to the DTI. Sea Mammal Research Unit, University of St Andrews, Scotland, 13pp.

SMRU (2011). Utilisation of space by grey and harbour seals in the Pentland Firth and Orkney waters. Scottish Natural Heritage commissioned report No. 441.

SNCB (2012). Guidance for staff advising on the potential risk of seal corkscrew injuries April 2012.

SNCB (2015). Interim advice on risk of seal corkscrew injuries (February 2015), 1pp.

SNH (2015). Habitats Regulations Appraisal of Plans: Guidance for Plan-making Bodies in Scotland. Scottish Natural Heritage report no. 1739, Version 3, 77pp.

SOTEAG (1993). Dealing with the Wildlife Casualties of the Braer Oil Spill, Shetland, January 1993. Report by the Shetland Oil Terminal Environmental Advisory Group.

Southall BL, Bowles AE, Ellison WT, Finneran JJ, Gentry RL, Greene Jr. CR, Kastak D, Ketten DR, Miller JH, Nachtigall PE, Richardson WJ, Thomas JA & Tyack PL (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33: 411-522.

Stemp R (1985). Observations on the effects of seismic exploration on seabirds. In: Greene GD, Engelhardt FR & Paterson RJ (Eds) *Proceedings of the Workshop on Effects of Explosives Use in the Marine Environment*. Jan 29-31, 1985, Halifax, Canada.

Teal JM & Howarth RW (1984). Oil spill studies: a review of ecological effects. *Environmental Management* **8**: 27-43

Teal JM, Farrington JW, Burns KA, Stegeman JJ, Tripp BW, Woodin B & Phinney C (1992). The West Falmouth oil spill after 20 years: fate of fuel oil compounds and effects on animals. *Marine Pollution Bulletin* **24**: 607-614.

Thompson D, Bexton S, Brownlow A, Wood D, Patterson T, Pye K, Lonergan M & Milne R (2010). Report on recent seal mortalities in UK waters caused by extensive lacerations. Sea Mammal Research Unit, 20pp.

Thompson D, Onoufriou J, Brownlow A & Bishop A (2015). Preliminary report on predation by adult grey seals on grey seal pups as a possible explanation for corkscrew injury patterns seen in the unexplained seal deaths. Sea Mammal Research Unit report to Scottish Government, 15pp.

Total (2014). Glenlivet Development Project Environmental Statement. TOTAL Exploration and Production UK Ltd and Xodus Group.

Trannum HC, Setvik Å, Norling K & Nilsson HC (2011). Rapid macrofaunal colonization of water-based drill cuttings on different sediments. *Marine Pollution Bulletin* **62**: 2145–2156

Turner RE, Overton EB, Meye BM, Miles MS, McClenachan G, Hooper-Bui L, Engel AS, Swenson EM, Lee JM, Milan CS & Gao H (2014). Distribution and recovery trajectory of Macondo (Mississippi Canyon 252) oil in Louisiana coastal wetlands. *Marine Pollution Bulletin* **87**: 57-67.

Turrell WR, Slesser G, Adams RD, Payne R and Gillibrand PA (1999). Decadal variability in the composition of Faroe Shetland Channel bottom water. *Deep-Sea Research I* **46**: 1-25.

van Neer A, Jensen LF & Siebert U (2015). Grey seal (*Halichoerus grypus*) predation on harbour seals (*Phoca vitulina*) on the island of Helgoland, Germany. *Journal of Sea Research* **97**: 1-4.

White HK, Hsing P-Y, Cho W, Shank TM, Cordes EE, Ouattrini AM, Netson RK, Camilli R, Demopoulos AWJ, German CR, Brooks JM, Roberts HH, Shedd W, Reddy CM & Fisher CR (2012). Impact of the Deepwater Horizon oil spill on a deep-water coral community in the Gulf of Mexico. *Proceedings of the National Academy of Sciences of the United States of America* **109**: 20303–20308.

Williams JM, Tasker ML, Carter IC & Webb A (1994). Method for assessing seabird vulnerability to surface pollutants. *Ibis* **137**: 147-152.

Appendix A – The Sites

A1 Introduction

The following maps and tables show the locations of potentially relevant European sites and their qualifying features with respect to the Blocks applied for as part of the 28th Licensing Round.

The primary sources of site data were the latest JNCC SAC[49] (version as of 1st September 2014) and SPA[50] (version as of 1st September 2014) summary data and interest features and site characteristics were filtered for their coastal and marine relevance. The Scottish Natural Heritage (SNH)[51] website was also reviewed to verify and augment site information.

The sites in this Appendix are ordered thus:

A2 Coastal and marine Special Protection Areas

A3 Coastal and marine Special Areas of Conservation

A4 Offshore Special Areas of Conservation

A5 Riverine Special Areas of Conservation

A6 Ramsar sites

A2 Coastal and Marine Special Protection Areas

Special Protection Areas (SPAs) are protected sites classified in accordance with Article 4 of the EC Birds Directive 2009/147/EC. Sites are classified for rare and vulnerable birds and for regularly occurring migratory birds. The SPAs included in this section are coastal sites which have been selected for the presence of one or more of the bird species listed in Box A.1 (below). A number of inshore marine SPAs, some of which provide marine extensions to existing sites, are presently at the draft stage in Scottish inshore and offshore waters. These dSPAs[52], though not formally subject to Government approval and yet to be formally consulted upon, are listed and shown in relevant maps below.

[49] Version as of 1st September 2014 - http://jncc.defra.gov.uk/page-1461
[50] Version as of 1st September 2014 - http://jncc.defra.gov.uk/page-1409
[51] http://gateway.snh.gov.uk/sitelink/index.jsp
[52] http://www.snh.gov.uk/docs/A1350044.pdf - 22nd July 2014

Box A.1: Migratory and/or Annex I bird species for which SPAs are selected in the UK

Divers and grebes
Red-throated diver *Gavia stellata*
Black-throated diver *Gavia arctica*
Little grebe *Tachybaptus ruficollis*
Great crested grebe *Podiceps cristatus*
Slavonian grebe *Podiceps auritus*

Seabirds
Fulmar *Fulmarus glacialis*
Manx shearwater *Puffinus puffinus*
Storm petrel *Hydrobates pelagicus*
Leach's petrel *Oceanodroma leucorhoa*
Gannet *Morus bassanus*
Cormorant *Phalacrocorax carbo carbo*
Shag *Phalacrocorax aristotelis*
Guillemot *Uria aalge*
Razorbill *Alca torda*
Puffin *Fratercula arctica*

Gulls, terns and skuas
Arctic skua *Stercorarius parasiticus*
Great skua *Catharacta skua*
Mediterranean gull *Larus melanocephalus*
Black-headed gull *Larus ridibundus*
Common gull *Larus canus*
Lesser black-backed gull *Larus fuscus*
Herring gull *Larus argentatus*
Great black-backed gull *Larus marinus*
Kittiwake *Rissa tridactyla*
Sandwich tern *Sterna sandvicensis*
Roseate tern *Sterna dougallii*
Common tern *Sterna hirundo*
Arctic tern *Sterna paradisaea*
Little tern *Sterna albifrons*

Crakes and rails
Spotted crake *Porzana porzana*
Corncrake *Crex crex*
Coot *Fulica atra*

Birds of prey and owls
Honey buzzard *Pernis apivorus*
Red kite *Milvus milvus*
Marsh harrier *Circus aeruginosus*
Hen harrier *Circus cyaneus*
Golden eagle *Aquila chrysaetos*
Osprey *Pandion haliaetus*
Merlin *Falco columbarius*
Peregrine *Falco peregrinus*
Short-eared owl *Asio flammeus*

Other bird species
Capercaillie *Tetrao urogallus*
Nightjar *Caprimulgus europaeus*
Woodlark *Lullula arborea*
Fair Isle wren *Troglodytes troglodytes fridariensis*
Aquatic warbler *Acrocephalus paludicola*
Dartford warbler *Sylvia undata*
Chough *Pyrrhocorax pyrrhocorax*
Scottish crossbill *Loxia scotica*

Waders
Oystercatcher *Haematopus ostralegus*
Avocet *Recurvirostra avosetta*
Stone curlew *Burhinus oedicnemus*
Ringed plover *Charadrius hiaticula*
Dotterel *Charadrius morinellus*
Golden plover *Pluvialis apricaria*
Grey plover *Pluvialis squatarola*
Lapwing *Vanellus vanellus*
Knot *Calidris canutus*
Sanderling *Calidris alba*
Purple sandpiper *Calidris maritima*
Dunlin *Calidris alpina alpina*
Ruff *Philomachus pugnax*
Snipe *Gallinago gallinago*
Black-tailed godwit *Limosa limosa* (breeding)
Black-tailed godwit *Limosa limosa islandica* (non-breeding)
Bar-tailed godwit *Limosa lapponica*
Whimbrel *Numenius phaeopus*
Curlew *Numenius arquata*
Redshank *Tringa totanus*
Greenshank *Tringa nebularia*
Wood sandpiper *Tringa glareola*
Turnstone *Arenaria interpres*
Red-necked phalarope *Phalaropus lobatus*

Waterfowl
Bewick's swan *Cygnus columbianus bewickii*
Whooper swan *Cygnus cygnus*
Bean goose *Anser fabalis*
Pink-footed goose *Anser brachyrhynchus*
Russian white-fronted goose *Anser albifrons albifrons*
Greenland white-fronted goose *Anser albifrons flavirostris*
Icelandic greylag goose *Anser anser*
Greenland barnacle goose *Branta leucopsis*
Svalbard barnacle goose *Branta leucopsis*
Dark-bellied brent goose *Branta bernicla bernicla*
Canadian light-bellied brent goose *Branta bernicla hrota*
Svalbard light-bellied brent goose *Branta bernicla hrota*
Shelduck *Tadorna tadorna*
Wigeon *Anas penelope*
Gadwall *Anas strepera*
Teal *Anas crecca*
Mallard *Anas platyrhynchos*
Pintail *Anas acuta*
Shoveler *Anas clypeata*
Pochard *Aythya ferina*
Tufted duck *Aythya fuligula*
Scaup *Aythya marila*
Eider *Somateria mollissima*
Long-tailed duck *Clangula hyemalis*
Common scoter *Melanitta nigra*
Velvet scoter *Melanitta fusca*
Goldeneye *Bucephala clangula*
Red-breasted merganser *Mergus serrator*
Goosander *Mergus merganser*

Map A.1: Location of SPAs

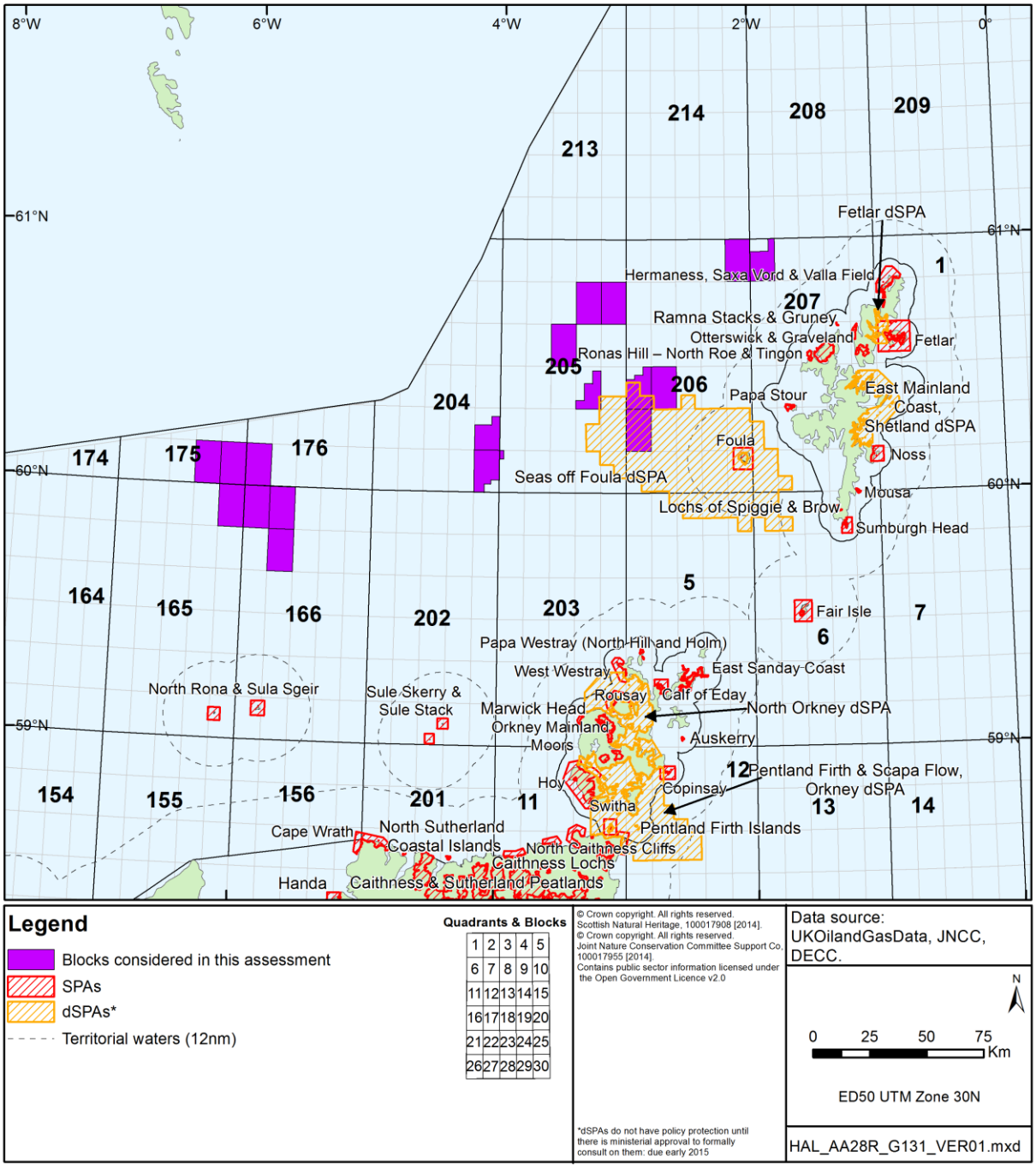


Table A.1: Coastal and marine SPAs and their Qualifying Features

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[53]
SHETLAND				
Sumburgh Head SPA	2477.91	Breeding: Arctic tern	N/A	Breeding: Seabirds
Lochs of Spiggie and Brow SPA	141.48	Over winter: Whooper swan	N/A	N/A
Foula SPA	7,985.49	Breeding: Arctic tern Leach's storm petrel Red-throated diver	Breeding: Great skua Guillemot Puffin Shag	Breeding: Seabirds
Seas off Foula dSPA	To be announced	N/A	Migratory: Great skua Fulmar Arctic skua Guillemot Puffin	N/A
Papa Stour SPA	569.03	Breeding: Arctic tern	Breeding: Ringed plover	N/A
Ronas Hill-North Roe and Tingon SPA	5,470.2	Breeding: Merlin Red-throated diver	Breeding: Great skua	N/A
Ramna Stacks and Gruney SPA	11.59	Breeding: Leach's storm petrel	N/A	N/A
Otterswick and Graveland SPA	2,241.41	Breeding: Red-throated diver	N/A	N/A
Hermaness, Saxa Vord and Valla Field SPA	6,833.04	Breeding: Red-throated diver	Breeding: Gannet Great skua Puffin	Breeding: Seabirds
Fetlar SPA	16962.16	Breeding: Arctic tern Red-necked phalarope	Breeding: Dunlin Great skua Whimbrel	Breeding: Seabirds
Fetlar dSPA	6351.70	Annex I species: Red-throated diver	N/A	N/A
East Mainland Coast, Shetland dSPA	31899.82	Annex I species: Great northern diver Red-throated diver Slavonian grebe	Migratory species: Eider Long-tailed duck Red-breasted merganser	N/A
Noss SPA	3338.34	N/A	Breeding: Gannet Great skua Guillemot	Breeding: Seabirds
Mousa SPA	197.98	Breeding: Arctic tern	N/A	N/A

[53] A seabird assemblage of international importance: the area regularly supports at least 20,000 seabirds. Or, a wetland of international importance: the area regularly supports at least 20,000 waterfowl.

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[53]
		Storm petrel		
Fair Isle SPA	6824.4	Breeding: Arctic tern Fair Isle wren	Breeding: Guillemot	Breeding: Seabirds
ORKNEY				
Pentland Firth Islands SPA	170.51	Breeding: Arctic tern	N/A	N/A
Switha SPA	57.39	Over winter: Barnacle goose	N/A	N/A
Orkney Mainland Moors SPA	5342.19	Breeding: Hen harrier Red-throated diver Short-eared owl Over winter: Hen harrier	N/A	N/A
Hoy SPA	18122.17	Breeding: Peregrine Red-throated diver	Breeding: Great skua	Breeding: Seabirds
Marwick Head SPA	475.58	N/A	Breeding: Guillemot	Breeding: Seabirds
Rousay SPA	5483.37	Breeding: Arctic tern	N/A	Breeding: Seabirds
North Orkney dSPA	57495.77	Annex I species: Great northern diver Slavonian grebe Red-throated diver Arctic tern	Migratory species: Eider Long-tailed duck Velvet scoter Red-breasted merganser Shag	N/A
West Westray SPA	3781.29	Breeding: Arctic tern	Breeding: Guillemot	Breeding: Seabirds
Papa Westray (North Hill and Holm) SPA	245.71	Breeding: Arctic tern	Breeding: Arctic skua	N/A
Calf of Eday SPA	2668.91	N/A	N/A	Breeding: Seabirds
East Sanday Coast SPA	1515.23	Over winter: Bar-tailed godwit	Over winter: Purple sandpiper Turnstone	N/A
Auskerry SPA	101.97	Breeding: Arctic tern Storm petrel	N/A	N/A
Copinsay SPA	3607.7	N/A	N/A	Breeding: Seabirds
Pentland Firth and Scapa Flow, Orkney dSPA	131751.45	Annex I species: Great northern diver Red-throated diver Black-throated diver Slavonian grebe Arctic tern	Migratory: Shag Guillemot Eider Long-tailed duck Goldeneye Red-breasted merganser	N/A

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[53]
NORTH COAST OF SCOTLAND				
North Rona and Sula Sgeir SPA	6850.58	Breeding: Leach's petrel Storm petrel	Breeding: Razorbill Puffin Fulmar Great black-backed gull Gannet Kittiwake Guillemot	Breeding: Seabirds
Sule Skerry and Sule Stack SPA	3909.45	Breeding: Leach's storm petrel Storm petrel	Breeding: Gannet Puffin	Breeding: Seabird
Handa SPA	3205.61	N/A	Breeding: Guillemot Razorbill Kittiwake Fulmar Great Skua	Breeding: Seabirds
Cape Wrath SPA	6737.26	N/A	N/A	Breeding: Seabirds
North Sutherland Coastal Islands SPA	221.11	Over winter: Barnacle goose	N/A	N/A
North Caithness Cliffs SPA	14621.14	Breeding: Peregrine	Breeding: Guillemot	Breeding: Seabirds
Caithness and Sutherland Peatlands SPA	145516.75	Breeding: Black-throated diver Golden eagle Golden plover Hen harrier Merlin Red-throated diver Short-eared owl Wood sandpiper	Breeding: Common scoter Dunlin Greenshank Wigeon	N/A
Caithness Lochs SPA	1378.45	Over winter: Greenland white-fronted goose Whooper swan	Over winter: Greylag goose	N/A

A3 Coastal and Marine Special Areas of Conservation

This section includes coastal or nearshore marine (within 12nm boundary) Special Areas of Conservation (SAC) sites which contain one or more of the Annex I coastal habitats listed in Box A.2 (below) or examples of Annex II qualifying marine species. Riverine/freshwater SACs which are designated for migratory fish and/or freshwater pearl mussel are included on Map A.2 and considered in Section A4.

Abbreviations for the Annex 1 habitats used in SAC site summaries (Tables A.2 and A.3 and Map A.2) are listed in Box A.2.

Box A.2: Annex 1 Habitat Abbreviations Used in Site Summaries

Annex I Habitat (abbreviated)	Annex I Habitat(s) (full description)
Bogs	Blanket bogs * Priority feature
	Depressions on peat substrates of the *Rhynchosporion*
Coastal Dunes	Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)
	Coastal dunes with *Juniperus* spp.
	Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)
	Fixed dunes with herbaceous vegetation (`grey dunes`) * Priority feature
	Humid dune slacks
	Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)
Coastal Lagoons	Coastal lagoons *Priority feature
Fens	Alkaline fens
	Petrifying springs with tufa formation (*Cratoneurion*) * Priority feature
Grasslands	Alpine and subalpine calcareous grasslands
	Calaminarian grasslands of the *Violetalia calaminariae*
	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
	Siliceous alpine and boreal grasslands
	Species-rich *Nardus* grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe) * Priority feature
Heaths	Alpine and Boreal heaths
	European dry heaths
	Northern Atlantic wet heaths with *Erica tetralix*
Inlets and bays	Large shallow inlets and bays
Limestone pavements	Limestone pavements * Priority feature
Mudflats and sandflats	Mudflats and sandflats not covered by seawater at low tide
Reefs	Reefs
Rocky slopes	Calcareous rocky slopes with chasmophytic vegetation
Sandbanks	Sandbanks which are slightly covered by sea water all the time
Scree	Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)
	Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)
Sea caves	Submerged or partially submerged sea caves
Sea cliffs	Vegetated sea cliffs of the Atlantic and Baltic coasts
Standing freshwater	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
	Natural dystrophic lakes and ponds
	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*

Map A.2: Location of coastal, marine and riverine SACs

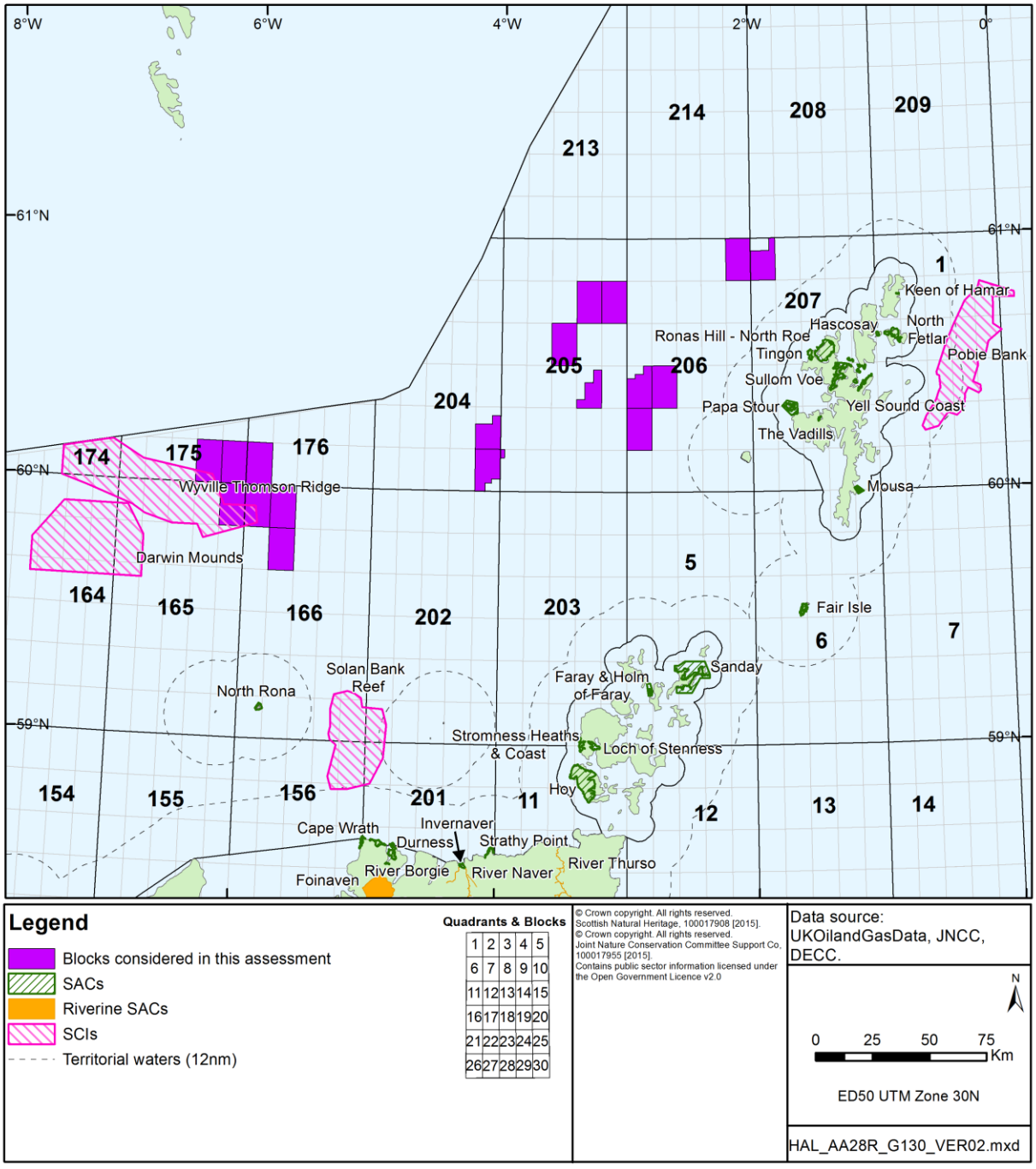


Table A.2: Coastal and marine SACs and their Qualifying Features

Site Name	Area (ha)	Annex I Habitat Primary	Annex II Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
SHETLAND					
Papa Stour SAC	2076.69	Reefs Sea caves	N/A	N/A	N/A
The Vadills SAC	62.43	Coastal lagoons	N/A	N/A	N/A
Tingon SAC	569.3	Bogs	Standing freshwater	N/A	N/A
Ronas Hill-North Roe SAC	4900.9	Standing freshwater Heath Bogs	Heath Scree	N/A	N/A
Sullom Voe SAC	2698.55	Inlets and bays	Coastal lagoons Reefs	N/A	N/A
Yell Sound Coast SAC	1540.55	N/A	N/A	Otter *Lutra lutra* Harbour seal *Phoca vitulina*	N/A
Keen of Hamar SAC	39.9	Grasslands Scree	Heath	N/A	N/A
Hascosay SAC	164.92	Bogs	N/A	N/A	Otter *Lutra lutra*
North Fetlar SAC	1581.93	Heath Fens	N/A	N/A	N/A
Mousa SAC	530.6	N/A	Reefs Sea caves	Harbour seal *Phoca vitulina*	N/A
Fair Isle SAC	561.27	Sea cliffs	Heaths	N/A	N/A
ORKNEY					
Hoy SAC	9499.7	Sea cliffs Standing freshwater Heath Bog	Heath Fens Rocky slopes	N/A	N/A
Loch of Stenness SAC	791.87	Coastal lagoons	N/A	N/A	N/A
Stromness Heaths and Coasts SAC	635.78	Sea cliffs Heath	Fens	N/A	N/A
Faray and Holm of Faray SAC	785.68	N/A	N/A	Grey seal *Halichoerus grypus*	N/A

Site Name	Area (ha)	Annex I Habitat Primary	Annex II Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
Sanday SAC	10971.65	Reefs	Sandbanks Mudflats and sandflats	Harbour seal *Phoca vitulina*	N/A
NORTH COAST OF SCOTLAND					
North Rona SAC	628.53	Sea cliffs Sea caves Reefs	N/A	Grey seal *Halichoerus grypus*	N/A
Cape Wrath SAC	1015.21	Sea cliffs	N/A	N/A	N/A
Durness SAC	1212.74	Coastal dunes Standing freshwater Grasslands Limestone pavements	Coastal dunes Heath Grasslands Fens	N/A	Otter *Lutra lutra*
Invernaver SAC	294.54	Coastal dunes Heath Grasslands	Coastal dunes Fens	N/A	N/A
Strathy Point SAC	203.58	Sea cliffs	N/A	N/A	N/A

A4 Offshore Special Areas of Conservation

Table A.3: Offshore SACs and their Qualifying Features from West of Shetland

Site Name	Area (ha)	Annex 1 Habitat Primary	Annex 1 Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
Darwin Mounds SCI	137,726	Reefs	N/A	N/A	N/A
Wyville Thomson Ridge SCI	173,995	Reefs	N/A	N/A	N/A
Solan Bank Reef SCI	85,593	Reefs	N/A	N/A	N/A
Pobie Bank Reef SCI	96,575	Reefs	N/A	N/A	N/A

A5 Riverine Special Areas of Conservation

Table A.4: Riverine SACs designated for migratory fish and/or the freshwater pearl mussel

Site Name	Freshwater pearl mussel *Margaritifera margaritifera*	Migratory fish[1]
Foinaven	✓	-
River Borgie	✓	AS
River Naver	✓	AS

Site Name	Freshwater pearl mussel *Margaritifera margaritifera*	Migratory fish[1]
River Thurso	-	AS

[1] *AS - Atlantic salmon Salmo salar*

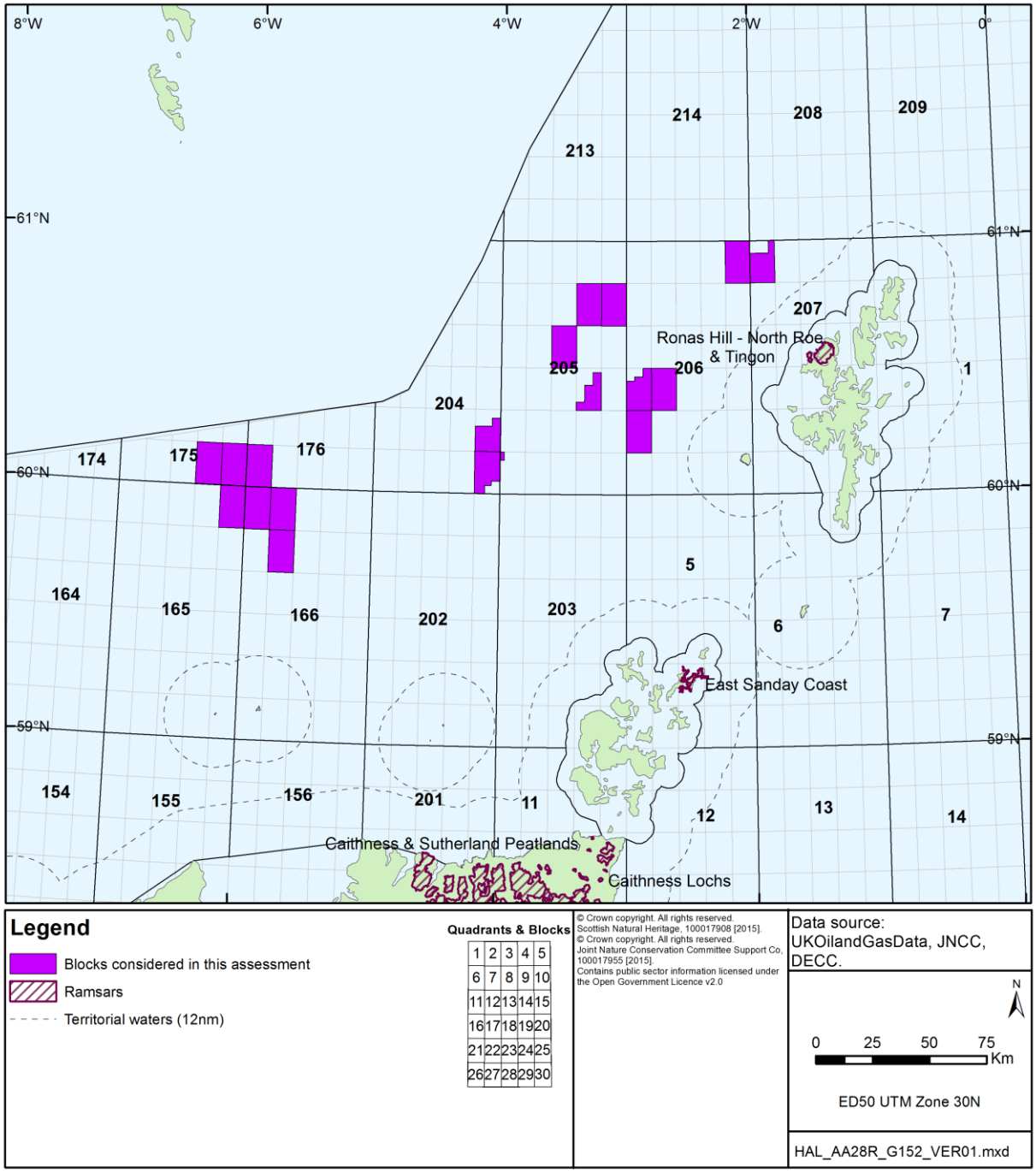
A6 Ramsar sites

The coastal Ramsar sites are also SPAs and/or SACs (although site boundaries are not always strictly coincident and a Ramsar site may comprise one or more Natura 2000 sites), see tabulation below.

Table A.5: Wetlands of international importance

Ramsar name	SPA name	SAC name
Caithness and Sutherland Peatlands	Caithness and Sutherland Peatlands	Caithness and Sutherland Peatlands
Caithness Lochs	Caithness Lochs	-
East Sanday Coast	East Sanday Coast	Sanday
Ronas Hill – North Roe and Tingon	Ronas Hill – North Roe and Tingon	Ronas Hill – North Roe

Map A.3: Location of coastal Ramsar sites



Appendix B – Re-screening tables for the identification of likely significant effects on the sites

B1 Introduction

In the screening assessment (DECC 2014), the implications of physical disturbance and drilling effects, underwater noise, accidental spills and in-combination and cumulative effects were considered in a generic way for all Blocks applied for in the 28th Round for sites where there was a foreseeable possibility of interactions. Proposed work programmes for the Blocks have now been confirmed by the applicant companies and are as follows:

- 165/5, 166/1, 166/2, 166/7, 175/29, 175/30 & 176/26 – 1 Drill or Drop well and obtain 2D seismic
- 204/25c – 1 Drill or Drop well and shoot 3D seismic
- 204/30b & 205/26d – 1 Drill or Drop well
- 205/9 (Part) & 205/10 – 1 Drill or Drop well and reprocess 3D
- 205/13 – 1 Drill or Drop well and reprocess 3D
- 205/19b – 1 Drill or Drop well
- 206/5 & 207/1b - 1 Drill or Drop well and reprocess 3D
- 206/16b, 206/17 & 206/21 – 1 Contingent well and shoot 3D seismic

In light of the proposed work programmes, those sites initially identified in the screening document as having a foreseeable interaction with offshore oil and gas activities are re-screened below. With respect to accidental spills, the geographic range of sites included has been broadened beyond the strict application of the screening criteria to take account of both the sensitivity and range of some of the qualifying features within the West of Shetland area. The potential for likely significant effects on relevant Natura 2000 sites is considered in the tables below and where relevant, the location of further appropriate assessment is clearly signposted. Activities which may be carried out following the grant of a licence, and which by themselves or in combination with other activities can affect the conservation objectives of relevant sites are considered under the following broad headings:

- Physical disturbance and drilling effects
- Underwater noise
- Accidental spills
- Cumulative and in-combination effects

B2 Coastal and marine Special Protection Areas

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
SHETLAND								
Sumburgh Head	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Lochs of Spiggie and Brow	-	✓	-	-	-	-	-	**Qualifying features** Overwintering waterfowl. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** N/A
Foula	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern, seabirds and diver. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Appropriate Assessment See Section 6.3.
Seas off Foula dSPA	-	-	✓	✓	✓	✓	-	**Qualifying features** Seabird aggregation – skua, fulmar, guillemot and puffin. Conservation objectives for the draft site yet to be detailed. Physical disturbance: Potential for significant physical disturbance and drilling effects given that Blocks 205/19b, 206/16b, 206/17 and 206/21 partly overlap or are adjacent to the site. Underwater noise: Potential for significant underwater noise effects given deep-diving qualifying features and that new seismic is proposed for Blocks 206/16b, 206/17 and 206/21 which partly overlap or are adjacent to the site. Accidental spills: In the unlikely event of an accidental spill from any of the Blocks, weathered spilled oil could have a significant effect, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 4.3, 5.3 and 6.3.
Papa Stour	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern and waders. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Ronas Hill-North Roe and Tingon	✓	-	-	✓	-	-	-	**Qualifying features** Breeding diver, skua and birds of prey. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Site is primarily terrestrial but in the unlikely event of a

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Ramna Stacks and Gruney	✓	-	-	✓	-	-	-	**Qualifying features:** Breeding Leach's petrel **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Otterswick and Graveland	✓	-		✓	-	-	-	**Qualifying features** Breeding diver **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Site is primarily terrestrial but in the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Hermaness, Saxa Vord and Valla Field	✓	-	-	✓	-	-	-	**Qualifying features** Breeding diver, seabirds and skua. Seabird assemblage **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Fetlar	✓	-	-	-	-	-	-	**Qualifying features** Breeding tern, waders and skua. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
Fetlar dSPA	-	✓	-	-	-	-	-	**Qualifying features** Overwintering divers and waterfowl. Conservation objectives for the draft site yet to be detailed. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
East Mainland Coast, Shetland dSPA	-	✓	-	-	-	-	-	**Qualifying features** Overwintering red-throated diver. Conservation objectives for the draft site yet to be detailed. **Consideration of likely significant effects** Physical disturbance: N/A

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
Noss	✓	-	-	-	-	-	-	**Qualifying features** Breeding seabirds and skua. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
Mousa	✓	-	-	-	-	-	-	**Qualifying features:** Breeding tern and seabirds. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
Fair Isle	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern, seabirds and Fair Isle wren. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
ORKNEY								
Pentland Firth Islands	✓	-	-	-	-	-	-	**Qualifying features** Breeding tern **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
Switha	-	✓	-	-	-	-	-	**Qualifying features** Overwintering waterfowl. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks.

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Cumulative: N/A **Appropriate Assessment** N/A
Orkney Mainland Moors	✓	✓	-	-	-	-	-	**Qualifying features:** Breeding birds of prey and diver, overwintering bird of prey. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Site is primarily terrestrial but in the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** N/A
Hoy	✓	-	-	✓	-	-	-	**Qualifying features** Breeding bird of prey, diver and skua. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Marwick Head	✓	-	-	✓	-	-	-	**Qualifying features** Breeding seabirds. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible.

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Rousay	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
North Orkney dSPA	✓	✓	✓	✓	-	-	-	**Qualifying features** Overwintering waterfowl, breeding tern, shag. Conservation objectives for the draft site yet to be detailed. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil could have a significant effect, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
West Westray	✓	-	-	✓	-	-	-	**Qualifying features** Breeding terns and seabirds. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Appropriate Assessment See Section 6.3.
Papa Westray (North Hill and Holm)	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern and skua. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Calf of Eday	✓	-	-	✓	-	-	-	**Qualifying features** Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
East Sanday Coast	-	✓	-	✓	-	-	-	**Qualifying features** Overwintering waders. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Auskerry	✓	-	-	-	-	-	-	**Qualifying features:** Breeding terns and seabirds. **Consideration of likely significant effects**

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
Copinsay	✓	-	-	-	-	-	-	**Qualifying features:** Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
Pentland Firth and Scapa Flow, Orkney dSPA	✓	✓	✓	✓	-	-	-	**Qualifying features** Overwintering divers and waterfowl, shag, guillemot, breeding terns. Conservation objectives for the draft site yet to be detailed. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of an accidental spill from any of the Blocks, weathered spilled oil could have a significant effect, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 6.3 and 7.

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
NORTH COAST OF SCOTLAND								
North Rona and Sula Sgeir SPA	✓	-	-	✓	-	-	-	**Qualifying features** Breeding seabirds and gulls. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Sule Skerry and Sule Stack	✓	-	-	✓	-	-	-	**Qualifying features** Breeding seabirds. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Handa	✓	-	-	✓	-	-	-	**Qualifying features** Breeding seabirds. Seabird assemblage. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Cape Wrath	✓	-	-	✓	-	-	-	**Qualifying features** Breeding seabirds. Seabird assemblage. **Consideration of likely significant effects**

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
North Sutherland Coastal Islands	-	✓	-	-	-	-	-	**Qualifying features:** Overwintering geese. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil unlikely to have a significant effect on the site's conservation objectives as the site includes limited marine habitats. Cumulative: N/A **Appropriate Assessment** N/A
North Caithness Cliffs	✓	-	-	✓	-	-	-	**Qualifying features:** Breeding seabirds, peregrine **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3
Caithness and Sutherland Peatlands	✓	-	-	-	-	-	-	**Qualifying features** Breeding diver, birds of prey, waterfowl and waders. **Consideration of likely significant effects**

Site name	Features present			Potential for likely significant effects				Consideration in light of Block work programmes
	Breeding	Wintering	Passage	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
								Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** N/A
Caithness Lochs	-	✓	-	-	-	-	-	**Qualifying features** Overwintering waterfowl. **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** N/A

B3 Coastal and marine Special Areas of Conservation

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
SHETLAND							
Papa Stour	✓	-	✓	-	-	-	**Qualifying features** Reefs, sea caves **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
The Vadills	✓	-	-	-	-	-	**Qualifying features** Coastal lagoons **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Tingon	✓	-	-	-	-	-	**Qualifying features** Bogs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered sensitive to marine spills.

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							Cumulative: N/A **Appropriate Assessment** N/A
Ronas Hill - North Roe	✓	-	-	-	-	-	**Qualifying features:** Standing freshwater, heath, bogs, heath, scree **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered sensitive to marine spills. Cumulative: N/A **Appropriate Assessment** N/A
Sullom Voe	✓	-	✓	-	-	-	**Qualifying features** Inlets and bays, coastal lagoons, reefs Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Yell Sound Coast	-	✓	✓	-	✓	-	**Qualifying features** Otter, harbour seal **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on seal qualifying features outside of site described in Section 5.3. Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
Keen of Hamar	✓	-	-	-	-	-	**Qualifying features** Grasslands, scree, heath **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered sensitive to marine spills. Cumulative: N/A **Appropriate Assessment** N/A
Hascosay	✓	✓	-	-	-	-	**Qualifying features** Otter **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A
North Fetlar	✓	-	-	-	-	-	**Qualifying features** Heath, fens **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil is not likely to have a significant effect on the site's conservation objectives given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** N/A

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
Mousa	✓	✓	✓	-	✓	-	**Qualifying features** Reefs, sea caves, harbour seal **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on seal qualifying features outside of site described in Section 5.3. Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives (through seal feature foraging outside of the site), although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.
Fair Isle	✓	-	-	-	-	-	**Qualifying features** Sea cliffs, heaths **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
ORKNEY							
Hoy	✓	-	-	-	-	-	**Qualifying features** Sea cliffs, standing freshwater, heath, bog, heath, fens, rocky slopes **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Loch of Stenness	✓	-	-	-	-	-	**Qualifying features** Coastal lagoons **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Stromness Heaths and Coasts	✓	-	-	-	-	-	**Qualifying features** Sea cliffs, heath, fens **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Faray and Holm of Faray	-	✓	✓	-	✓	-	**Qualifying features** Grey seal **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on mobile qualifying features outside of site described in Section 5.3. Accidental spills: In the unlikely event of a major crude oil spill from any of

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives (through qualifying feature foraging outside of the site), although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.
Sanday	✓	✓	✓	-	✓	-	**Qualifying features** Reefs, sandbanks, mudflats and sandflats, harbour seal **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on mobile qualifying features outside of site described in Section 5.3. Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives (through seal qualifying feature foraging outside of the site), although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.
NORTH COAST OF SCOTLAND							
North Rona	✓	✓	✓	-	✓	-	**Qualifying features** Sea cliffs, sea caves, reefs, grey seal **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on mobile qualifying features outside of site described in Section 5.3. Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.
Cape Wrath	✓	-	-	-	-	-	**Qualifying features** Sea cliffs **Consideration of likely significant effects** Physical disturbance: N/A

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Durness	✓	✓	-	-	-	-	**Qualifying features** Coastal dunes, standing freshwater, grasslands, limestone pavements, heath, fens **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Invernaver	✓	-	-	-	-	-	**Qualifying features** Coastal dunes, heath, grasslands, coastal dunes, fens **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A
Strathy Point	✓	-	-	-	-	-	**Qualifying features** Sea cliffs

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							Consideration of likely significant effects Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil is not likely to have a significant effect on the site's conservation objectives as qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** N/A

Notes: 1 ✓denotes feature present; 2 ✓denotes vulnerability to effect

B4 Riverine Special Areas of Conservation

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
Foinaven	✓	✓	✓	-	✓	-	**Qualifying features** Standing freshwater, heaths, grasslands, scree, rocky slope, bogs, freshwater pearl mussel & otter **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: The gills of migratory salmonids provide an essential mode of dispersal for the larvae of the qualifying feature. Potential for underwater noise effect on salmon outside of site described in Section 5.3. Accidental spills: Qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives (through impact on freshwater pearl mussel host, Atlantic salmon), although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.
River Borgie	-	✓	✓	-	✓	-	**Qualifying features** Freshwater pearl mussel, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: The gills of migratory salmonids provide an essential mode of dispersal for the larvae of the qualifying feature. Potential for underwater noise effect on salmon feature outside of site described in Section 5.3. Accidental spills: Qualifying features not considered particularly sensitive to marine spills (Law *et al*. 2011). In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could have a significant effect on the site's conservation objectives (through impact on salmon feature outside of site), although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
River Naver	-	✓	✓	-	✓	-	**Qualifying features** Freshwater pearl mussel, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: As for River Borgie SAC above. Accidental spills: As for River Borgie SAC above. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.
River Thurso	-	✓	✓	-	✓	-	**Qualifying features** Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: As for River Borgie SAC above. Accidental spills: As for River Borgie SAC above. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.

Notes: 1 ✓ denotes feature present; 2 ✓ denotes vulnerability to effect

B5 Offshore Special Areas of Conservation

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
Darwin Mounds SCI	✓	-	-	-	-	-	**Qualifying features** Reefs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: JNCC (2012)[54] indicates low sensitivity of the qualifying feature to toxic contamination (e.g. crude oil spills). Given depth of qualifying feature (1,000m), accidental spill is not likely to have a significant effect on the site's conservation objectives. Cumulative: N/A **Appropriate Assessment** N/A
Wyville Thomson Ridge SCI	✓	-	-	✓	-	-	**Qualifying features** Reefs **Consideration of likely significant effects** Physical disturbance: Blocks 165/5, 166/1 and 175/29 partly overlap the site. The qualifying feature is highly sensitive to physical damage through disturbance or abrasion (e.g. anchoring)[55]. Moderate sensitivity of qualifying feature to smothering by drill cuttings. Given water depths over the Blocks, anchoring of a semi-submersible rig and cuttings discharges may result in large and fairly long term seabed footprints. Drilling activities could therefore have a significant effect on the site's conservation objectives although mitigation would be possible.

[54] http://jncc.defra.gov.uk/pdf/DarwinMounds_ConservationObjectives_AdviceonOperations_4%200.pdf
[55] http://jncc.defra.gov.uk/PDF/DoggerBank_ConservationObjectivesAdviceonOperations_6.0.pdf

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							Underwater noise: N/A Accidental spills: JNCC (2012)[56] indicates unknown sensitivity of the qualifying feature to toxic contamination (e.g. crude oil spills). With respect to the qualifying feature, the lack of substrata that could retain a persistent oil contamination (apart from some organisms) means that any impacts are only likely to be due to the acute effects of the dispersed oil (Law *et al*. 2011). Given depth of qualifying feature (400-1,000m), accidental spill is not likely to have a significant effect on the site's conservation objectives. Cumulative: N/A **Appropriate Assessment** N/A
Solan Bank Reef SCI	✓	-	-	-	-	-	**Qualifying features** Reefs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: JNCC (2013)[57] indicates moderate sensitivity of the qualifying feature to toxic contamination (e.g. crude oil spills). With respect to the qualifying feature, the lack of substrata that could retain a persistent oil contamination (apart from some organisms) means that any impacts are only likely to be due to the acute effects of the dispersed oil (Law *et al*. 2011). Given depth of qualifying feature (60-80m), accidental spill is not likely to have a significant effect on the site's conservation objectives. Cumulative: N/A **Appropriate Assessment** N/A
Pobie Bank Reef SCI	✓	-	-	-	-	-	**Qualifying features** Reefs **Consideration of likely significant effects**

[56] http://jncc.defra.gov.uk/pdf/WyvilleThomsonRidge_ConservationObjectives_AdviceonOperations%205.0.pdf
[57] http://jncc.defra.gov.uk/pdf/Solan%20Bank%20_ConservationObjectivesandAdviceonOperations_v3.0.pdf

Site name	Features present		Potential for likely significant effects				Consideration in light of Block work programmes
	Habitats	Species	Accidental spills	Physical Disturbance	Underwater noise	Cumulative	
							Physical disturbance: N/A Underwater noise: N/A Accidental spills: JNCC (2013)[58] indicates moderate sensitivity of the qualifying feature to toxic contamination (e.g. crude oil spills). With respect to the qualifying feature, the lack of substrata that could retain a persistent oil contamination (apart from some organisms) means that any impacts are only likely to be due to the acute effects of the dispersed oil (Law *et al*. 2011). Given depth of qualifying feature (70-100m), accidental spill is not likely to have a significant effect on the site's conservation objectives. Cumulative: N/A **Appropriate Assessment** N/A

[58] http://jncc.defra.gov.uk/pdf/Pobie%20Bank%20Reef_ConservationObjectivesandAdviceonOperations_v3.0.pdf

Appendix C – Detailed information on sites where the potential for effects have been identified

C1 Coastal and marine Special Protection Areas

The following tables provide detailed information of the relevant sites, including full listing of their qualifying features. Where available, information is provided on the assessed condition of the qualifying features, as stated on the SNH sitelink website.

Site Name: Sumburgh Head SPA	
Location	Grid Ref: HU411085 (central point) Latitude 59°51'36"N Longitude 01°15'59"W
Area (ha)	2477.91
Summary	Sumburgh Head is located at the most southern tip of the Shetland mainland in northern Scotland. The site comprises boulder-strewn beaches and cliffs up to 100 m high along the east side of Sumburgh Head. The site is of importance as a breeding area for several species of seabirds, including terns, auks and gulls. These seabirds feed outside the SPA, both in the waters immediately around Sumburgh Head, and further away.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 700 pairs representing at least 1.6% of the breeding population in Great Britain.	
Assemblage qualification: A seabird assemblage of international importance The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds During the breeding season, the area regularly supports 35,000 individual seabirds (Count period ongoing) including: Guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, fulmar *Fulmarus glacialis*, Arctic tern *Sterna paradisaea*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Foula SPA	
Location	Grid Ref: HT957388 (central point) Latitude 60º08'03"N Longitude 02º04'43"W
Area (ha)	7,985.49
Summary	Foula is the most westerly of the Shetland Islands, which are situated to the north of the Scottish mainland and Orkney. It lies 20 km west of the Shetland mainland and is the most isolated inhabited island in the UK. The island is formed of Old Red Sandstone with a low-lying eastern side rising steeply to a central ridge and terminating on the western coast in sea-cliffs, including the second highest sea-cliff in the UK (The Kame at 317 m). The cool oceanic climate has produced extensive peat formation and much of the island is covered in different types of bog vegetation, largely dominated by hare's-tail cottongrass *Eriophorum vaginatum* and crowberry *Empetrum nigrum*, although with very little heather *Calluna vulgaris*. At higher altitudes the vegetation becomes sub-maritime, whilst near cliff-tops it is highly spray-influenced. The island is important for a wide range of breeding seabirds, with different species nesting in different parts of the island. It is one of only seven known nesting localities in the EU for Leach's petrel *Oceanodroma leucorhoa.* The seabirds feed outside the SPA in nearby waters, as well as more distantly in the North Atlantic.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 1,100 pairs representing at least 2.5% of the breeding population in Great Britain. Leach's storm-petrel *Oceanodroma leucorhoa*, 50 pairs representing at least 0.1% of the breeding population in Great Britain. Red-throated diver *Gavia stellata*, 11 pairs representing at least 1.2% of the breeding population in Great Britain.	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Great skua *Catharacta skua*, 2,170 pairs representing at least 16.0% of the breeding World population. Guillemot *Uria aalge*, 25,125 pairs representing at least 1.1% of the breeding East Atlantic population. Puffin *Fratercula arctica*, 48,000 pairs representing at least 5.3% of the breeding population. Shag *Phalacrocorax aristotelis*, 2,400 pairs representing at least 1.9% of the breeding Northern Europe population. **Assemblage qualification: A seabird assemblage of international importance** The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds. During the breeding season, the area regularly supports 250,000 individual seabirds including: Leach's storm-petrel *Oceanodroma leucorhoa*, razorbill *Alca torda*, kittiwake *Rissa tridactyla*, Arctic skua *Stercorarius parasiticus*, fulmar *Fulmarus glacialis*, puffin *Fratercula arctica*, guillemot *Uria aalge*, great skua *Catharacta skua*, shag *Phalacrocorax aristotelis*, Arctic tern *Sterna paradisaea*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Seas off Foula dSPA	
Location	To be confirmed
Area (ha)	To be confirmed
Qualifying bird species:	
Migratory species: Great skua *Catharacta skua* Northern fulmar *Fulmarus glacialis* Arctic skua *Stercorarius parasiticus* Common guillemot *Uria aalge* Atlantic puffin *Fratercula arctica*	
Conservation objectives:	
To be confirmed	
Likely significant effects associated with activities that could follow Block licensing:	
• Physical disturbance (see Section 4.3) • Underwater noise (see Section 5.3) • Accidental spills (see Section 6.3)	

Site Name: Papa Stour SPA	
Location	Grid Ref: HU166613 (central point) Latitude 60º08'30"N Longitude 01º42'00"W
Area (ha)	569.03
Summary	Papa Stour lies on the west coast of mainland Shetland in northern Scotland. The SPA comprises the northern and western parts of Papa Stour and consists of rocky hillsides rising to about 90 m, a number of lochs and a few offshore skerries. The main vegetation is a lichen-rich heath that has developed on substrates that formerly consisted of peat and turf. The island is an important breeding site for Arctic tern *Sterna paradisaea* and ringed plover *Charadrius hiaticula*. The terns feed outside the SPA in the waters around the islands.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 1,000 pairs representing at least 2.3% of the breeding population in Great Britain.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Ronas Hill – North Roe and Tingon SPA	
Location	Grid Ref: HU320852 (central point) Latitude 60°33'00"N Longitude 01°25'00"W
Area (ha)	5,470.2
Summary	Ronas Hill – North Roe and Tingon SPA is located in the north mainland of Shetland in northern Scotland. The site comprises two adjacent headlands separated by the large Ronas Voe. Most of the site is composed of active blanket bog with numerous lochans and pools that support a typical peatland avifauna. The flatter parts of Tingon and North Roe have many pools and acidic lochans set within an open landscape of blanket bog and maritime heath. The area holds some of the highest-quality blanket bog in Shetland, which is floristically rich and intact. The site is of importance for breeding red-throated diver *Gavia stellata* and merlin *Falco columbarius*.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Merlin *Falco columbarius*, 6 pairs representing at least 0.5% of the breeding population in Great Britain Red-throated diver *Gavia stellata*, 50 pairs representing at least 5.3% of the breeding population in Great Britain.	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Great skua *Catharacta skua*, representing at least 0.9% of the breeding World population.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Ramna Stacks and Gruney SPA	
Location	Grid Ref: HU381967 (central point) Latitude 60°39'10"N Longitude 01°18'10"W
Area (ha)	11.59
Summary	Ramna Stacks and Gruney lie north of mainland Shetland in the north of Scotland. With the exception of Gruney, where guano-enriched maritime grassland occurs, these rocky islands support little or no vegetation. They are of importance as a site for breeding seabirds, particularly as one of only seven known nesting localities in the EU for Leach's petrel *Oceanodroma leucorhoa*. The nesting seabirds using the site feed outside the SPA in surrounding and more distant marine areas.

Qualifying features for which the site is designated [condition]:

Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season:
Leach's storm-petrel *Oceanodroma leucorhoa*, 22 pairs representing at least 0.0% of the breeding population in Great Britain.

Conservation objectives:

To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Accidental spills (see Section 6.3)

Site Name: Otterswick and Graveland SPA	
Location	Grid Ref: HU 452940 (central point) Latitude 60º 35'42" N Longitude 01º 08'07" W
Area (ha)	2,241.41
Summary	Otterswick & Graveland Special Protection Area comprises two areas of open moorland with numerous pools and lochans on Yell, Shetland. Otterswick is located in the south of Yell, while Graveland is a peninsula on the west of Yell. The site rises from sea-level on Graveland, to 205m at Ward of Otterswick. Inland areas are dominated by blanket bog, with some stretches of dry heather moorland. The blanket bog is variable in quality, with considerable areas of eroded peat, especially on the eastern side of Otterswick. However, some of the erosion is re-vegetating. A band of maritime grassland extends along the coastal stretch of the Graveland peninsula.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Red-throated diver *Gavia stellata* (average of 26 pairs during 1992-99, 3% of the British population).	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Hermaness, Saxa Vord and Valla Field SPA	
Location	Grid Ref: HP598166 (central point) Latitude 60°49'42"N Longitude 00°54'05"W
Area (ha)	6,833.04
Summary	Hermaness, Saxa Vord and Valla Field SPA is located at the northernmost part of the Shetland island of Unst, Scotland, the most northerly part of the UK. The vegetation of Hermaness is mainly *Calluna/Eriophorum* blanket bog, with acidic grassland together with small oligotrophic lochans and streams. More species-rich closely grazed, maritime grasslands line the cliff tops. The cliffs of Hermaness, Saxa Vord and the off-lying stacks (including Muckle Flugga) are mostly 100-200 m high. The site is important for a number of breeding seabird species that nest on both the extensive cliffs as well as on the heathland and grassland parts of the site. The seabirds feed outside the SPA in nearby waters, as well as more distantly elsewhere in the North Atlantic.

Qualifying features for which the site is designated [condition]:

Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season:
Red-throated diver *Gavia stellata*, 28 pairs representing at least 3.0% of the breeding population in Great Britain.

Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

During the breeding season:
Gannet *Morus bassanus*, 12,000 pairs representing at least 4.6% of the breeding North Atlantic population.
Great skua *Catharacta skua*, 630 pairs representing at least 4.6% of the breeding World population.
Puffin *Fratercula arctica*, 25,400 pairs representing at least 2.8% of the breeding population.

Assemblage qualification: A seabird assemblage of international importance
The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds. During the breeding season, the area regularly supports 152,000 individual seabirds including: Guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, shag *Phalacrocorax aristotelis*, fulmar *Fulmarus glacialis*, puffin *Fratercula arctica*, great skua *Catharacta skua*, gannet *Morus bassanus*.

Conservation objectives:

To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Accidental spills (see Section 6.3)

Site Name: Fair Isle SPA	
Location	Grid Ref: HZ216724 (central point) Latitude 59°32'15"N Longitude 01°37'00"W
Area (ha)	6,824.4
Summary	Fair Isle is located in the North Sea, halfway between the Shetland mainland and the Orkney Islands in northern Scotland. It is partly composed of Old Red Sandstone that has weathered to produce a greatly indented coastline with many geos, stacks and crags. The island is of major importance as a breeding area for seabirds, including skuas, terns, gulls and auks. It is also notable for its endemic race of wren *Troglodytes troglodytes fridariensis.* The seabirds nest both on the cliffs and crags around the island as well as on moorland and maritime grassland areas, and feed in the waters around the island, outside the SPA. The SPA includes the entire coastline of the island together with an extensive area of moorland and grassland in the north of the island.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 1,120 pairs representing at least 2.5% of the breeding population in Great Britain (5 year mean, 1993-1997) [favourable maintained] Fair Isle wren *Troglodytes troglodytes fridariensis*, 37 individuals representing 100.0% of the breeding population in Great Britain (Count, as at 1997) [favourable maintained]	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 25,165 pairs representing at least 1.1% of the breeding East Atlantic population (Count as at 1994) [favourable maintained]	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 180,000 individual seabirds including: puffin *Fratercula arctica*, razorbill *Alca torda*, kittiwake *Rissa tridactyla*, great skua *Catharacta skua*, Arctic skua *Stercorarius parasiticus*, shag *Phalacrocorax aristotelis*, gannet *Morus bassanus*, fulmar *Fulmarus glacialis*, guillemot *Uria aalge*, Arctic tern *Sterna paradisaea* [all favourable maintained, except shag: unfavourable recovering]	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Hoy SPA	
Location	Grid Ref: ND226975 (central point) Latitude 58°51'30"N Longitude 03°19'10"W
Area (ha)	9499.7
Summary	Hoy is one of the most southerly of the major islands of the Orkney archipelago in northern Scotland. The Hoy SPA covers the northern and western two-thirds of the island, which is formed of Old Red Sandstone and contains Orkney's highest hills. Most of the island is moorland, drained by numerous streams with diverse vegetation. The site supports an extremely diverse mixture of mire, heath and alpine vegetation, and also Britain's most northerly native woodland. The highly exposed nature of the vegetation results in an arctic-alpine character to the summit of Ward Hill at only 479 m. The low intensity of burning and grazing on Hoy has allowed scrub regeneration to a much greater extent than on most British moorlands. On the west coast, Old Red Sandstone cliffs reach 339 m in height and include a number of notable stacks and crags. These cliffs provide important breeding sites for a number of seabird species, especially gulls and auks, whilst moorland areas support large numbers of breeding birds, in particular Great Skua *Catharacta skua*. Red-throated Diver *Gavia stellata* nest on the numerous small lochans found on the moorland. The divers and seabirds feed in the rich waters around Hoy, outside the SPA.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Peregrine *Falco peregrinus*, 6 pairs representing at least 0.5% of the breeding population in Great Britain (Mid-1990s) Red-throated Diver *Gavia stellata*, 56 pairs representing at least 6.0% of the breeding population in Great Britain (1994 National Survey)	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Great Skua *Catharacta skua*, 1,900 pairs representing at least 14.0% of the breeding World population (Seabird Census Register)	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 120,000 individual seabirds including: Puffin *Fratercula arctica*, Guillemot *Uria aalge*, Kittiwake *Rissa tridactyla*, Great Black-backed Gull *Larus marinus*, Arctic Skua *Stercorarius parasiticus*, Fulmar *Fulmarus glacialis*, Great Skua *Catharacta skua*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Marwick Head SPA	
Location	Grid Ref: HY223253 (central point) Latitude 59°06'30"N Longitude 03°21'27"W
Area (ha)	475.58
Summary	Marwick Head lies on the west coast of the island of Mainland in the Orkney archipelago of northern Scotland. The site comprises a 2 km section of high, eroded Old Red Sandstone cliffs rising to 85 m and backed by cliff-top maritime grassland. The site is of importance as a nesting area for large numbers of guillemot *Uria aalge* and kittiwake *Rissa tridactyla*. These species feed outside the SPA in surrounding marine areas.
Qualifying features for which the site is designated [condition]:	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 24,388 pairs representing up to 1.1% of the breeding East Atlantic population.	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds. During the breeding season, the area regularly supports 75,000 individual seabirds including: Kittiwake *Rissa tridactyla*, guillemot *Uria aalge*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Rousay SPA	
Location	Grid Ref: HY399338 (central point) Latitude 59º11'14"N Longitude 03º03'09"W
Area (ha)	5,483.37
Summary	Rousay is an island off the north-east coast of the island of Mainland in the Orkney archipelago, in northern Scotland. The site is composite and consists of two parts located at the north-west and north-east ends of the island. Here, sea-cliffs grade inland to areas of maritime heath and grassland. The maritime heath contains numerous base-rich flushes characterised by Black Bog-rush *Schoenus nigricans* and various sedges *Carex* spp. and grasses. The maritime heath also supports colonies of the nationally scarce Scottish primrose *Primula scotica*. The site holds a diverse assemblage of breeding seabirds, including terns, auks, gulls and skuas. The nesting seabirds feed in the waters around Rousay outside the SPA, as well as further away.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 1,000 pairs representing at least 2.3% of the breeding population in Great Britain.	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds. During the breeding season, the area regularly supports 30,000 individual seabirds (Three year mean, 1986-1988) including: Guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, Arctic skua *Stercorarius parasiticus*, fulmar *Fulmarus glacialis*, Arctic tern *Sterna paradisaea*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: North Orkney dSPA		
Location	Latitude Longitude	59º09'16"N 03º00'58"W
Area (ha)	57,495.77	
Qualifying bird species:		
Annex 1 species: Great northern diver *Gavia immer* Slavonian grebe *Podiceps auritus* Red-throated diver *Gavia stellata* Arctic tern *Sterna paradisaea* **Migratory species:** Common Eider *Somateria mollissima* Long-tailed duck *Clangula hyemalis* Velvet Scoter *Melanitta fusca* Red-breasted merganser *Mergus serrator* European shag *Phalacrocorax aristotelis*		
Conservation objectives:		
To be confirmed		
Likely significant effects associated with activities that could follow Block licensing:		
• Accidental spills (see Section 6.3)		

Site Name: West Westray SPA	
Location	Grid Ref: HY401470 (central point) Latitude 59º18'21"N Longitude 03º03'07"W
Area (ha)	3,781.29
Summary	The SPA is located on the west coast of the island of Westray, one of the most northerly of the Orkney islands in northern Scotland. The site comprises an 8 km length of Old Red Sandstone cliffs, together with adjoining areas of species-rich maritime grassland and heath. The area is rich in cliff-top plants including the nationally scarce Scottish primrose *Primula scotica*, sea plantain *Plantago maritima*, and spring squill *Scilla verna*. The cliffs support large colonies of breeding auks and kittiwake *Rissa tridactyla*, whilst the grassland and heathland areas support breeding colonies of skuas and terns. The seabirds feed in the surrounding waters outside the SPA.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 1,200 pairs representing at least 2.7% of the breeding population in Great Britain.	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 28,274 pairs representing at least 1.3% of the breeding East Atlantic population.	
Assemblage qualification: A seabird assemblage of international importance The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds. During the breeding season, the area regularly supports 120,000 individual seabirds including: Razorbill *Alca torda*, kittiwake *Rissa tridactyla*, Arctic skua *Stercorarius parasiticus*, fulmar *Fulmarus glacialis*, guillemot *Uria aalge*, Arctic tern *Sterna paradisaea*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Papa Westray (North Hill and Holm) SPA	
Location	Grid Ref: HY501549 (central point) Latitude 59º22'40"N Longitude 02º52'45"W
Area (ha)	245.71
Summary	Papa Westray is a small island lying close to Westray in the northern Orkney islands in Scotland. The island rises to 48 m above sea level at North Hill and is surrounded by a rocky coastline backing onto maritime sedge heath. Halophytic communities of plants typify the grassland immediately above the shore, grading inland to maritime sedge heath with a few small pools. The site supports a wide variety of plants, including the nationally scarce Scottish primrose *Primula scotica*. The Holm is a small, low-lying island of 48 ha off the east coast of Papa Westray dominated by a rocky coastline and maritime grassland. The islands are an important breeding site for both Arctic tern *Sterna paradisaea* and Arctic skua *Stercorarius parasiticus*. The terns feed outside the SPA in the waters surrounding the islands.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Arctic tern *Sterna paradisaea*, 1,950 pairs representing at least 4.4% of the breeding population in Great Britain.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Calf of Eday SPA	
Location	Grid Ref: HY584394 (central point) Latitude 59º14'24"N Longitude 02º43'48"W
Area (ha)	2,668.91
Summary	The Calf of Eday is a small, uninhabited island located to the north of the island of Eday in the Orkney archipelago. The island has a rocky coastline with cliffs on the north and east coasts. The dominant vegetation on the island is dry dwarf-shrub heath dominated by heather, with smaller areas of wet heath, semi-improved grassland and coastal grassland. The site is of importance as a nesting area for breeding seabirds, which feed in surrounding waters outside the SPA. Gulls and cormorant nest in the dry heath and grassland areas, whilst fulmar, kittiwake and auks nest on the cliffs.
Qualifying features for which the site is designated [condition]:	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 24,388 pairs representing up to 1.1% of the breeding East Atlantic population (as of 1991) [unfavourable declining]	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 30,000 individual seabirds (as of 1997) including: guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, great black-backed gull *Larus marinus*, cormorant *Phalacrocorax carbo*, fulmar *Fulmarus glacialis* [unfavourable declining, except great black-backed gull and fulmar: favourable maintained]	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: East Sanday Coast SPA	
Location	Grid Ref: HY676423 (central point) Latitude 59°16'00"N Longitude 02°34'00"W
Area (ha)	1,515.23
Summary	East Sanday Coast SPA is located on the island of Sanday in the Orkney Islands of northern Scotland. The site comprises a 55km stretch of coast, and consists of both rocky and sandy sections. The coastline supports internationally important populations of wintering waders.
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **Over winter:** Bar-tailed godwit *Limosa lapponica*, 600 individuals representing at least 1.1% of the wintering population in Great Britain (Winter peak mean 1991/2-1993/4) [favourable maintained]	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **Over winter:** Purple sandpiper *Calidris maritima*, 840 individuals representing at least 1.7% of the wintering Eastern Atlantic - wintering population (winter peak means) [unfavourable declining] Turnstone *Arenaria interpres*, 1,400 individuals representing at least 2.0% of the wintering Western Palearctic - wintering population (three year peak mean, 1991/2-1993/4) [unfavourable declining]	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Pentland Firth and Scapa Flow dSPA		
Location	Latitude Longitude	59º09'16"N 03º00'58"W
Area (ha)	57,495.77	
Qualifying bird species:		
Annex 1 species: Great northern diver *Gavia immer* Red-throated diver *Gavia stellate* Black-throated diver *Gavia arctica* Slavonian grebe *Podiceps auritus* Arctic tern *Sterna paradisaea* **Migratory species:** European shag *Phalacrocorax aristotelis* Common guillemot *Uria aalge* Common eider *Somateria mollissima* Long-tailed duck *Clangula hyemalis* Common goldeneye *Bucephala clangula* Red-breasted merganser *Mergus serrator*		
Likely significant effects associated with activities that could follow Block licensing:		
• Accidental spills (see Section 6.3) • Cumulative and in-combination effects (see Section 7)		

Site Name: North Rona and Sula Sgeir SPA	
Location	Grid Ref: HW727316 (central point) Latitude 59º06'35"N Longitude 05º59'27"W
Area (ha)	6,850.58
Summary	The two small and remote islands of North Rona and Sula Sgeir lie in the North Atlantic about 65 km from the island of Lewis in the Outer Hebrides off the north-west coast of Scotland. Sula Sgeir is about 15 km west of the far larger North Rona. North Rona is well covered by peat or soil and is vegetated with maritime grassland. Sula Sgeir is subject to severe erosive pressure from sea spray and seabirds and has little soil or vegetation. The islands provide strategically placed nesting localities for large numbers of seabirds which feed in the waters off the north coast of Scotland away from the SPA. They hold a diverse assemblage of species including large numbers of petrels, auks, gulls and Gannet *Morus bassanus*. It is one of only seven known nesting localities in the EU for Leach's Petrel *Oceanodroma leucorhoa.*
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Leach's Storm-petrel *Oceanodroma leucorhoa*, 2,750 pairs representing at least 5.0% of the breeding population in Great Britain (Seabird Census Register 1986-88) Storm Petrel *Hydrobates pelagicus*, 1,000 pairs representing at least 1.2% of the breeding population in Great Britain (Seabird Census Register 1986-88)	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Gannet *Morus bassanus*, 9,000 pairs representing at least 3.4% of the breeding North Atlantic population (Seabird Census Register) Guillemot *Uria aalge*, 28,944 pairs representing at least 1.3% of the breeding East Atlantic population (Seabird Census Register)	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 130,000 individual seabirds including: Puffin *Fratercula arctica*, Razorbill *Alca torda*, Kittiwake *Rissa tridactyla*, Great Black-backed Gull *Larus marinus*, Fulmar *Fulmarus glacialis*, Guillemot *Uria aalge*, Gannet *Morus bassanus*, Leach's Storm-petrel *Oceanodroma leucorhoa*, Storm Petrel *Hydrobates pelagicus*.	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Sule Skerry and Sule Stack SPA	
Location	Grid Ref: HX594215 (central point) Latitude 59º03'26"N Longitude 04º27'08"W
Area (ha)	3,909.45
Summary	The two small and remote islands of Sule Skerry and Sule Stack lie in the North Atlantic, west of Orkney. Sule Skerry is about 60 km from Orkney, while Sule Stack is another 8 km to the south-west. Sule Skerry is the larger of the two islands, covering about 16 ha, and is low-lying and covered by peaty soil with rocky outcrops. Vegetation is limited by the combination of salt spray and seabird activity. Sule Stack is a higher, bare rock with no vascular plants. The islands provide strategically placed nesting localities for large numbers of seabirds which feed in the waters off the north coast of Scotland outside the SPA. They also hold a diverse assemblage of largely pelagic species, including large numbers of petrels, auks and gannet *Morus bassanus*. It is one of only seven known nesting localities in the EU for Leach's petrel *Oceanodroma leucorhoa.*
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Storm petrel *Hydrobates pelagicus*, 1,000 pairs representing at least 1.2% of the breeding population in Great Britain.	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: ***During the breeding season:*** Gannet *Morus bassanus*, 4,890 pairs representing at least 1.9% of the breeding North Atlantic population. Puffin *Fratercula arctica*, 43,380 pairs representing at least 4.8% of the breeding population.	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 100,000 individual seabirds including: Leach's storm-petrel *Oceanodroma leucorhoa*, guillemot *Uria aalge*, shag *Phalacrocorax aristotelis*, puffin *Fratercula arctica*, gannet *Morus bassanus*, storm petrel *Hydrobates pelagicus*.	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Handa SPA		
Location	Grid Ref: Latitude Longitude	NC128481 (central point) 58º23'00"N 05º11'12"W
Area (ha)	3205.61	
Summary	Handa is an island surrounded by high sea-cliffs lying a short distance from the west coast of Sutherland in Scotland. It provides a strategic nesting locality for seabirds that feed in the productive waters of the northern Minch, outside the SPA. Most of the island is vegetated with sub-maritime grasslands and heaths. The SPA's principal ornithological importance is for its breeding seabirds.	
Qualifying features for which the site is designated [condition]:		
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 76,105 pairs representing at least 3.4% of the breeding East Atlantic population (Count as at 1994) Razorbill *Alca torda*, 10,432 pairs representing at least 1.8% of the breeding population (Count as at 1997)		
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 200,000 individual seabirds including: Kittiwake *Rissa tridactyla*, Great Skua *Catharacta skua*, Fulmar *Fulmarus glacialis*, Razorbill *Alca torda*, Guillemot *Uria aalge*.		
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species		
Likely significant effects associated with activities that could follow Block licensing:		
• Accidental spills (see Section 6.3)		

Site Name: Cape Wrath SPA	
Location	Grid Ref: NC291732 (central point) Latitude 59º03'26"N Longitude 04º27'08"W
Area (ha)	6,737.26
Summary	Cape Wrath lies at the north-westernmost tip of mainland Scotland in Sutherland. The site comprises two stretches of Torridonian sandstone and Lewisian gneiss cliffs (of *c*. 15 km length) around the headland of Cape Wrath. These cliffs provide suitable nest sites for large numbers of breeding seabirds. West of Cape Wrath, the cliffs are broken with undercliffs vegetated by Heather *Calluna vulgaris,* Juniper *Juniperus communis* and ferns, whilst east of the headland, far more precipitous cliffs rise to about 200 m. Cape Wrath is especially important for gulls and auks. The seabirds feed outside the SPA in the nearby waters and more distantly in the North Atlantic.
Qualifying features for which the site is designated [condition]:	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 50,000 individual seabirds including: Puffin *Fratercula arctica*, Razorbill *Alca torda*, Guillemot *Uria aalge*, Kittiwake *Rissa tridactyla*, Fulmar *Fulmarus glacialis*.	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: North Caithness Cliffs SPA	
Location	Grid Ref: ND215731 (central point) Latitude 58°39'00"N Longitude 03°24'30"W
Area (ha)	14,621.14
Summary	The North Caithness Cliffs SPA is located on the north coast of Caithness in northern Scotland. The site comprises most of the sea-cliff areas between Red Point and Duncansby Head on the north mainland coast, and the western cliffs on the island of Stroma. The cliffs are formed from Old Red Sandstone and are generally between 30-60 m high, rising to 120 m at Dunnet Head. Cliff ledges, stacks and geos provide ideal nesting sites for important populations of seabirds, especially gulls and auks. The seabirds nesting on the North Caithness Cliffs feed outside the SPA in the surrounding waters of the Pentland Firth, as well as further afield. The cliffs also provide important nesting habitat for Peregrine *Falco peregrinus.*
Qualifying features for which the site is designated [condition]:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: **During the breeding season:** Peregrine *Falco peregrinus*, 6 pairs representing at least 0.5% of the breeding population in Great Britain (Mid-1990s)	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 26,994 pairs representing at least 1.2% of the breeding East Atlantic population (Count as at 1987)	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds ***Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 110,000 individual seabirds including: Puffin *Fratercula arctica*, Razorbill *Alca torda*, Kittiwake *Rissa tridactyla*, Fulmar *Fulmarus glacialis*, Guillemot *Uria aalge*.	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

C2 Special Areas of Conservation

Site Name: Papa Stour SAC	
Location	Grid Ref: HU170610 (central point) Latitude 60º19'46"N Longitude 01º41'46"W
Area (ha)	2,076.69
Summary	Papa Stour has excellent examples of caves, tunnels and arches occurring in cold northerly waters. In very exposed sea conditions the caves support rich communities that illustrate the effects of surge, scour and changes in light conditions. The cave walls have extensive faunal turfs, and among the more unusual species present is the northern anemone *Phellia gausapata*. The rare, surge-tolerant alga *Schmitzia hiscockiana* is found on boulders in cave entrances. The underwater terrain is rugged, with rock walls, slopes, gullies, ledges, ridges and boulder slopes, which support a diverse range of plant and animal communities. Communities on circalittoral rock are characteristic of northern parts of the UK, with dominant species including the soft coral *Alcyonium digitatum*, the featherstar *Antedon bifida*, encrusting coralline algae, and the serpulid worm *Pomatoceros triqueter*. Wave-exposed gullies have rich, surge-tolerant communities, with turfs of the jewel anemone *Corynactis viridis*, ascidians and bryozoans. In the strong tidal streams of the Sound of Papa, boulder reefs and bedrock ridges are dominated by scour-tolerant organisms such as the hydroid *Abietinaria abietina* and the brittlestar *Ophiocomina nigra*.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat Primary feature: Reefs, submerged or partially submerged sea caves Secondary features: None **Annex II Species** Primary features: None Secondary features: None	
Conservation objectives:	
For Annex I Habitats To avoid deterioration of the qualifying habitats (listed above), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying habitats that the following are maintained in the long term: • Extent of the habitats on site • Distribution of the habitats within site • Structure and function of the habitats • Processes supporting the habitats • Distribution of typical species of the habitats • Viability of typical species as components of the habitats • No significant disturbance of typical species of the habitats	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Sullom Voe SAC	
Location	Grid Ref: HU380757 (central point) Latitude 60°27'50"N Longitude 01°18'35"W
Area (ha)	2,698.55
Summary	Sullom Voe in the Shetland Isles is the most northerly site in the UK to be selected as a representative of large shallow inlets and bays, and it is the only Scottish example of a ria (known locally as a 'voe'). The boreal-arctic (northern) species-rich communities of Sullom Voe are restricted to Shetland voes and are not represented elsewhere in the SAC series. The intertidal sediments, confined to lagoons near the mouth of the voe are colonised by a diverse faunal community including bivalves, polychaetes and the sea cucumber *Leptosynapta inhaerens*. Poorly-mixed, muddy sediments which characterise the sublittoral are colonised by horse mussels, sea-pens *Virgularia* sp. and diverse burrowing communities. A range of bivalves, polychaetes and amphipods can also be found in the organically enriched shell-sand, gravel and muddy-sand sediments.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat Primary feature: Large shallow inlets and bays [Favourable maintained] Secondary features: Coastal lagoons [Favourable maintained], reefs [Favourable maintained] **Annex II Species** Primary features: None Secondary features: None	
Conservation objectives:	
For Annex I Habitats To avoid deterioration of the qualifying habitats (listed above), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying habitats that the following are maintained in the long term: • Extent of the habitats on site • Distribution of the habitats within site • Structure and function of the habitats • Processes supporting the habitats • Distribution of typical species of the habitats • Viability of typical species as components of the habitats • No significant disturbance of typical species of the habitats	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Yell Sound Coast SAC	
Location	Grid Ref: HU467755 (central point) Latitude 60º27'40"N Longitude 01º09'00"W
Area (ha)	1,540.55
Summary	The Yell Sound Coast SAC has the highest density of otter of sites designated on Shetland for this feature. The site consists of a complex of islands and coastline, selected to include the areas of highest otter density. The areas are characterised by low-lying peaty coastlines with large numbers of otter holts and easy access to fresh water. The adjacent marine areas have extensive algal beds which are used for foraging. The site is also the most northerly UK site selected for the common seal *Phoca vitulina*. The rocky shores and uninhabited islands and skerries within Yell Sound support a colony representing over 1% of the UK population.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat Primary feature: None Secondary features: None **Annex II Species** Primary features: Otter *Lutra lutra* [Unfavourable declining], harbour seal *Phoca vitulina* [Unfavourable declining] Secondary features: None	
Conservation objectives:	
For Annex II Species To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within the site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Underwater noise (see Section 5.3) • Accidental spills (see Section 6.3)	

Site Name: Mousa SAC	
Location	Grid Ref: HU462211 (central point) Latitude 60º00'00"N Longitude 01°10'20"W
Area (ha)	530.6
Summary	The exposed rocky island of Mousa lies off the east coast of Shetland Mainland and supports one of the largest groups of common seal *Phoca vitulina* in Shetland, and is one of the most northerly groups in the UK. The large rocky tidal pools on the island are of particular importance as they are frequently used by the seals for pupping, breeding and moulting, and provide shelter from the exposed conditions on the open coast. The site supports just over 1% of the UK population.

Qualifying features for which the site is designated [condition]:

Annex I Habitat
Primary feature: None
Secondary features: Reefs, submerged or partially submerged sea caves

Annex II Species
Primary features: Harbour seal *Phoca vitulina* [unfavourable declining]
Secondary features: None

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitats (listed above), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest.

To ensure for the qualifying habitats that the following are maintained in the long term:

- Extent of the habitats on site
- Distribution of the habitats within site
- Structure and function of the habitats
- Processes supporting the habitats
- Distribution of typical species of the habitats
- Viability of typical species as components of the habitats
- No significant disturbance of typical species of the habitats

For Annex II Species
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within the site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)

Site Name: Faray and Holm of Faray SAC	
Location	Grid Ref: HY529378 (central point) Latitude 59º13'30"N Longitude 02º49'30"W
Area (ha)	785.68
Summary	These two uninhabited islands in the northern part of Orkney support a well-established breeding colony of grey seal *Halichoerus grypus*. The seals tend to be found in areas where there is easy access from the shore, and freshwater pools on the islands appear to be particularly important. The islands support the second-largest breeding colony in the UK, contributing around 9% of annual UK pup production.

Qualifying features for which the site is designated [condition]:

Annex I Habitat
Primary feature: None
Secondary features: None

Annex II Species
Primary features: Grey seal *Halichoerus grypus* [favourable maintained]
Secondary features: None

Conservation objectives:

For Annex II Species
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within the site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)

Site Name: Sanday SAC	
Location	Grid Ref: HY715442 (central point) Latitude 59°17'00"N Longitude 02°30'00"W
Area (ha)	10,971.65
Summary	Sanday is a large, low-lying island in the north-east of the Orkney archipelago. Surrounded by clear, relatively shallow water, the island has a complex coastline dominated by extensive sandy beaches and sheltered inlets, interspersed with rocky headlands. Sanday is notable for the extensive subtidal bedrock reefs that surround the island and provide a habitat for dense forests of kelp. The kelp occurs to a depth of about 20m and provides a habitat for species-rich, red algal turf communities, sponges, and ascidians. The kelp beds also provide important foraging areas for harbour seal *Phoca vitulina*. The seal colony is the largest at any discrete site in Scotland with the breeding groups representing over 4% of the UK population. The north coast of Sanday is tide-swept and appears to support a richer fauna than the south coast, with a dense bryozoan/hydroid turf, dense brittlestar and horse mussel *Modiolus modiolus* beds lying in mixed sediment below the kelp zone. Crabs and brittlestars are common within crevices in the rock.

Qualifying features for which the site is designated [condition]:

Annex I Habitat
Primary feature: Reefs [favourable maintained]
Secondary features: Sandbanks which are slightly covered by seawater all the time, mudflats and sandflats not covered by seawater at low tide [all favourable maintained]

Annex II Species
Primary features: Harbour seal *Phoca vitulina* [favourable maintained]
Secondary features: None

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitats (listed above), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest.

To ensure for the qualifying habitats that the following are maintained in the long term:

- Extent of the habitats on site
- Distribution of the habitats within site
- Structure and function of the habitats
- Processes supporting the habitats
- Distribution of typical species of the habitats
- Viability of typical species as components of the habitats
- No significant disturbance of typical species of the habitats

For Annex II Species
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within the site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)

Site Name: North Rona SAC	
Location	Grid Ref: HW811327 (central point) Latitude 59º07'30"N Longitude 05º49'30"W
Area (ha)	612.88
Summary	North Rona is a remote and very exposed island in the North Atlantic off the north-west tip of mainland Scotland. The islands are rarely disturbed by human activities in the breeding season. Grey seal *Halichoerus grypus* are found over much of the island and use many of the submerged sea caves that are found around the coast. North Rona supports the third-largest breeding colony in the UK, representing some 5% of annual UK pup production.

Qualifying features for which the site is designated [condition]:

Annex I Habitat
Primary feature: None
Secondary features: Reefs, Vegetated sea cliffs of the Atlantic and Baltic coasts [favourable maintained], Submerged or partially submerged sea caves

Annex II Species
Primary features: Grey seal *Halichoerus grypus* [favourable maintained]
Secondary features: None

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitats (listed above), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying habitats that the following are maintained in the long term:

- Extent of the habitats on site
- Distribution of the habitats within site
- Structure and function of the habitats
- Processes supporting the habitats
- Distribution of typical species of the habitats
- Viability of typical species as components of the habitats
- No significant disturbance of typical species of the habitats

For Annex II Species
To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)

Site Name: Foinaven SAC		
Location	Grid Ref: Latitude Longitude	NC336495 (central point) 58°24'23"N 04°4'05"W
Area (ha)	14,845.6	
Summary	Foinaven is representative of the range of northern Atlantic wet heaths in the more highly oceanic and cool parts of the north-west Scottish Highlands. This site has one of the largest extents of M15 *Scirpus cespitosus – Erica tetralix* wet heath within the SAC series. It includes the best example in the north-west Highlands of *Cladonia*-rich wet heath with an abundance of woolly fringe-moss *Racomitrium lanuginosum* and the large Atlantic liverwort *Pleurozia purpurea* (comparable with the same sub-type on North Harris but not as rich in Atlantic bryophytes)	

Qualifying features for which the site is designated [condition]:

Annex I Habitat
Primary feature: Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea,* Natural dystrophic lakes and ponds, Northern Atlantic wet heaths with *Erica tetralix,* European dry heaths, Alpine and Boreal heaths, Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*), Siliceous rocky slopes with chasmophytic vegetation
Secondary features: Siliceous alpine and boreal grasslands, Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe), Blanket bogs, Depressions on peat substrates of the *Rhynchosporion,* Calcareous rocky slopes with *chasmophytic* vegetation

Annex II Species
Primary features: None
Secondary features: Freshwater pearl mussel *Margaritifera margaritifera,* Otter *Lutra lutra*

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitats (listed above), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying habitats that the following are maintained in the long term:

- Extent of the habitats on site
- Distribution of the habitats within site
- Structure and function of the habitats
- Processes supporting the habitats
- Distribution of typical species of the habitats
- Viability of typical species as components of the habitats
- No significant disturbance of typical species of the habitats

For Annex II Species
To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Likely significant effects associated with activities that could follow Block licensing:

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)

Site Name: River Borgie SAC	
Location	Grid Ref: NC666582 (central point) Latitude 58°29'30"N Longitude 04°17'20"W
Area (ha)	32.72
Summary	This site is designated primarily for the presence of Freshwater pearl mussel *Margaritifera margaritifera* which are found throughout the main stem of the Borgie, from just above the estuary to the outflow of Loch Slaim, the lowest of a series of lochs on the river. In addition, this site, along with the Rivers Naver and Thurso is representative of the most northerly extent of the *Salmo salar* population.

Qualifying features for which the site is designated [condition]:

Annex I Habitat
N/A

Annex II Species
Primary features: Freshwater pearl mussel *Margaritifera margaritifera* [unfavourable declining]
Secondary features: Atlantic salmon *Salmo salar* [unfavourable recovering]
Otter *Lutra lutra* [favourable maintained]

Conservation objectives:

For Annex II Species
To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and to ensure for the qualifying species that the following are maintained in the long term:

- Population of the species, including range of genetic types for salmon, as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species
- Distribution and viability of freshwater pearl mussel host species
- Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species

Likely significant effects associated with activities that could follow Block licensing:

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)

Site Name: River Naver SAC	
Location	Grid Ref: ND629375 (central point) Latitude 58°18'25"N Longitude 04°20'30"W
Area (ha)	1066.66
Summary	The River Naver and its major tributary, the Mallart, flow from a large peatland catchment northwards to its mouth on the north coast of Scotland. The site supports a high-quality salmon *Salmo salar* population and, along with the Rivers Borgie and Thurso, is representative of the northerly part of the species' range in the UK. With the River Borgie, this site in Sutherland represents the northern extreme for freshwater pearl mussel *Margaritifera margaritifera* in the UK.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat N/A **Annex II Species** Primary features: Freshwater pearl mussel *Margaritifera margaritifera* [unfavourable no change] Secondary features: Atlantic salmon *Salmo salar* [unfavourable recovering]	
Conservation objectives:	
For Annex II Species To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species, including range of genetic types for salmon, as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species • Distribution and viability of freshwater pearl mussel host species • Structure, function and supporting processes of habitats supporting freshwater pearl mussel host species	
Likely significant effects associated with activities that could follow Block licensing:	
• Underwater noise (see Section 5.3) • Accidental spills (see Section 6.3)	

Site Name: River Thurso SAC	
Location	Grid Ref: ND142490 (central point) Latitude 58º25'20"N Longitude 03º28'00"W
Area (ha)	355.58
Summary	The River Thurso drains a moderately large peatland catchment in Caithness and flows north through a short section of agricultural land before entering the Pentland Firth at the town of Thurso. The river supports a higher proportion of multi sea-winter salmon *Salmo salar* than is found in many rivers further south in its range; aided by its northerly location and the cooler ambient water temperature, resulting in slower-growing juveniles which smolt at an older age, and tend to return as older multi sea-winter salmon. In addition, grilse also return to the River Thurso, meaning that the river supports the full range of salmon life-history types.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat N/A **Annex II Species** Primary features: Atlantic salmon *Salmo salar* [unfavourable recovering] Secondary features: None	
Conservation objectives:	
For Annex II Species To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species, including range of genetic types, as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Underwater noise (see Section 5.3) • Accidental spills (see Section 6.3)	

Site Name: Wyville Thomson Ridge SCI	
Location	Latitude 59º58'22"N Longitude 06º42'52"W
Area (ha)	173,995
Summary	The Wyville Thomson Ridge is a rock ridge situated in the Atlantic Ocean at the northern end of the Rockall Trough. It is approximately 20km wide and 70km long and rises from over 1000m depth to less than 400m at the summit. The Ridge is composed of extensive areas of stony reef interspersed with gravel areas and bedrock reef along the flanks. The rock and stony reef areas support diverse biological communities representative of hard substratum in deep water, including a range of sponges; stylasterid, cup and soft corals; brachiopods; cyclostome bryozoans; dense beds of featherstars and brittlestars; sea urchins, sea cucumbers and sea spiders. Communities on the bedrock reef vary in species composition between the two sides of the ridge due to the influences of different water masses. This combination of water masses in one area is unique in UK waters.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat Primary features: Reefs Secondary features: None **Annex II Species** Primary features: None Secondary features: None	
Conservation objectives:	
For Annex II Species To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species, including range of genetic types, as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	
Likely significant effects associated with activities that could follow Block licensing:	
• Physical disturbance (see Section 4.3)	

Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.gov.uk/decc

URN 15D/086