Department of Energy & Climate Change

Offshore Oil & Gas Licensing
28th Seaward Round
Moray Firth

Blocks 12/21d, 12/26c, 12/30, 13/16b, 13/17, 13/21c, 18/1, 18/2, 18/4, 18/5, 18/9 and 19/15

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

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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 2011a). 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 12 Blocks in the Moray Firth.

1.2 Moray Firth Blocks

The Moray Firth Blocks applied for in the 28th Round and 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).

12/21d	12/26c	12/30	13/16b	13/17	13/21c
18/1	18/2	18/4	18/5	18/9	19/15

1.3 Relevant Natura 2000 sites

The Natura 2000 sites considered in this assessment were identified based on their location in relation to the 12 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), the relevant sites considered include classified and potential SPAs, designated and candidate SACs and Sites of Community Importance (SCIs).

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.

[2] Figures do not include Blocks for which Promote licence applications were made. 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 of 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.

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, 2011a), 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 Moray Firth Blocks and relevant SPAs

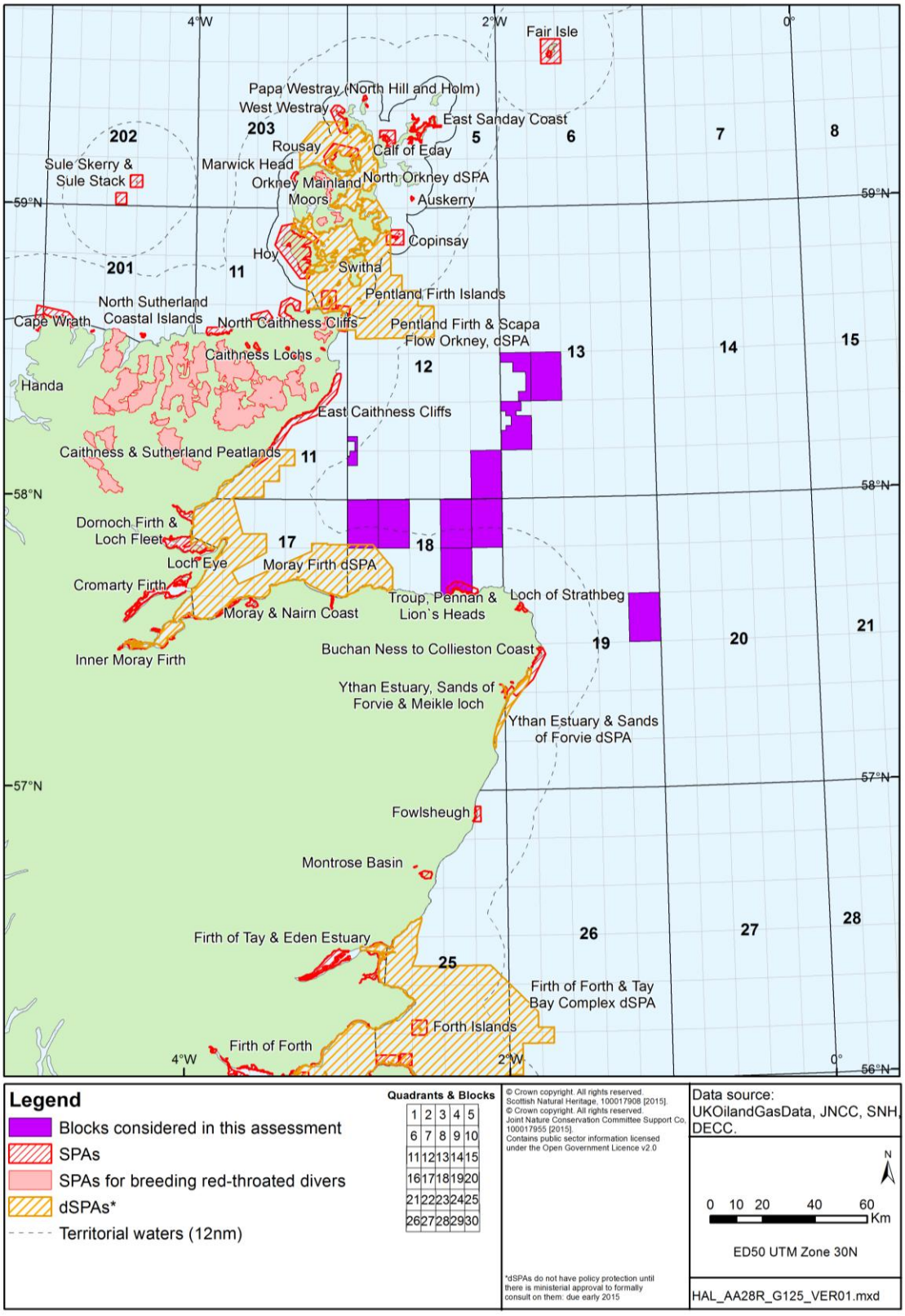
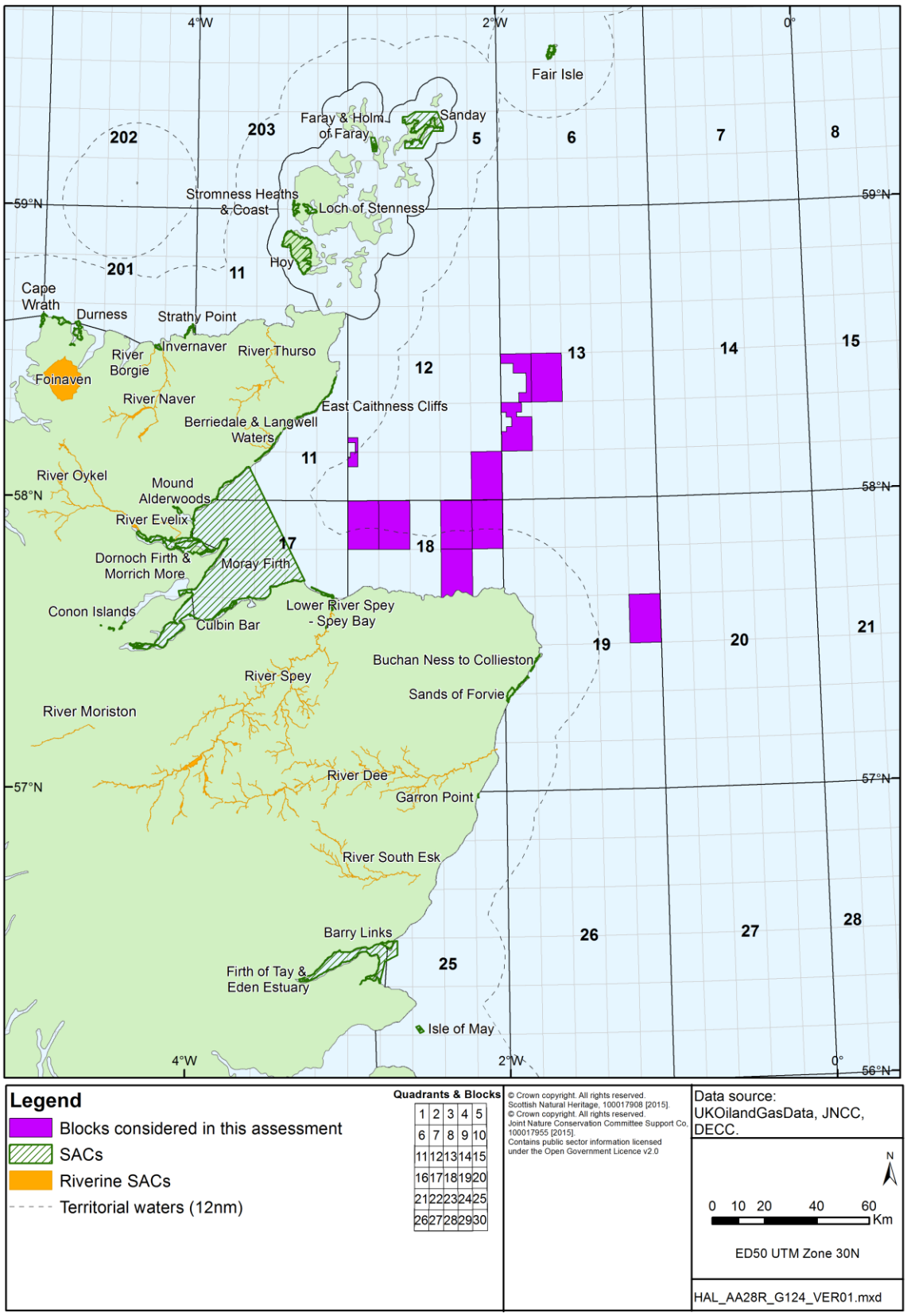


Figure 1.2: Location of Moray Firth Blocks and relevant SACs



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.

The applications for the 12 Moray Firth Blocks were for 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.

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.

With respect to drilling commitments, all of the proposed work programmes for the Moray Firth Blocks indicate a Drill or Drop (D/D) Drilling Commitment which is a conditional commitment with the proviso 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[3].

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 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 Central North Sea area (which includes the Moray Firth) each year since 2000 as well as the number of significant discoveries made in the Moray Firth (associated with exploration activities).

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 4 current projects identified by DECC's Project Pathfinder (as of February 2015)[4] for Blocks within the Moray Firth area, 3 are planned as subsea tie-backs to existing infrastructure, with the fourth, the Golden Eagle development (Block 20/1) having already commenced production in 2014 from new fixed facilities. The nature, extent and timescale of development, if any, which may ultimately result from the licensing of the Moray Firth 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.

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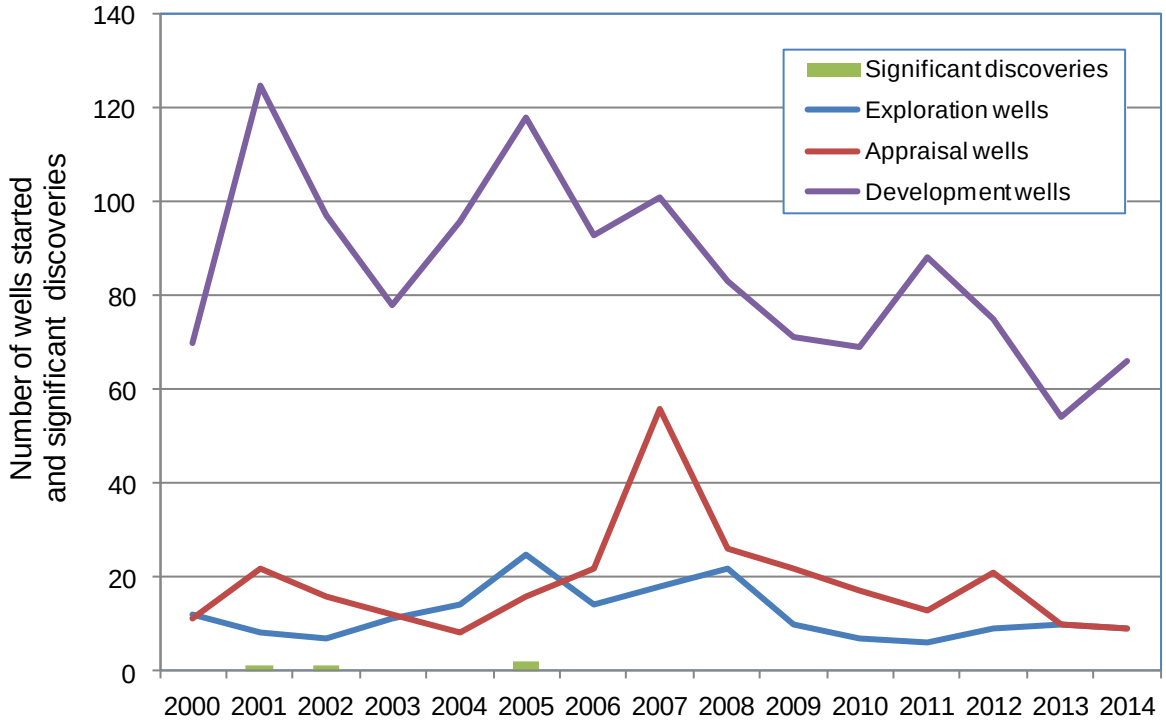
3 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/274621/28R_Technical_guidance.pdf

4 https://itportal.decc.gov.uk/eng/fox/path/PATH_REPORTS/pdf

Figure 2.1: Number of exploration, appraisal and development wells started in the Central North Sea and significant discoveries in the Moray Firth 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

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
12/21d & 12/26c	Drill or drop well, obtain 2D seismic	**Traditional:** work programme must be carried out and 50% of block acreage relinquished within 4 years, otherwise licence will not continue to second term.
12/30	Drill or drop well, shoot and obtain 3D seismic	
13/16b & 13/17	Drill or drop well, reprocess 3D seismic	
13/21c	Drill or drop well, reprocess 3D seismic	
18/1 & 18/2	Drill or drop well, obtain 2D seismic	
18/4, 18/5 & 18/9	Drill or drop well, obtain 2D seismic	
19/15	Drill or drop well, obtain 2D seismic	

Note: Reprocessing or obtaining seismic refers to use of existing seismic data rather than undertaking new seismic survey[5].

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

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.

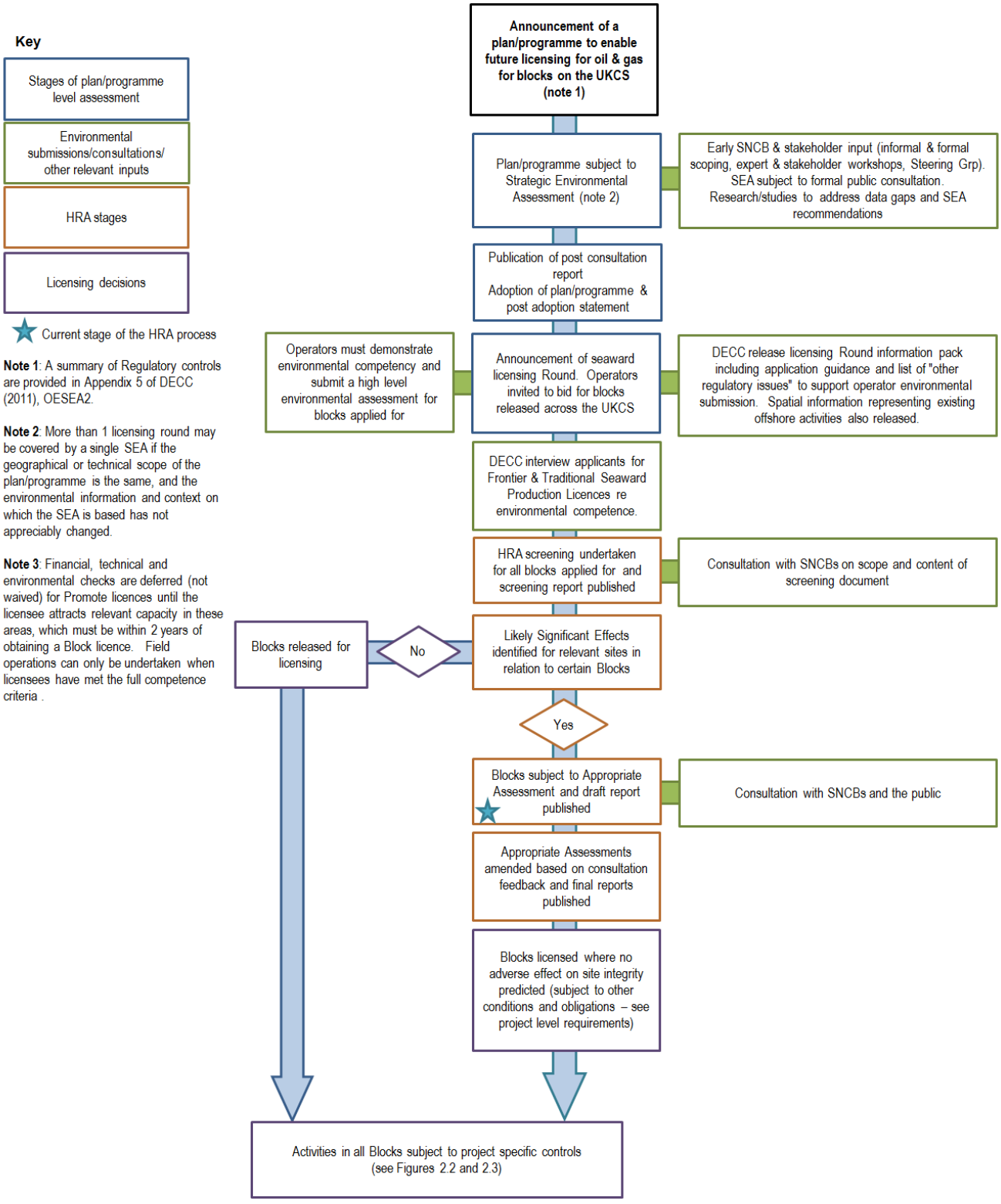
Table 2.1: High level controls identified for potential sources of effect

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 2011a, 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 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.

Source of effect	High level controls
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[6] 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.
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)[7]. 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[8].

Figure 2.2: Stages of plan level environmental assessment

[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/283487/28R_other_reg_issues.pdf
[7] http://www.shetnews.co.uk/news/9565-sic-retaining-northern-isles-emergency-vessel-is-crucial
[8] https://www.gov.uk/government/news/moore-welcomes-bp-and-north-star-support-for-second-support-vessel

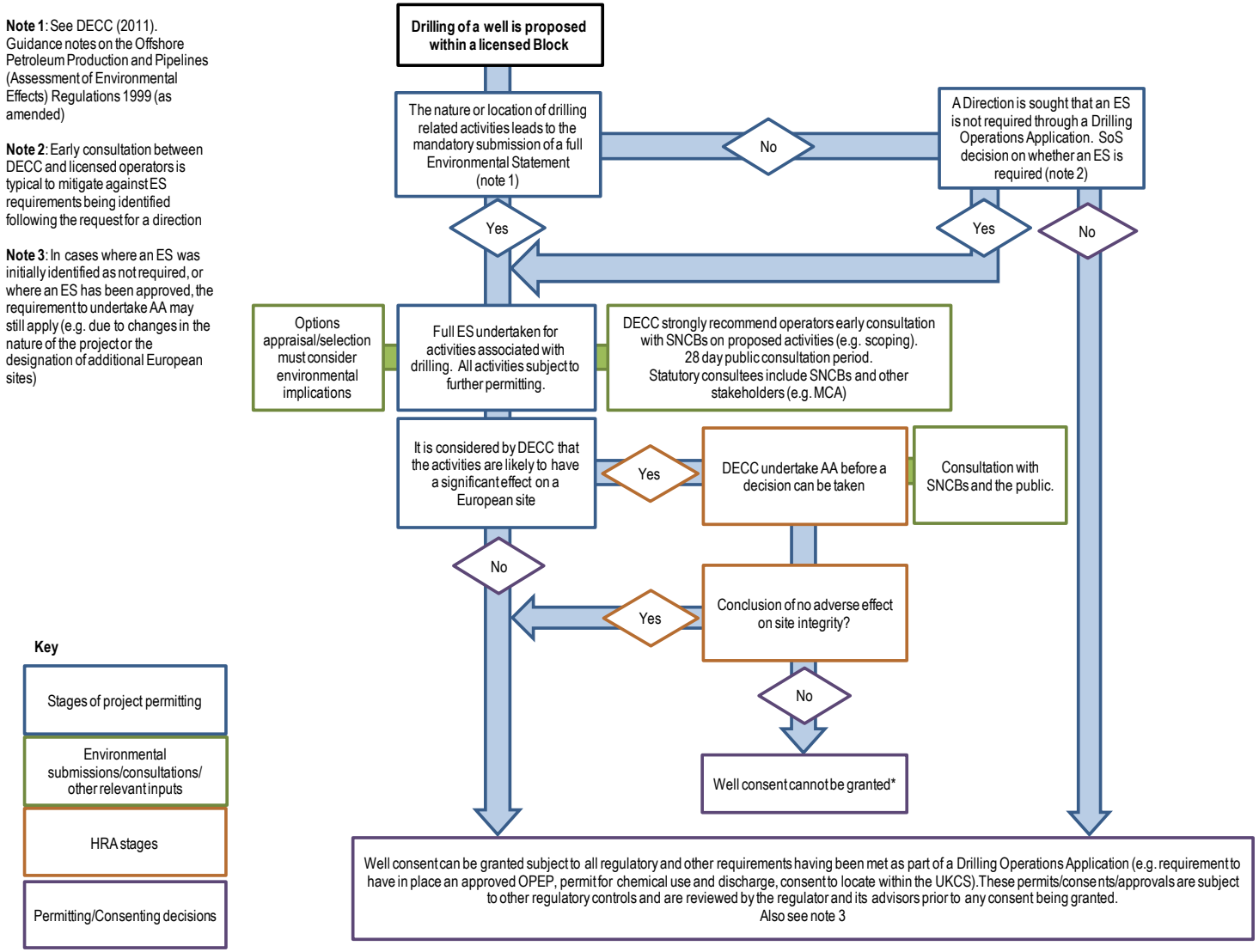


Note 1: A summary of Regulatory controls are provided in Appendix 5 of DECC (2011), OESEA2.

Note 2: More than 1 licensing round may be covered by a single SEA if the geographical or technical scope of the plan/programme is the same, and the environmental information and context on which the SEA is based has not appreciably changed.

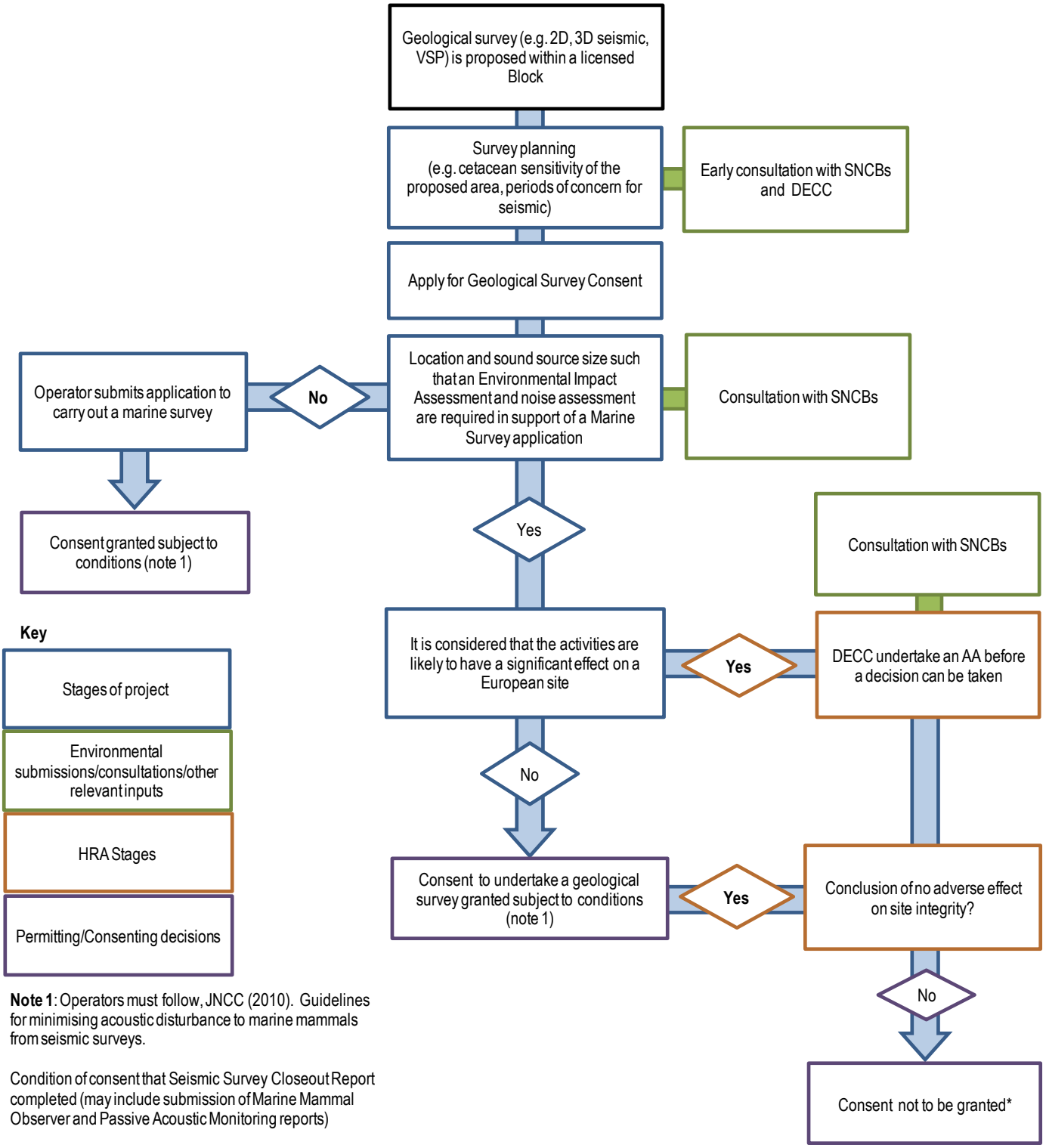
Note 3: Financial, technical and environmental checks are deferred (not waived) for Promote licences until the licensee attracts relevant capacity in these areas, which must be within 2 years of obtaining a Block licence. Field operations can only be undertaken when licensees have met the full competence criteria .

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.

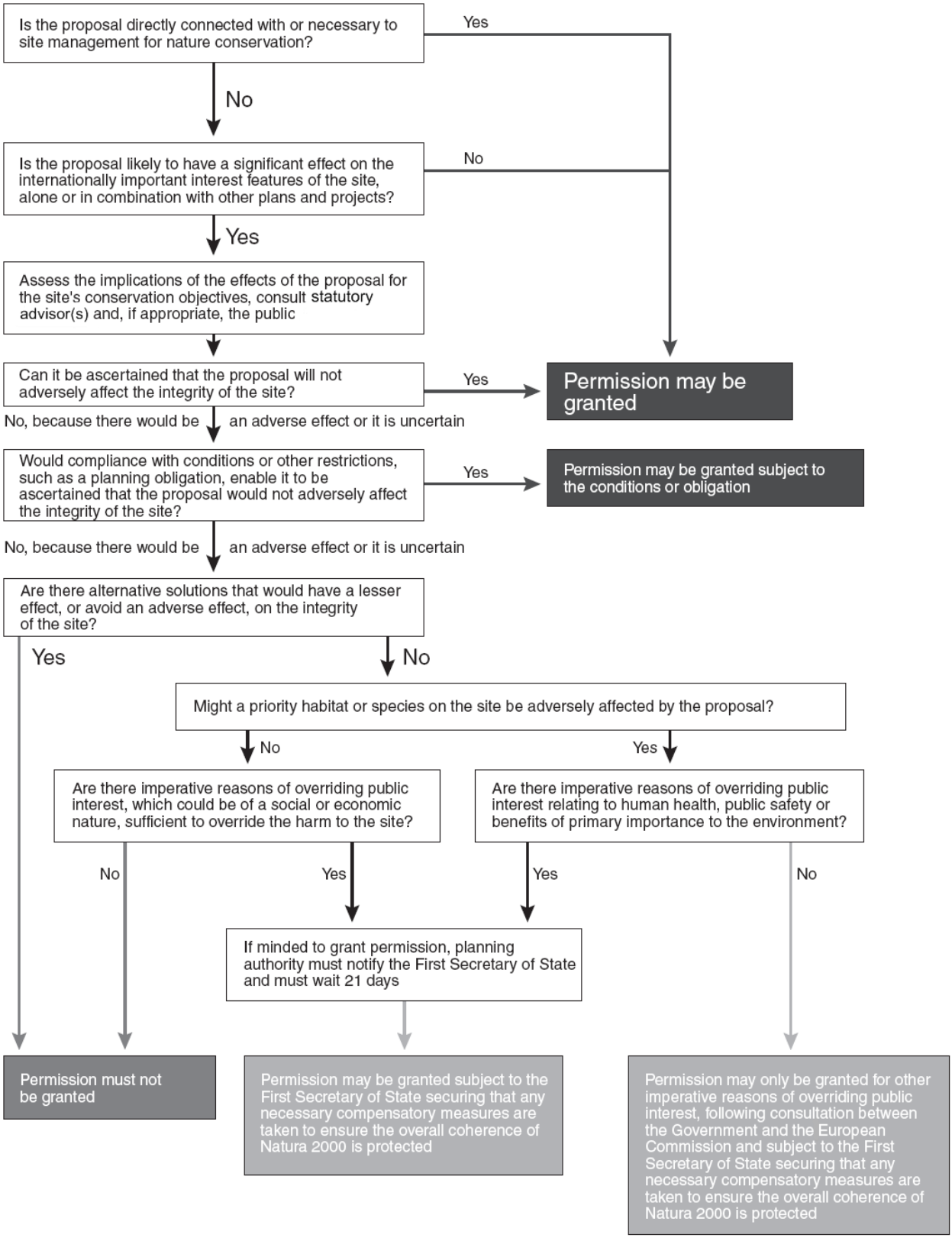
In considering the above, DECC used the clarification of the tests set out in the Habitats Directive in line with the ruling of the ECJ in the *Waddenzee* case (Case C-127/02), so that:

- 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 12 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[9] 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.

[9] 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 Moray Firth 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. An Environmental Statement (ES) for an exploration well in Block 18/05 in *ca*. 90m water depth indicated that the semi-submersible rig anchors would be deployed at distances of around 1,700m from the well location. The anchors (10 in number, about 2m wide and weighing 20 tonnes each), would drag for up to 50m during tensioning to ensure a good hold, with between 600 and 1,200m of chain in contact with the seabed (catenary contact) providing additional anchoring hold. The anchor chain may scrape the seabed surface, particularly closer to the rig around where the chain/cable rises from the seabed to the rig attachment. The area of seabed affected by anchoring was estimated at *ca*. 0.01km^2. The ES estimated that the depth of sediment over-turned by anchor-scarring would be of the order of a few metres, and based on long core samples, exposed sediments were likely to be qualitatively similar to existing surficial sediments. Long-lasting compaction or over-consolidation of surface sediments was unlikely, and long-term effects resulting from changed physico-chemical characteristics of the substrate were not predicted (Apache North Sea Limited 2006).

- **Placement of jack-up rigs**. Jack-up rigs, normally used in shallower water (<120m), leave three or four seabed depressions from the feet of the rig (the spud cans) around 15-20m in diameter. A four-legged rig with 20m diameter spudcans would have an approximate seabed footprint of 1,250m^2 within a radius of *ca*. 50m of the rig centre. In locations with an uneven seabed, material such as grout bags may be placed on the seabed to stabilise the rig feet. An ES for an appraisal well in Block 12/21c in *ca*. 40m water depth indicated that each of the selected jack-up rig's three legs terminated in a spud-can with a diameter of 18m. These were spaced at between 48m to 53m apart and would form seabed depressions (typically 1-3m deep) as a result of sinking into the

seabed during the process of jacking the rig legs to support the drilling deck. Within the seabed footprint of the rig (760m^2), the benthic fauna would likely be killed by crushing or by the effects of reduced water exchange. The ES concluded that given the small scale of the footprint, the nature of the sandy seabed fauna and the inferred sediment movement in the area, the seabed depressions formed would not endure and the effects would be negligible (Ithaca Energy (UK) Limited 2006).

- **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, 2011a).

In contrast to historic oil based mud discharges[10], 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 WBM cuttings discharges in the Moray Firth for an appraisal well in Block 12/21 in *ca*. 40m water depth (Ithaca Energy (UK) Limited 2006) and an exploration well in Block 18/05 in *ca*. 90m water depth (Apache North Sea Limited 2006), indicated that a large proportion of the material predicted to deposit within the model area was located within distances of between 1-5km of the well locations. The predicted settling rates were comparable to natural erosion/deposition rates recorded in the coastal North Sea (20-200g/m^2/year, OSPAR 2000) and were considered unlikely to have significant ecological effects through smothering or physical disturbance.

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).

[10] 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.

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).

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). With respect to the disturbance and subsequent displacement of seabirds in relation to offshore windfarm (OWF) developments, Natural England & JNCC (2014) interim advice recommends a generic displacement buffer of 2km to be added to the OWF footprint for all species with the exception of divers and seaducks, for which a 4km buffer was recommended due to their increased sensitivity. The potential qualifying features of the Moray Firth dSPA[11] include a number of sensitive diver and seaduck species which could be disturbed by activities within the 28th Round Blocks (see Table 4.1).

The presence and/or movement of vessels from and within Blocks during drilling activities could also potentially disturb marine mammals foraging within or outside of SACs for which they are a qualifying feature (e.g. bottlenose dolphins from the Moray Firth SAC). However, shore-based monitoring of the effects of boat activity on the behaviour of bottlenose dolphins off the US South Carolina coast, have indicated that slow moving, large vessels, like ships or ferries, appeared to cause little to no obvious response in dolphin groups (Mattson *et al.* 2005). New *et al.* (2013) developed a mathematical model to simulate the complex social, spatial, behavioural and motivational interactions of coastal bottlenose dolphins in the Moray Firth, in order to assess the biological significance of an increased rate of behavioural disruptions caused by vessel traffic. They explored a scenario in which vessel traffic increased from 70 to 470 vessels a year in response to the construction of a proposed offshore renewables facility. Despite the more than six-fold increase in vessel traffic, the dolphins' predicted behavioural time budget, spatial distribution, motivations and social structure remained unchanged. The limited number of vessel movements (e.g. supply vessels typically make 2-3 supply trips per week between rig and shore) that are likely as a result of potential activities following licensing of any of the Moray Firth Blocks, are unlikely to cause significant disturbance of the Moray Firth SAC qualifying feature both within or outside of the site.

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

[11] As described in Section 3, a number of marine SPAs are presently at the draft stage in Scottish inshore and offshore waters.

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

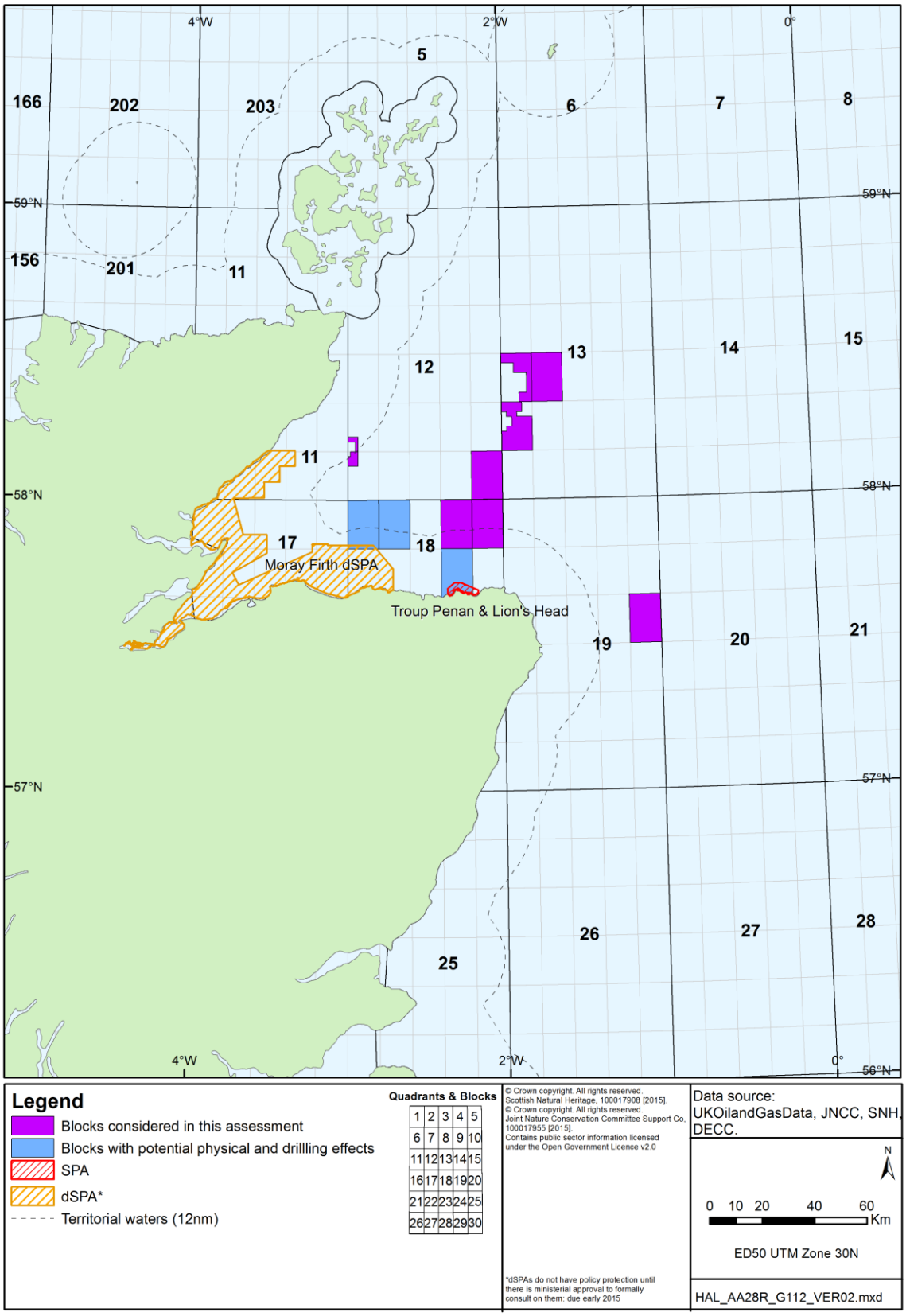


Table 4.1: Consideration of potential physical disturbance and drilling effects and relevant site conservation objectives

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
SPAs		
Moray Firth dSPA	Overwintering divers and waterfowl, European 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[12]. **Rig installation/ placement** Block 18/1 partly overlaps with the draft site boundary and Block 18/2 is *ca*. 1km from the boundary. Both Blocks are part of a single licence application with one drill or drop well proposed between them. Potential impact will be restricted to drilling a well in Block 18/1 as 18/2 is sufficiently distant from the site to ensure no overlap of disturbance footprint with the site. The potential physical damage to supporting habitats within the site is not likely to be significant given the small and temporary nature of the seabed footprint of a jack-up rig (see Section 4.2.1), and the large size of the dSPA. **Drilling discharges** Modelling of cuttings discharges in the area indicate that drilling discharges within either Block could result in a seabed footprint which overlaps with part of the site (see Section 4.2.2). However, predicted settling rates were considered comparable to natural erosion/deposition rates recorded in the coastal North Sea. Therefore, the potential smothering of supporting habitats within the site is not likely to be significant given the relatively natural levels of predicted deposition, the localised and temporary nature of the drill cuttings footprint, and the large size of the dSPA. **Rig/vessel presence and movement** The sensitivity of some of the qualifying features to non-physical disturbance (noise, visual presence) is likely to be high (Section 4.2.3), and the presence and movement of vessels has the potential to disturb sensitive qualifying features at feeding and resting sites. The likelihood and scale of potential impact will be determined by the proposed location and timing of activities and mitigation measures (see Section 4.4) 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).
Troup, Pennan and Lion's Head SPA	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

[12] http://www.snh.gov.uk/docs/A1350044.pdf

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		• Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species **Rig installation/ placement** Block 18/9 partly overlaps with the site boundaries and is part of a licence application with Blocks 18/4 and 18/5, with one drill or drop well proposed between the 3 Blocks. Potential impact will be restricted to drilling a well in Block 18/9 as the other Blocks are sufficiently distant from the site to ensure no overlap of disturbance footprint with the site. Although the seabed footprint associated with a jack-up rig or semi-submersible drilling rig is relatively small and temporary (see Section 4.2.1), rig placement, anchoring and well placement could cause deterioration of supporting habitats through physical damage. The likelihood and scale of impact will be determined by the proposed location and timing of drilling activities and mitigation measures (see Section 4.4) are available to ensure site conservation objectives are not undermined. **Drilling discharges** Previous modelling of cuttings discharges in the area indicate that drilling discharges within Block 18/9 could result in a seabed footprint which overlaps with part of the site (see Section 4.2.2). However, predicted settling rates were considered comparable to natural erosion/deposition rates recorded in the coastal North Sea. The potential smothering of supporting habitats within the site is not likely to be significant given the relatively natural levels of predicted deposition, and the localised and temporary nature of the drill cuttings footprint. However, the likelihood and scale of impact will be determined by the proposed location and timing of drilling activities and mitigation measures (see Section 4.4) are available to ensure site conservation objectives are not undermined. **Rig/vessel presence and movement** Given that Block 18/9 partly overlaps with the site, the presence and movement of vessels has the potential to disturb the qualifying features (unfavourable declining or no change) which have a low to moderate sensitivity to disturbance by vessel traffic (Garthe & Hüppop 2004). The likelihood and scale of impact will be determined by the proposed location and timing of drilling activities and mitigation measures (see Section 4.4) are available 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 the permitting process (e.g. Drilling Operations Application), and the discharge of chemicals which would be expected to have a significant negative impact would not be permitted. If the scale and location of the proposed drilling discharges could lead to significant smothering effects, further mitigation is possible such as relocation of the cuttings discharge point further away from the site, and discharge near the seabed rather than near sea surface or zero discharge where appropriate.

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, and 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, 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 through the implementation of the EIA regulations and 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 12/21d, 12/26c, 12/30, 13/16b, 13/17, 13/21c, 18/1, 18/2, 18/4, 18/5, 18/9 and 19/15, 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 Moray Firth 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, 2011a).

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[13], 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

[13] 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[13]). 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[13]) 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 receptor 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[14] and energy[15] (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

[14] pressure measurements are based on peak sound pressure levels or SPL expressed as dB re 1 µPa (peak)(flat)
[15] 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[16]. 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[17].

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).

[16] 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 thresholds for injury.

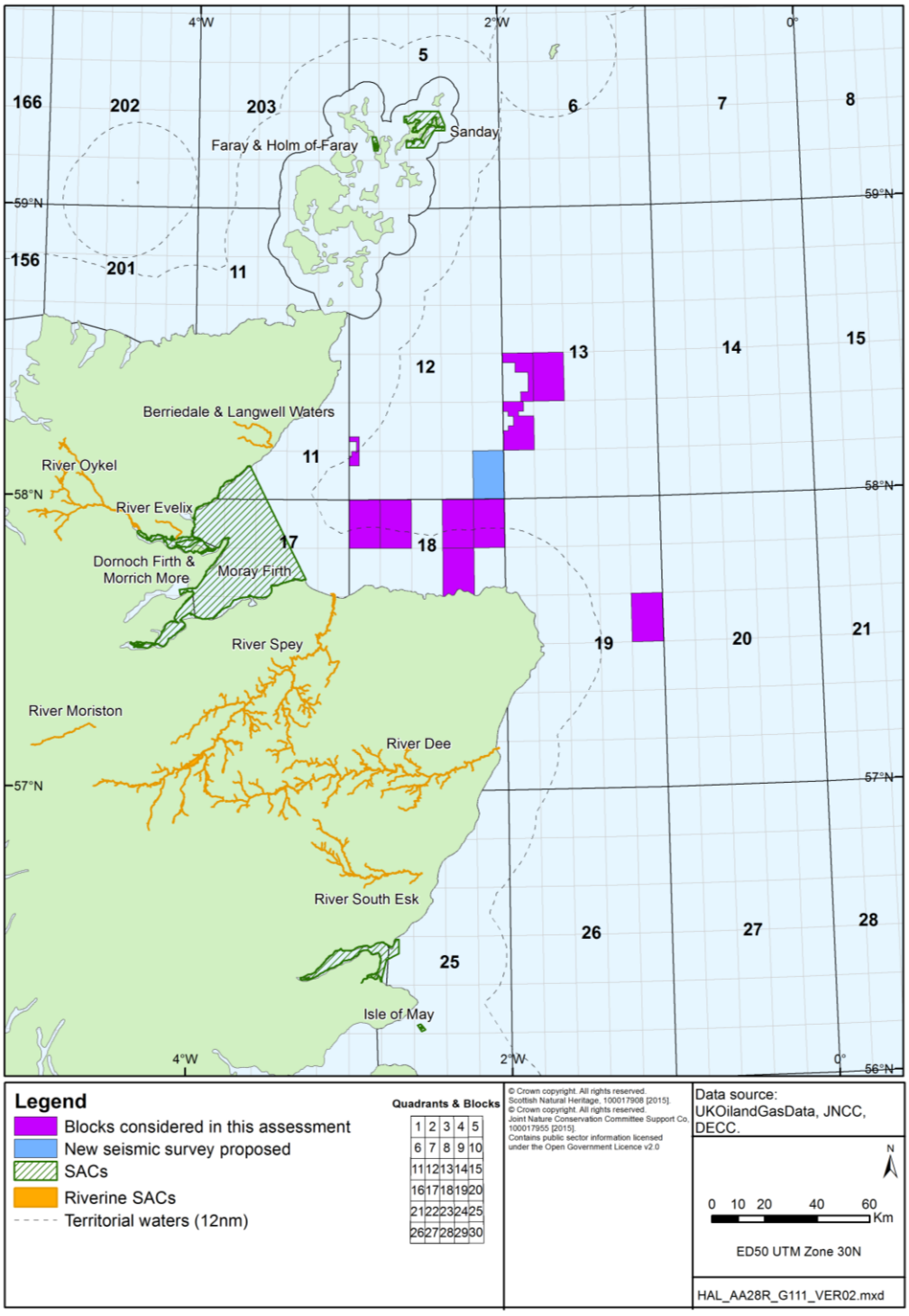
[17] In the UK, such an approach has been adopted in the guidance on the protection of marine EPS (JNCC 2010) where disturbance is interpreted as sustained or chronic disruption of behaviour scoring 5 or more.

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 Block 12/30 (the only Block where new seismic is proposed) on the bottlenose dolphin qualifying feature (favourable recovered) of the Moray Firth SAC (*ca*. 70km from Block 12/30), whilst foraging outside of the site. Similarly, seismic survey could also impact seal qualifying features foraging outside of designated sites (see 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



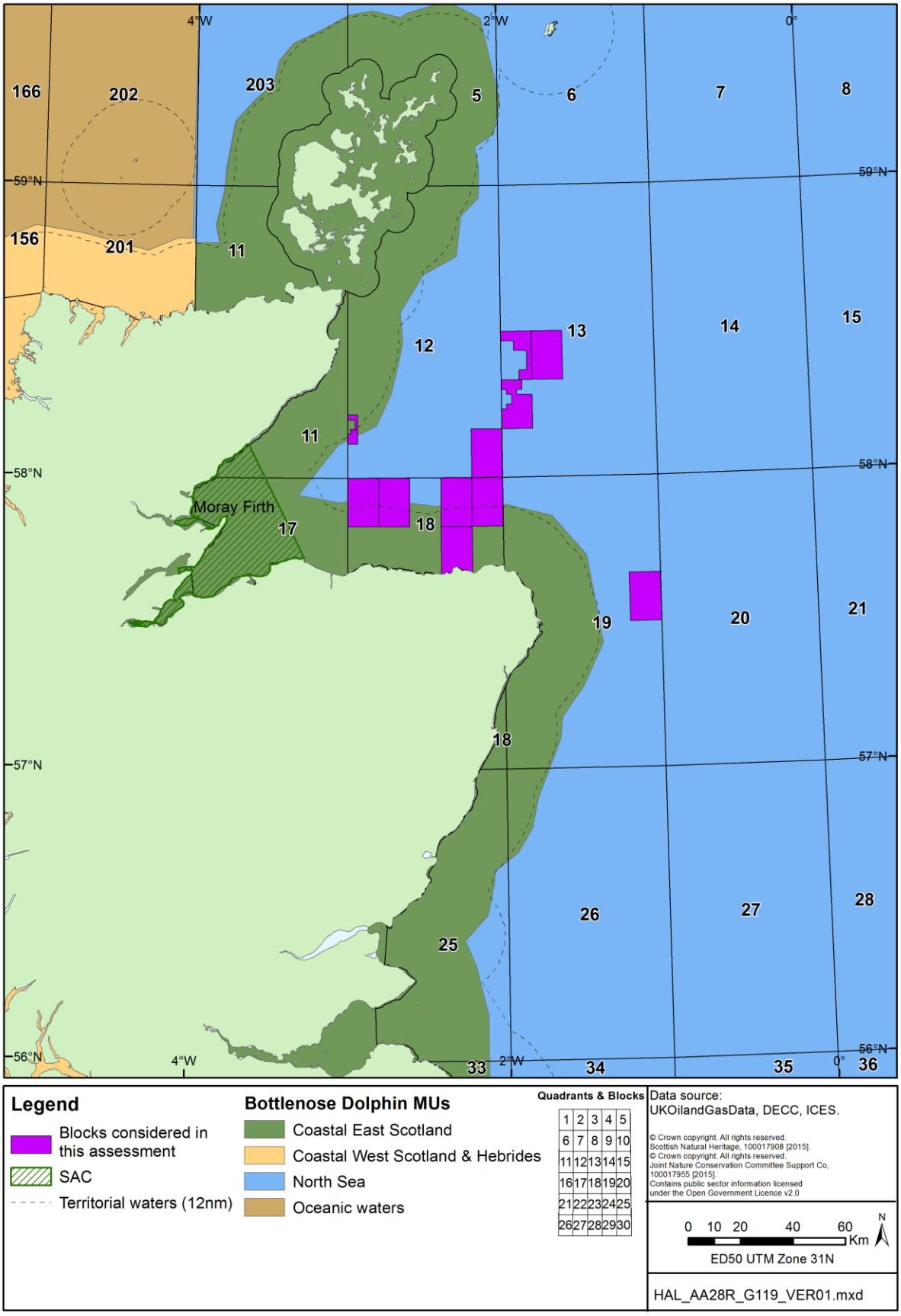
Previous cetacean surveys in the Moray Firth (as summarised by Thompson *et al.* 2013), have identified that almost all bottlenose dolphin sightings were within 15km of the coast in the inner part of the Moray Firth SAC or the coastal strip along the southern Moray Firth. There were few records of bottlenose dolphins in offshore areas of the outer Moray Firth. Quick *et al*. (2014) reported on bottlenose dolphin movements outside of the Moray Firth SAC, particularly around Aberdeen and down to the Firths of Tay and Forth, primarily in waters less than 20m deep and within 2km of the coast.

A series of management units for bottlenose dolphins around the UK have been proposed by ICES (2013) and these largely reflect those identified by the Interagency Marine Mammal Working group (IAMMWG) (2013). These units offer a mechanism to take account of the likely range of bottlenose dolphin movements from relevant SACs. Of relevance to the Moray Firth AA is the coastal east Scotland unit (Figure 5.2). The presence of a number of 28th Round Blocks (primarily from Quadrant 18) within this management unit indicates that underwater noise within these Blocks could impact the Moray Firth SAC bottlenose dolphin population. However, Block 12/30 (the only Block where new seismic proposed) is *ca*. 10km to the north of the management unit (see below for a consideration of distances within which behavioural responses have been observed in previous seismic survey).

An extensive 3 year study to examine the potential impact of seismic survey operations on cetaceans in the Moray Firth, provided no evidence of an overall reduction in the occurrence of bottlenose dolphins in those parts of their core-range that were closest to the survey vessel (Thompson *et al.* 2013). The 2D seismic survey was conducted over two areas (in Blocks 14/4b, 11/23, 11/27 and 11/28) licensed for oil and gas exploration in the central Moray Firth, between 1st and 11th September 2011. The vessel used a 470 cu inch air-gun array with a shot point interval of 5-6 seconds, producing peak-to-peak source levels that were estimated to be 242-253 dB re 1µPa@1m. Passive acoustic monitoring (PAM) studies indicated some evidence of short-term behavioural responses with the occurrence of dolphins at PAM sites on the southern Moray Firth coast increasing during the 10 day seismic survey, most likely as a result of animals being displaced inshore, away from the survey vessel. Peak to peak levels at these sites averaged 156.9 and 155.7 dB re 1 µPa, and would be expected to be detectable above background noise for bottlenose dolphins. Thompson *et al.* (2013) indicated that this relatively short seismic survey would not have a major impact on the number of animals using the SAC, with data suggesting the survey was associated with a finer-scale re-distribution of individuals or change in behaviour that could incur some energetic costs. Where such changes occur during longer periods of disturbance, there could be potential impacts on individual vital rates (Currey *et al.* 2011, New *et al.* 2013).

Similarly, Thompson *et al.* (2013) also described changes in the occurrence of harbour porpoises in the Moray Firth during the seismic survey. Both acoustic and visual data provided evidence of fine-scale behavioural responses to seismic survey noise within 5-10km, at received peak-to-peak sound pressure levels of 165-172 dB re 1 µPa and sound exposure levels of 145-151 dB re 1µPa^2 s. However, animals were typically detected again at affected sites within a few hours, and the level of response declined through the 10 day survey. Overall, there was a significant decrease in acoustic detections over the survey period in the impact area compared to a control area. However, this effect was small in relation to natural variation, and porpoises were detected in the impact area for a median of 10 hours per day throughout the seismic survey period. These results demonstrated that prolonged seismic survey noise did not lead to broader-scale displacement into sub-optimal or higher-risk habitats (Thompson *et al*. 2013).

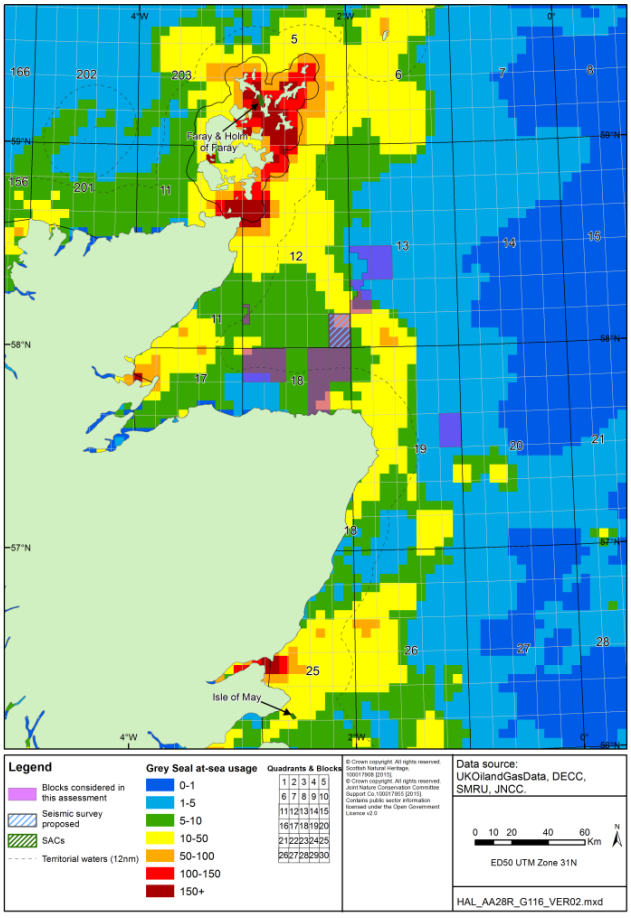
Figure 5.2: Proposed bottlenose dolphin management units relevant to the Moray Firth Blocks



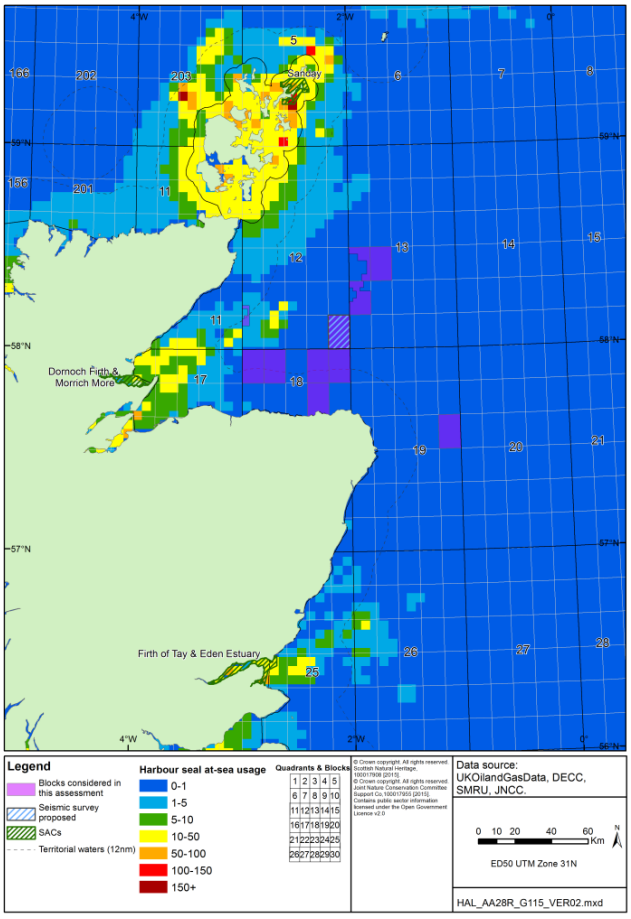
Maps showing the at-sea distribution of grey and harbour seals around the UK have been produced (Marine Scotland website[18]). The density maps (Figure 5.3) indicate that the Moray Firth area is of moderate importance for seals, particularly grey seals (which may forage from Orkney and the north coast, the east coast of Scotland and north east England, Hanson & Lonergan 2012), with harbour seals having a more restricted distribution within the Firth. Relevant SACs for grey (Faray and Holm of Faray SAC, favourable maintained; Isle of May SAC, favourable maintained) and harbour seals (Dornoch Firth and Morroch More SAC, unfavourable recovering) are highlighted on Figures 5.1 and 5.3. Of relevance to the AA is the moderate density of grey seals over parts of Block 12/30, for which a 3D seismic survey is proposed.

Figure 5.3: Estimated at-sea usage by seals in the Moray Firth area

a) Grey seals



b) Harbour seals



With respect to the previously mentioned 2D seismic survey in the Moray Firth, DECC undertook an AA prior to the survey being consented (DECC 2011b), which included assessment of the impact on the Dornoch Firth and Morrich More SAC harbour seal population. Results from noise modelling studies indicated that there could be a potential zone of auditory impact up to 200m away but permanent effects would only occur within 11m of the survey vessel. DECC (2011b) noted the potential for the disturbance and displacement of seals in the vicinity of the operating airguns with the most precautionary noise model indicating that this may extend up to

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

approximately 5km from the airguns. The AA concluded that any displacement or disturbance that may occur would be outside the SAC and for a relatively short duration.

With respect to the bottlenose dolphin and 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 bottlenose dolphin, 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 a 3D seismic survey operation in Block 12/30. 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: Berriedale and Langwell Waters (Atlantic salmon, unfavourable recovering), River Evelix (freshwater pearl mussel, unfavourable no change), River Oykel (freshwater pearl mussel, unfavourable declining; Atlantic salmon, unfavourable recovering), River Moriston (freshwater pearl mussel unfavourable no change; Atlantic salmon (unfavourable recovering)), River Spey (freshwater pearl mussel, unfavourable recovering; sea lamprey, favourable maintained; Atlantic salmon, unfavourable recovering), River Dee (freshwater pearl mussel, unfavourable no change; Atlantic salmon, unfavourable recovering), and River South Esk (freshwater pearl mussel, unfavourable declining; 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. Seismic survey is proposed for Block 12/30 which is a considerable distance from any of the SACs for migratory fish (e.g. the closest relevant site is River Spey SAC at 65km from the Block).

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 Moray Firth 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. Block 12/30 is not located close to

the entrance of the relevant sites and therefore seismic survey activities are not expected to have an adverse effect on the integrity of the 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) did not identify any sites where significant underwater noise effects were likely.

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 is made through DECC's Portal Environmental Tracking System (PETS) by applying for a standalone Master Application Template (MAT) and Geological Survey Subsidiary Application Template (SAT) which is supported by an Environmental Impact Assessment (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*.

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[19] and stipulate, whenever possible, the implementation of several best practice measures, including:

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

- 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 Special Areas of Conservation for harbour seals or grey seals.

- Provide trained MMOs to implement the JNCC guidelines.

- 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 activity specific conditions relevant to 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 Moray Firth, 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[20] 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 SACs with marine mammals and fish as a qualifying feature. 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 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 a 3D seismic survey be proposed in Block 12/30 (as indicated by the work programme), 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 bottlenose dolphins and 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 require individual consents which will not be granted unless the operator can demonstrate that the proposed activities which may include a 3D seismic survey, will not adversely affect the site integrity of relevant sites. These activities will be subject to activity level EIA and HRA (where appropriate).

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

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 Moray Firth Blocks. 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 will never 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)[21]. 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 12 Moray Firth 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,

[21] 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[22]).

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[23] by the MCA and PON1 reports to DECC – the latter are published monthly on the DECC website[24]. 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 the period 1980 to 2005, provided blowout frequencies (per drilled well) for exploration drilling of normal oil[25] (2.5×10^{-4}) and gas[26] wells (3.6×10^{-4}), as well as deep high pressure high temperature[27] oil (1.5×10^{-3}) and gas (2.2×10^{-3}) wells (OGP 2010). Accident statistics for offshore units on the UKCS estimated an annual average frequency of blowouts[28] for mobile drilling units of 6.6×10^{-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 types in the Moray Firth Blocks are primarily oil but condensate or gas may also be found. Therefore the potential risk of crude oil spills has been

[22] https://www.gov.uk/oil-and-gas-uk-field-data#oil-discharged-with-produced-water
[23] POLREP (pollution reports) relate to those issued in accordance with the Bonn Agreement, to alert Contracting Parties to relevant pollution events.
[24] https://www.gov.uk/oil-and-gas-environmental-data
[25] A well where the formation has an estimated gas/oil ratio less than 1,000.
[26] A well where the formation has an estimated gas/oil ratio exceeding 1,000.
[27] 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.
[28] 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).

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[29].

Coincident with these weathering processes, surface and dispersed oil will be transported as a result of tidal (and other) currents, wind and wave action. Generally, the 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 Moray Firth Blocks would push spilled oil towards Orkney and out into the central and northern North Sea.

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 and rig availability, time to drill the well etc.). Representative modelling cases from various parts of the UKCS have been reviewed by successive SEAs.

A collation of 12 years worth of oil spill modelling studies completed for oil and gas exploration and development in the Moray Firth from Blocks 12, 13, 18, 19 and 20 (Table 6.1) indicates deterministic estimates of time to beach for a number of different spill scenarios and hydrocarbon types. The time to beach for different locations (where beaching occurs) can be summarised by the following ranges:

- Northeast coast of Scotland – 8-39 hours
- Orkney – 41 hours

Previous oil spill modelling from Blocks within the Moray Firth (Table 6.1) suggests that beaching from a spill would not occur for at least 8 hours (from Block 18/5), under a 30 knot onshore wind. However, with respect to this AA, Block 18/9 impinges upon the coast and beaching is therefore likely to occur more quickly (depending on the location of the well). It should be noted that the estimates in Table 6.1 are from 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. From the stochastic modelling described in Table 6.1 for spills in Moray Firth Blocks, the likelihood of beaching of hydrocarbons is *ca*. 10%.

[29] OPEP Guidance (DECC 2012) indicates that trajectory modelling must be carried out using a 30 knot onshore wind to determine the likely scale and impact to the UK.

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

Block	Water depth (m)	Spill type*	Spill size	Model used & conditions	Time to beach (trajectory modelling)	Likelihood of beaching (stochastic modelling)	Date of model run
13/21a	98	Blowout, 19º API Captain and Alba crude	597 tonnes (*ca.* 635m^3) per day	OSIS III and Oilmap v.3, 30 knot onshore wind	Fraserburgh - 30h Wick - 38h Orkney - 41h	Over a six day period none of the oil would be expected to beach in January and May models.	2000
19/5 and 20/1	82-106	32º API crude	Worse case single well open hole flow rate of 5,000 tonnes (*ca*. 5,814m^3) per day	OSIS III, 30 knot onshore winds	Rattray Head - 26h	Scotland <10%	2003
18/5	90	Blowout, 30º API crude	Uncontrolled flow with an open hole flow rate of 1,088 tonnes (*ca.* 1,236m^3) per day, flowing for 48h	OSIS 3.1.1, 30 knot onshore winds	NE coast of Scotland - 8h	Scotland 10%	2006
12/21c	30-40	Blowout, 38.8º API Beatrice crude	Uncontrolled flow with an open hole flow rate of 383 tonnes (*ca.* 461m^3) per day, flowing for five days	OSIS 3.1.1, 30 knot onshore winds	NE coast of Scotland -14h	Scotland 10% Norway <1%	2008
20/2a, 20/3a and 20/3f	110	40º API crude	6,500 tonnes (*ca*. 7,879m^3)	30 knot onshore winds	NE coast of Scotland -39h	-	2010
13/24a, 13/24b and 13/29b; Bleo Holm FPSO 13/28a	95	Blake field crude (30.3 º API)	350 tonnes (*ca.* 400m^3) per day over a ten day winter period	OSIS	-	Scotland, Norway <1%	2010

Note: API is a measure of oil density relative to water. Lower API values indicate heavier and more persistent oils. Values of ~30-40ºAPI are typical of North Sea/light crude oils.

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.

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.

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, but also habitat loss and degradation) 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. Surveys carried out in early spring of 2008 (Cork Ecology 2008) recorded the presence of various waterbirds (black throated diver, goldeneye, great northern diver, eider, long tailed duck) and seabirds (fulmar, gannet, cormorant, shag, black headed gull, common gull, lesser black-

backed gull, herring gull, greater black-backed gull, kittiwake, guillemot, razorbill, black guillemot, little auk and puffin) within the Moray Firth.

Oil spill risks to marine mammals have been reviewed by successive SEAs[30] 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[31] 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.

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.

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

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[37]), 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 Moray Firth and surrounding area (identified by the re-screening process in Appendix B, see Figure 6.1). 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 specific Moray Firth 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.

Figure 6.1: Relevant sites and Blocks for accidental spill effects

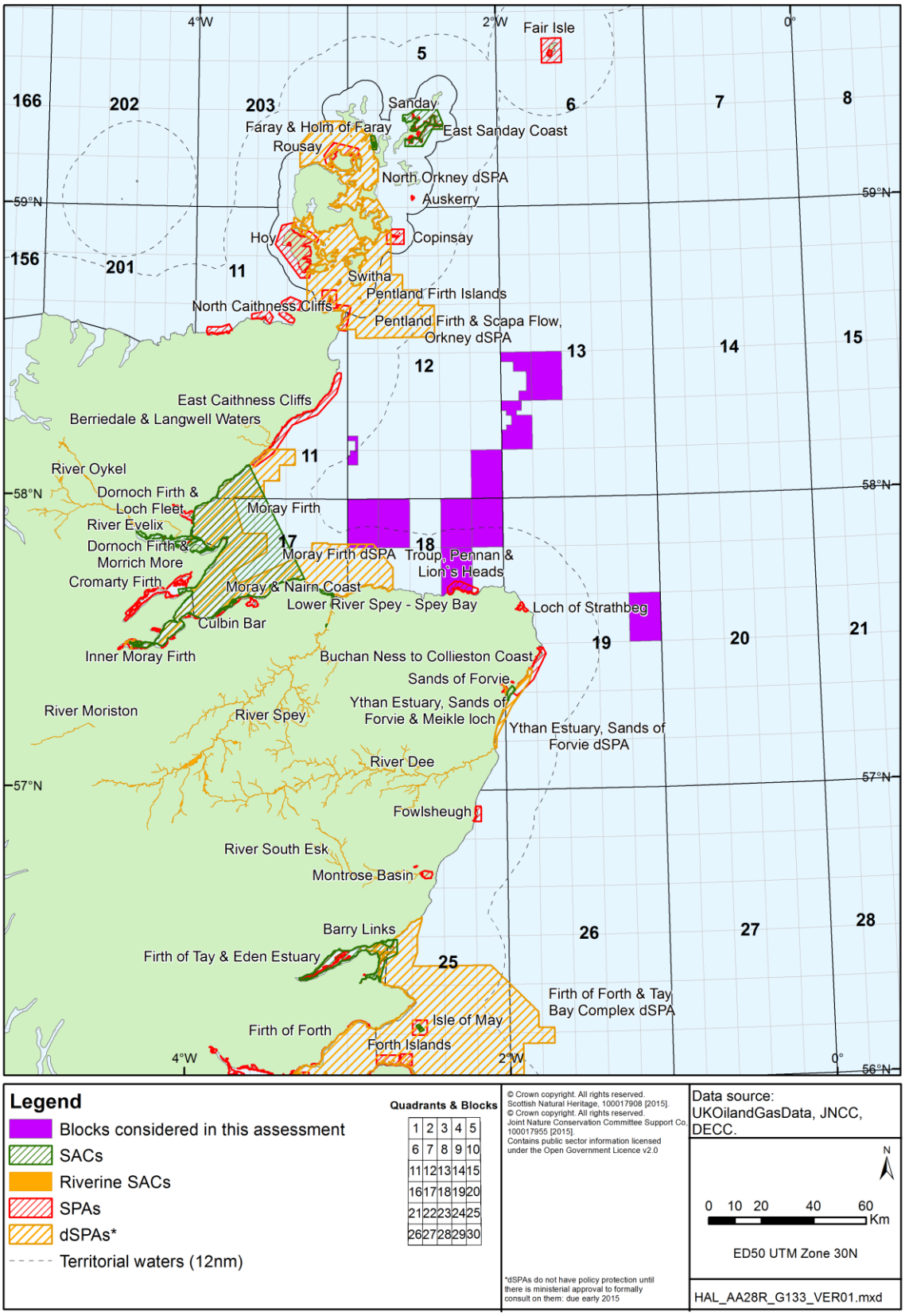


Table 6.2: Consideration of potential accidental spill effects and relevant site conservation objectives

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
Spill risk: Worst case scenario likely to be the release of crude oil through a blowout although incidents are rare. Most frequent types of spill from mobile drilling rigs tend to be small releases of organic phase drilling fluids (and base oil), diesel and crude oil (see Section 6.3.1).		
SPAs		
Fair Isle	Breeding tern, wren and seabirds	**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 (13/17) is *ca*. 112km from the site. Qualifying features have a high (e.g. auks, gannet, Arctic skua) to moderate (e.g. fulmar, Arctic tern) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the populations of the qualifying features, their distributions 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 following this table.
ORKNEY: Representative worst case oil spill modelling (Table 6.1) indicates that a blowout in Block 13/21a could reach Orkney (*ca*. 56km from Block) in *ca*. 40h with stochastic modelling indicating a relatively low likelihood of beaching.		
Pentland Firth Islands	Breeding tern	**Conservation objectives:** As above. **Consideration** Closest Block (12/21d) is *ca*. 52km from the site. Qualifying feature has a moderate vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the population of the qualifying feature, 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.
Switha	Overwintering geese	**Conservation objectives:** As above. **Consideration** Closest Block (12/21d) is *ca*. 65km from the site. Geese have a relatively low vulnerability to the direct effects of oil spills - the primary concern would be the effects of the oil and the clean-up on their feeding and roosting resources (Law *et al.* 2011). Given the distance from the site and that much of the site and roosting resource above Mean High Water Springs (MHWS), no adverse impact on site integrity.
Hoy	Breeding peregrine, red-throated diver and skua.	**Conservation objectives:** As above. **Consideration** Closest Block (13/16b) is *ca*. 78km from the site. Qualifying features have a very high (e.g. great skua, red-throated diver), high (e.g. Arctic skua, auks), and moderate (e.g. fulmar) vulnerability to surface pollution (Williams *et al*. 1994).

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
	Breeding seabirds, seabird assemblage	The potential for an accidental spill to impact the populations 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 following this table.
Rousay	Breeding terns and seabirds	**Conservation objectives:** As above. **Consideration** Closest Block (13/16b) is *ca*. 94km from the site. Qualifying features have a high (e.g. guillemot, Arctic skua) to moderate (e.g. fulmar, Arctic tern) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the populations 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 following this table.
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 (13/16b) is *ca*. 67km from the draft site. Potential qualifying features have a very high (e.g. divers) to moderate (e.g. Arctic tern) 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).
East Sanday Coast	Overwintering waders	**Conservation objectives:** As for Rousay SPA above. **Consideration** Closest Block (13/16b) is *ca*. 86km 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 populations 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.
Auskerry	Breeding tern and storm petrel	**Conservation objectives:** As above. **Consideration** Closest Block (13/16b) is *ca*. 67km from the site. Qualifying features have a moderate vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the populations 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.
Copinsay	Breeding seabirds	**Conservation objectives:** As above. **Consideration** Closest Block (13/16b) is *ca*. 55km from the site. Qualifying features have a high (e.g. guillemot, 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 populations of the qualifying features, their distribution or cause disturbance will be determined by

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		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 following this table.
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 (13/16b) is *ca*. 26km from the draft site. Potential qualifying features have a very high (e.g. divers) to moderate (e.g. Arctic tern) 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).
MORAY FIRTH AND EAST COAST: Representative worst case oil spill modelling (Table 6.1) indicates that a blowout in: • Block 12/21c could reach shore (*ca*. 18km from Block) in *ca*. 14h with stochastic modelling indicating a 10% likelihood of reaching shore. • Block 18/5 could reach shore (*ca*. 15km from Block) in *ca*. 8h with stochastic modelling indicating a 10% likelihood of reaching shore. • Blocks 19/5 and 20/1 could reach shore (*ca*. 45km from Block 19/5) in *ca*. 26h with stochastic modelling indicating a <10% likelihood of reaching shore.		
North Caithness Cliffs	Breeding peregrine and seabirds	**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 (12/21d) is *ca*. 40km from the site. Qualifying features have a high (e.g. auks) to moderate (e.g. fulmar, kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the populations 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 following this table.
East Caithness Cliffs	Breeding seabirds and gulls. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (12/21d) is *ca*. 14km from the site. Qualifying features have a high (e.g. auks, shag) to moderate (e.g. fulmar, herring gull) vulnerability to surface pollution (Williams *et al.* 1994). 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 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 following this table.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
Moray Firth dSPA	Overwintering divers and waterfowl, 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** Block 18/1 overlaps with part of the draft site. Potential qualifying features have a very high (e.g. divers) to moderate (e.g. long tailed duck) 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).
Dornoch Firth and Loch Fleet	Breeding osprey, overwintering waders and waterfowl	**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 (18/1) is *ca*. 45km from the site. Overwintering waders and waterfowl have a relatively low vulnerability to the direct effects of oil spills - the primary concern 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 populations 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.
Cromarty Firth	Breeding tern and osprey, overwintering waders and waterfowl	**Conservation objectives:** As above. **Consideration** Closest Block (18/1) is *ca*. 62km from the site. Breeding common tern has a high vulnerability to surface pollution (Williams *et al.* 1994). Overwintering waders and waterfowl have a relatively low vulnerability to the direct effects of oil spills - the primary concern 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 populations 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.
Inner Moray Firth	Breeding tern and osprey, overwintering waders and waterfowl	**Conservation objectives:** As above. **Consideration** Closest Block (18/1) is *ca*. 64km from the site. As for Cromarty Firth SPA above.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
Moray and Nairn Coast	Breeding osprey, overwintering waders and waterfowl	**Conservation objectives:** As above. **Consideration** Closest Block (18/1) is *ca*. 18km from the site. Qualifying features such as common and velvet scoter spend most of the time on the water, diving in shallow areas for bivalve shellfish, and are therefore very vulnerable to oil spills. Other features (e.g. waders and waterfowl) have a relatively low vulnerability to the direct effects of oil spills. The primary concern for waterfowl 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 populations 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.
Troup, Pennan and Lion's Head	Breeding seabirds and gulls. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Block 18/9 partly overlaps the site although only 1 D/D well proposed between it and Blocks 18/4 and 18/5. Qualifying features have a high (e.g. auks) to moderate (e.g. kittiwake) vulnerability to surface pollution (Williams *et al*. 1994). 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 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 following this table.
Loch of Strathbeg	Breeding tern and overwintering waterfowl	**Conservation objectives:** As above. **Consideration** Closest Block (18/5) is *ca*. 22km from the site. High vulnerability to surface pollution for breeding sandwich tern feature (Williams *et al.* 1994) which forage in the loch but could be present in nearshore waters close to the site. Other features (e.g. waterfowl) have a relatively low vulnerability to the direct effects of oil spills (Law *et al*. 2011). Majority of site above MHWS and not generally vulnerable to surface oil pollution, except possibly to wind-blown oil or evaporated hydrocarbons. The potential for an accidental spill to impact the populations 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.
Buchan Ness to Collieston Coast	Breeding seabirds. Seabird assemblage	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 33km from the site. Qualifying features have a high (e.g. guillemot, shag) to moderate (e.g. kittiwake, fulmar) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the populations 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 following this table.
Ythan Estuary and Sands of Forvie dSPA	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 (19/15) is *ca*. 39km from the draft site. Potential qualifying features have a high (sandwich tern) to moderate (little tern) vulnerability to surface pollution (Williams *et al.* 1994). The potential for an accidental spill to impact the

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		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).
Ythan Estuary, Sands of Forvie and Meikle Loch	Breeding terns and overwintering waterfowl	**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 (19/15) is *ca*. 49km from the site. Breeding terns have a moderate to high vulnerability to surface pollution (Williams *et al.* 1994). Overwintering waterfowl have a relatively low vulnerability to the direct effects of oil spills - the primary concern 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 populations 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.
Fowlsheugh	Breeding seabirds	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 85km from the site. Qualifying features have a high (e.g. auks) to moderate (e.g. kittiwake, fulmar) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the populations 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 following this table.
Montrose Basin	Overwintering waterfowl and waders	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 117km from the site. Overwintering waterfowl and waders have a relatively low vulnerability to the direct effects of oil spills - the primary concern 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 populations 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.
Firth of Forth and Tay Bay Complex dSPA	Overwintering divers and waterfowl, shag, seabirds,	**Conservation Objectives**: Conservation objectives will be drafted prior to formal consultation. The following consideration is based on the qualifying features for the draft site.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
	breeding terns	**Consideration** Closest Block (19/15) is *ca*. 133km from the draft site. Potential qualifying features have a very high (e.g. red-throated diver), high (e.g. gannet, auks, Manx shearwater) to moderate (e.g. kittiwake, herring gull) 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).
Firth of Tay and Eden Estuary	Overwintering waterfowl, waders and cormorant	**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 (19/15) is *ca*. 148km from the site. Cormorant qualifying feature has a high vulnerability to surface pollution (Williams *et al.* 1994). Overwintering waterfowl and waders have a relatively low vulnerability to the direct effects of oil spills - the primary concern 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 populations 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.
Forth Islands	Breeding seabirds and terns	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 164km from the site. Qualifying features have a high (e.g. auks, gannet, shag) to moderate (e.g. kittiwake, fulmar) vulnerability to surface pollution (Williams *et al*. 1994). The potential for an accidental spill to impact the populations 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 following this table.
Firth of Forth	Overwintering waterfowl and waders	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 161km from the site. Overwintering waterfowl and waders have a relatively low vulnerability to the direct effects of oil spills - the primary concern 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 populations 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.
SACs		

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
ORKNEY: Representative worst case oil spill modelling (Table 6.1) indicates that a blowout in Block 13/21a could reach Orkney (*ca*. 56km from Block) in *ca*. 40h with stochastic modelling indicating a relatively low likelihood of beaching.		
Faray and Holm of Faray	Grey 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 • No significant disturbance of the species **Consideration** Closest Block (13/16b) is *ca*. 93km from the site. Qualifying feature of moderate vulnerability to oil spills although more vulnerable (particularly pups) during pupping season (October to December). Geographic location of site with respect to Blocks makes oiling at the site very unlikely. 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 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 following this table.
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:

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		• 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 (13/16b) is *ca*. 85km from the site. Harbour seal feature of moderate vulnerability to oil spills although more vulnerable (particularly pups) during pupping season (June to July). 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 following this table.
MORAY FIRTH AND EAST COAST: Representative worst case oil spill modelling (Table 6.1) indicates that a blowout in: • Block 12/21c could reach shore (*ca*. 18km from Block) in *ca*. 14h with stochastic modelling indicating a 10% likelihood of reaching shore. • Block 18/5 could reach shore (*ca*. 15km from Block) in *ca*. 8h with stochastic modelling indicating a 10% likelihood of reaching shore. • Blocks 19/5 and 20/1 could reach shore (*ca*. 45km from Block 19/5) in *ca*. 26h with stochastic modelling indicating a <10% likelihood of reaching shore.		
Moray Firth	Sandbanks, bottlenose dolphin	**Conservation objectives:** As above. **Consideration** Closest Block (18/1) is *ca*. 20km from the site. With respect to sandbank feature, impacts to fauna have been described after a number of oil spills, but normally only in shallow depths where oil in water concentrations were particularly high or close to sandy beaches. The extent to which sediment contamination occurs is also a function of the sediment character – oil particles preferentially adsorb onto fine particles of silt and clay, so higher concentrations are normally found in muddy sediments (Law *et al.* 2011). With respect to the dolphin feature, while their skin is not thought to be particularly sensitive to oil, any accidental ingestion or breathing of oily fumes could cause physiological stress. However, evidence does not suggest more than a low vulnerability (Law *et al*. 2011) although indirect impacts on prey species may be important. The potential for an accidental spill to cause deterioration of the sandbank habitat or impact the dolphin feature population 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 following this table.
Dornoch Firth and Morrich More	Estuaries, mudflats and sandflats, saltmarsh and saltmeadows, coastal dunes, reefs, otter and harbour seal	**Conservation objectives:** As above. **Consideration** Closest Block (18/1) is *ca*. 50km from the site. The potential for an accidental spill to cause deterioration of the habitat features or impact the harbour seal population 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 following this table.
Culbin Bar	Vegetation of stony banks, salt meadows, coastal	**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
	dunes	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 (18/1) is *ca*. 47km from the site. Coastal habitats above the level of spring high tides may be physically impacted by intensive clean-up activity if they are used as an access route to the shore or as a laydown area for equipment. Those that will be particularly vulnerable include vegetated shingle ridge communities and coastal dunes (Law *et al*. 2011). The potential for an accidental spill to cause deterioration of the habitat features 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.
Lower River Spey – Spey Bay	Vegetation of stony banks	**Conservation objectives:** As above. **Consideration** Closest Block (18/1) is *ca*. 18km from the site. Much of the site above MHWS and not generally vulnerable to surface oil pollution, except possibly to wind-blown oil or evaporated hydrocarbons (Law *et al.* 2011). Coastal habitats above the level of spring high tides may be physically impacted by intensive clean-up activity if they are used as an access route to the shore or as a laydown area for equipment. Those that will be particularly vulnerable include vegetated shingle ridge communities (Law *et al*. 2011). The potential for an accidental spill to cause deterioration of the qualifying feature 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.
Sands of Forvie	Coastal dunes	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 48km from the site. Much of the site above MHWS and not generally vulnerable to surface oil pollution, except possibly to wind-blown oil or evaporated hydrocarbons (Law *et al.* 2011). Coastal habitats above the level of spring high tides may be physically impacted by intensive clean-up activity if they are used as an access route to the shore or as a laydown area for equipment. Those that will be particularly vulnerable include coastal dunes communities (Law *et al.* 2011). The potential for an accidental spill to cause deterioration of the qualifying feature 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.
Barry Links	Coastal dunes	**Conservation objectives:** As above. **Consideration** Closest Block (19/15) is *ca*. 146km from the site. As for Sands of Forvie SAC above.

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
Firth of Tay and Eden Estuary	Estuaries, sandbanks, mudflats and sandflats, harbour seal	**Conservation objectives:** As for Sanday SAC above. **Consideration** Closest Block (19/15) is *ca*. 146km from the site. The potential for an accidental spill to cause deterioration of the habitat features or impact the harbour seal population 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 following this table.
Isle of May	Reefs, grey seal	**Conservation objectives:** As for Sanday SAC above. **Consideration** Closest Block (19/15) is *ca*. 167km from the site. The potential for an accidental spill to cause deterioration of the habitat features or impact the grey seal population 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 following this table.
Riverine SACs		
Berriedale and Langwell Waters	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; 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 **Consideration** Closest Blocks (12/21d & 12/26c) are *ca*. 29km from the site. 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. The potential for an accidental spill to impact the salmon population 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 Evelix	Freshwater pearl mussel	**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; 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

Relevant sites	Relevant qualifying features	Consideration against conservation objectives
		• Distribution and viability of the species' host species • Structure, function and supporting processes of habitats supporting the species' host species **Consideration** Closest Blocks (18/1) is *ca*. 66km from the site. The most sensitive period for Atlantic salmon (qualifying 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 qualifying feature's host species population 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 Oykel	Freshwater pearl mussel, 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; 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 **Consideration** Closest Blocks (18/1) is *ca*. 80km from the site. As for River Evelix SAC above.
River Moriston	Freshwater pearl mussel, Atlantic salmon	**Conservation objectives:** As above **Consideration** Closest Block (18/1) is *ca*. 120km (straight line over land) from the site. As for River Evelix SAC above.
River Spey	Sea lamprey, Atlantic salmon, otter, freshwater pearl mussel	**Conservation objectives:** As above **Consideration** Closest Block (18/1) is *ca*. 18km from the site. Oil spill modelling of a blowout in Block 18/5 (Table 6.1) indicates that an oil spill could reach shore in *ca*. 8h with stochastic modelling indicating a 10% likelihood of reaching shore. As for River Evelix SAC consideration above.
River Dee	Freshwater pearl mussel, Atlantic salmon	**Conservation objectives:** As above **Consideration** Closest Block (19/15) is *ca*. 65km from the site. As for River Evelix SAC consideration above.
River South Esk	Freshwater pearl mussel, Atlantic salmon	**Conservation objectives:** As above **Consideration** Closest Block (19/15) is *ca*. 116km from the site. As for River Evelix SAC consideration above.

6.3.1 Consideration of mobile qualifying species

A number of the sites considered in Table 6.2 support qualifying features which may forage widely and could be present in 28th Round Blocks outside of those identified in Figure 6.1.

With respect to relevant SPA qualifying features, based on indicative mean foraging ranges described by Thaxter *et al.* (2012), guillemot (mean foraging range of 37.8 ± 32.3km), fulmar (mean foraging range of 47.5 ± 1km), and gannet (mean foraging range of 92.5 ± 59.9km) could potentially forage outside of the relevant Blocks identified in Figure 6.1.

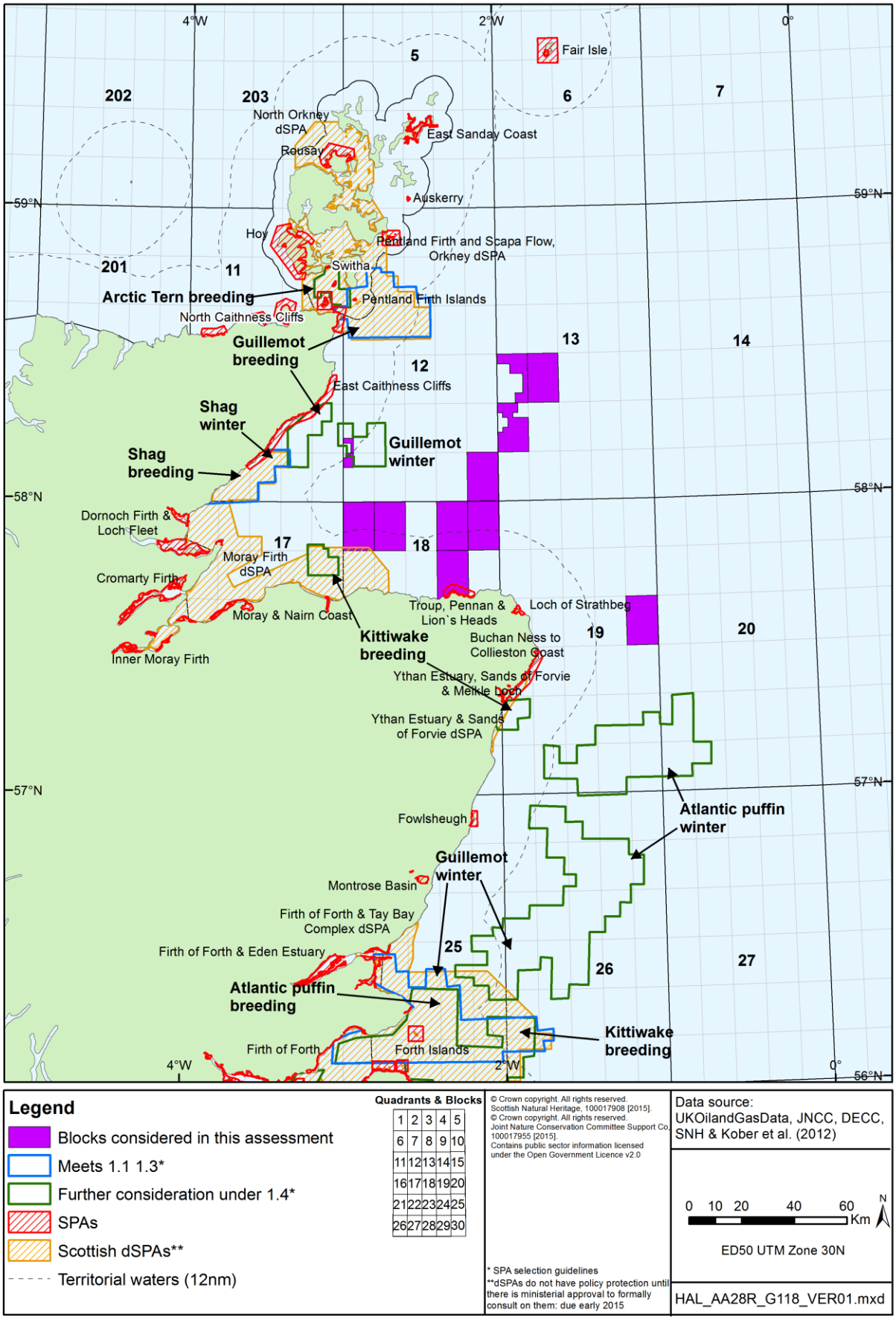
Stone *et al*. (1995) indicates that the Moray Firth is an important area for guillemots at all times of year. During the breeding season (May to June), their distribution is determined by their need to remain close to the colony with highest densities close to the coast, with only low numbers (probably immature or non-breeders) further from land. Outside of this period, there is a general offshore dispersal of guillemots with areas of the Moray Firth and off the north east coast of Scotland important throughout autumn and winter. Guillemots spend much of their time sitting on the sea surface and are thus vulnerable to oil. This is especially so during the period of their autumn moult when they are flightless and therefore unable to escape such pollution (Stone *et al.* 1995). Relevant sites with guillemot as a qualifying feature include Pentland Firth and Scapa Flow dSPA, Orkney dSPA, East Caithness Cliffs SPA, Troup, Pennan and Lion's Head SPA and Buchan Ness to Collieston Coast SPA

With respect to fulmars, Stone *et al.* (1995) indicates that the shelf edge to the north and west of Scotland was important at most times of the year, although less so from August to November when there is a southern movement throughout the central North Sea. In the outer Moray Firth, moderate densities of fulmar throughout much of the year with high densities over winter (December to February). Relevant sites with fulmar as a qualifying feature include Pentland Firth and Scapa Flow dSPA, Orkney dSPA, East Caithness Cliffs SPA, Troup, Pennan and Lion's Head SPA and Buchan Ness to Collieston Coast SPA.

With respect to gannet foraging, tracking data from Wakefield *et al*. (2013) indicates that gannets from Bass Rock (Firth of Forth Islands SPA) may forage over some of the Moray Firth Blocks. However, Stone *et al*. (1995) indicated that low densities of gannets were present in the Moray Firth throughout the year.

Of particular relevance are important areas of seabird activity outside designated sites which have 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). This research has been used by SNH to inform proposals for inshore sites (within 12 nautical miles) and by JNCC for offshore sites (from 12 to 200 nautical miles), and a number of draft SPAs have been identified for consideration (see Figure 6.2). Whilst individual birds such as guillemots may be present over the Moray Firth, Figure 6.2 indicates that with respect to offshore areas supporting important numbers of birds, no other 28th Round Blocks beyond those identified in Table 6.2 need be included in the AA consideration. No important offshore areas for fulmar and gannet were identified in the Moray Firth area.

Figure 6.2: Important seabird areas relevant to the Moray Firth Blocks



As described in Section 5.3.1, previous cetacean surveys in the Moray Firth have identified that almost all bottlenose dolphin sightings were within 15km of the coast in the inner part of the Moray Firth SAC or the coastal strip along the southern Moray Firth. There were few records of bottlenose dolphins in the outer Moray Firth. Quick *et al*. (2014) reported on bottlenose dolphin movements outside of the Moray Firth SAC, particularly around Aberdeen and down to the Firths of Tay and Forth and a proposed management unit for the east coast of Scotland population includes 28th Round Blocks within Quadrant 18. Therefore, potential drilling activities (and accidental spills) in these Blocks could impact the Moray Firth SAC bottlenose dolphin population and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.

As described in Section 5.3.1, both grey and harbour seals forage widely within the Moray Firth. Grey seals from Orkney and the north coast as well as further south along the Scottish east coast and the north east coast of England may forage over the Moray Firth Blocks (Hanson & Lonergan 2012). Harbour seals generally have a more restrictive foraging range and within the Moray Firth foraged primarily in the inner Moray Firth, the northern half of the outer Moray Firth and around Orkney. Figure 5.3 highlighted that the area of the Moray Firth Blocks is of moderate importance for seals, particularly grey seals. Therefore, an oil spill within any of the Blocks could impact foraging seals within or close to some of the 28th Round Blocks and mitigation measures (see Section 6.4) are available to ensure site conservation objectives are not undermined.

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 well. The potential for spills to cause deterioration or significant disturbance of qualifying features will be determined by the location and timing of drilling 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 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]	Response Times		
			Aerial Surveillance Capability	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*[32] and updates to OPEP[33] guidance to fulfil specific requirements of the Directive.

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

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 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)[34]. The government has also been in discussions with the oil industry on the potential of a commercial call-out arrangement to use their vessels[35] and BP have agreed to volunteer a vessel to help in an emergency should the MCA deem it appropriate[36].

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[37] within 30 minutes of an oil pollution incident notification

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[33] 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

[34] http://www.shetnews.co.uk/news/9565-sic-retaining-northern-isles-emergency-vessel-is-crucial

[35] Scotland Office website - http://www.scotlandoffice.gov.uk/scotlandoffice/17322.html

[36] https://www.gov.uk/government/news/moore-welcomes-bp-and-north-star-support-for-second-support-vessel\

[37] 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.

  - 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[38] scenario

- In the event of a Tier 2 incident, Tier 2 resources must be available on scene within half the time taken for the oil to reach shore in 30 knot wind conditions

- Details of resources to deal with a Tier 3 incident (i.e. an oil pollution incident that cannot be controlled by Tier 1 or 2 resources), including sources 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 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[39] 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.

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[38] 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).

[39] 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).

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.

The incremental risk associated with activities resulting from the proposed licensing (i.e. additional to existing risk; primarily associated with shipping and other maritime activities) is low. This results from the combination of low probability and low severity (since most spills would be small in volume). The overall risks of a major crude oil spill, which would require catastrophic loss of well control, are quantitatively and qualitatively comparable to those considered ALARP (As Low As Reasonably Practicable) under the relevant UK health and safety regulations. The 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 12/21d, 12/26c, 12/30, 13/16b, 13/17, 13/21c, 18/1, 18/2, 18/4, 18/5, 18/9 and 19/15, 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, 2011a; 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 Moray Firth, 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 Plan will set 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

From the re-screening described in Appendix B, a number of sites were identified where there was the likelihood of significant cumulative and in-combination effects that could result from licensing of the Moray Firth Blocks. Table 7.1 highlights projects from the Marine Scotland Licensing Operations Team's (MS-LOT) list of current projects which have been granted consent, for which there is a potential for interaction with operations that could arise should the 28th Round Moray Firth Blocks be licensed.

The potential sources of cumulative effects are regarded to be related to underwater noise and physical disturbance (including physical presence), primarily arising from offshore wind development (given the scale of potential offshore wind development in the Moray Firth and the proximity of these to some of the 28th Round Blocks). Offshore wind will introduce noise and disturbance sources (particularly during construction) and present an additional physical presence in the marine environment. Offshore wind zones (e.g. Round 3) have already been subject to SEA and HRA, and any related projects will be or have been subject to their own individual assessment and HRA processes. Figure 7.1 indicates the location of the projects highlighted in Table 7.1 above in relation to Blocks subject to assessment in the 28th Round.

The UK Government believes that the oil & gas and wind industry can successfully co-exist, as stated in DECC's *Other Regulatory Issues* for the 28th Round, "…we [(DECC)] advise that potential applicants on such blocks [(areas where oil and gas licenses and proposed or actual wind farm sites exist and indeed overlap)] should make early contact with the holders of any relevant wind farm lease or Agreement for lease (AfL), or the relevant zone developer(s), and

establish in good time a mutual understanding of the respective proposals and time frames envisaged (acknowledging that not all aspects of the future plans of either side will necessarily be definitively decided at that time)"[40]. Early discussions between the developers will ensure that any potential conflict can be mitigated so that both developments can proceed with minimal delay and without the need to determine any part of an existing Crown Estate Lease or Agreement for Lease. In addition to renewables activities, early engagement with other users (e.g. through fisheries liaison, vessel traffic surveys, consultation with the MoD or holders of other Crown Estate offshore interests)[40] where scheduling overlaps may occur should allow both for developer cooperation, and the mitigation of potential cumulative or in-combination effects.

Table 7.1: Projects relevant to the cumulative and in-combination assessment of the Moray Firth Blocks

Relevant projects	Project summary	Project status	Proximity to OMF Blocks
Offshore wind developments			
Beatrice offshore wind farm (Beatrice Offshore Wind Limited (BOWL))	Located on the Smith Bank *ca*. 13.5km from the Caithness coastline. The original application was up to 277 turbines and a maximum generating capacity of up to 1,000MW, now reduced to up to 140 turbines and a maximum generating capacity of 750MW. Foundation options include gravity bases, pin piles, and suction piles. BOWL is adjacent to the Moray Offshore Renewables Limited (MORL) Eastern Development Area (EDA).	Consent granted March 2014. Construction over 3-5 years and likely to commence in 2015/16.	Block 12/21d is within BOWL site and 12/26c is adjacent.
Moray Firth - Eastern Development Area (EDA) consisting of Telford, Stevenson and MacColl offshore wind farms (Moray Offshore Renewables Limited (MORL))	The applications for consent for the three wind farms in the MORL EDA set out an original design for up to 339 wind turbines with a maximum generating capacity of up to 1,500MW, now reduced to up to 186 turbines and a maximum generating capacity of up to 1,116MW. Foundation options include gravity bases and jacket structures using pin piles. The proposed development is located on the Smith Bank in the Moray Firth (approximately 22km from the Caithness coastline, in water depths of 38-57m). The three proposed wind farm sites: the Telford, Stevenson and MacColl, will each have a maximum generating capacity of 372MW.	Consent granted March 2014. Construction proposed to take place from Q1 2016 to Q3 2020.	Block 12/21d is 4km from the EDA
European offshore wind deployment centre (EOWDC) (Aberdeen Offshore Wind Farm Limited (AOWFL))	Offshore wind powered electricity generating station and deployment centre 2km off the coast of Aberdeen with a maximum generating capacity of up to 100MW, comprising of up to 11 offshore wind turbines, inter array cables, export cables to shore and turbine foundations. The proposed project would combine a small commercially operated wind farm with a test and research centre, allowing manufacturers to test wind turbines and foundations.	Consent granted March 2013.	Block 19/15 is 53km from EOWDC

[40] DECC 28th Round other regulatory issues

Relevant projects	Project summary	Project status	Proximity to OMF Blocks
Seagreen Alpha and Bravo Offshore Wind Farms (Seagreen Wind Energy Limited (SWEL))	SAWEL and SBWEL are to be located 27km and 38km to the east off the Angus coastline respectively. The export cables from the sites are proposed to reach a landfall location at Carnoustie (approximately 70km from the SAWEL site). Design is for up to 75 wind turbines and a maximum generating capacity of up to 525MW for each of SAWEL and SBWEL.	Consent granted September 2014. Construction over *ca*. 4 years and likely to commence in 2017	Block 19/15 is 97km from SAWEL
Inch Cape Offshore Wind Farm (Inch Cape Offshore Limited)	To be located 15km off the Angus coastline, to the east of the Firth of Tay. Water depths across the site range from approximately 40m to 57m. The export cables from the site are proposed to reach a landfall location in East Lothian. The original application was for up to 213 turbines and a maximum generating capacity of up to 1,050 MW, now reduced to up to 110 turbines and a maximum generating capacity of 784MW.	Consent granted September 2014. Construction over 2-3 years and likely to commence in 2017	Block 19/15 is 117km from Inch Cape
Neart na Gaoithe (Neart na Gaoithe Offshore Windfarm Limited)	To be located 15.5km to the east of Fife Ness and 16km from the Isle of May in the Firth of Forth. Water depths across the site range from 40m to 60m. The original application was for a design envelope of up to 125 wind turbine generators ("WTGs"), and a maximum generating capacity of up to 450 MW. Reduced to a maximum of 75 turbines. Foundation options include gravity bases and jacket structures using piles. Due to seabed conditions these may be driven, or partly or fully pre-drilled.	Consent granted October 2014. Construction over 1.5 years and likely to commence in 2015/2016	Block 19/15 is 147km from Inch Cape
Marine renewable developments			
MeyGen Tidal Energy Project Phase 1 (MeyGen Limited)	Proposed initial deployment of up to 61 turbines installed in stages at the site with a final generating capacity totalling 86MW with future proposals to ultimately develop a 398MW tidal turbine array. Proposed project will be built in stages with stage one being limited to a maximum of 6 turbines (four 1.5MW turbines). Deployment area is 1.1km^2 in water depths of 31.5 to 38m.	Consent granted February 2014. Construction expected to commence Q4 2014	Block 13/16b is 69km from site
Port developments			
Berth development at Invergordon service base (Cromarty Firth Port Authority)	Construction of an additional deep water berth and lay-down area. The project involves vibro and impact piling and land reclamation.	Consent granted January 2014. Construction during 2014 and 2015.	Block 18/1 is 71km from site
Redevelopment of Former McDermott Fabrication Yard (Port of Ardersier Limited)	Establish a port and port related services for energy related uses, primarily offshore wind. Includes construction of new deep water quay facilities and an associated dredged access channel.	Consent granted August 2014.	Block 18/1 is 65km from site
South quayside extension, Nigg (Global Energy Nigg Ltd)	New berthing facilities designed to accommodate oil rig supply and mini- bulk (large) vessels, oil rig exploration rigs, barges, and small tug boats and pilot service vessels.	Consent granted October 2013.	Block 18/1 is 63km from site

Source: http://www.scotland.gov.uk/Topics/marine/Licensing/marine/scoping

7.3 Underwater noise

Seismic survey (only proposed for Block 12/30) 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.

Other noise producing activities which are likely to occur within the Moray Firth and adjacent areas include those associated with the development of marine renewable energy and port developments. The majority of these developments have already undertaken EIA and HRA processes, and have been granted consent. Of particular relevance are the BOWL and MORL development sites due to the proximity of Blocks 12/21d and 12/26c.

MS-LOT and Marine Scotland Science have undertaken an AA of the Beatrice wind farm in-combination with the MORL site on behalf of the Scottish Ministers (published March 2014). With respect to the Moray Firth SAC, the AA indicated that MORL and BOWL had modelled potential underwater noise impacts to bottlenose dolphins during construction. Predicted zones of disturbance from the noisiest construction activities (associated with pile-driving the turbine foundations) could slightly extend into areas used by bottlenose dolphins transiting along the coast in the Moray Firth: this was for a 'worst case' of piling activity at MORL and BOWL wind farm sites together. Further modelling of whether any resulting disturbance to individuals could lead to population level effects was undertaken. This concluded that there were no long-term effects from underwater noise disturbance on the bottlenose dolphin population of the Moray Firth SAC. Similarly, the BOWL AA concluded that potential in-combination effects associated with construction noise (e.g. piling) of the European offshore wind deployment centre and port developments listed in Table 7.1 would not adversely affect site integrity of the Moray Firth SAC[41].

With respect to the 28th Round Moray Firth Blocks, a seismic survey is only proposed for Block 12/30 which is *ca*. 72km from the Moray Firth SAC and 32km from the southern Moray Firth coast (where bottlenose dolphins may transit along the coast). As reported by Thompson *et al.* (2013, see Section 5.3.1), a relatively short seismic survey did not have a major impact on the number of animals using the SAC, with data suggesting the survey was associated with a finer-scale re-distribution of individuals or change in behaviour that could incur some energetic costs. Where such changes occur during longer periods of disturbance, there could be potential impacts on individual vital rates (Currey *et al.* 2011, New *et al.* 2013). Whilst the seismic survey is likely to be a relatively short and temporary activity (days to weeks), piling associated with construction of the BOWL and MORL developments is likely to be carried out over longer time-scales. Piling noise would generate interference during seismic survey such that the activities would not be undertaken at the same time. Liaison between the block licensee and the wind farm developer (as indicated in 7.2) would be required to ensure that the timing of activities did not overlap, which would also limit the cumulative effect of these. The proposed seismic survey is unlikely to represent a significant

[41] http://www.gov.scot/Topics/marine/Licensing/marine/scoping/Beatrice/appropass

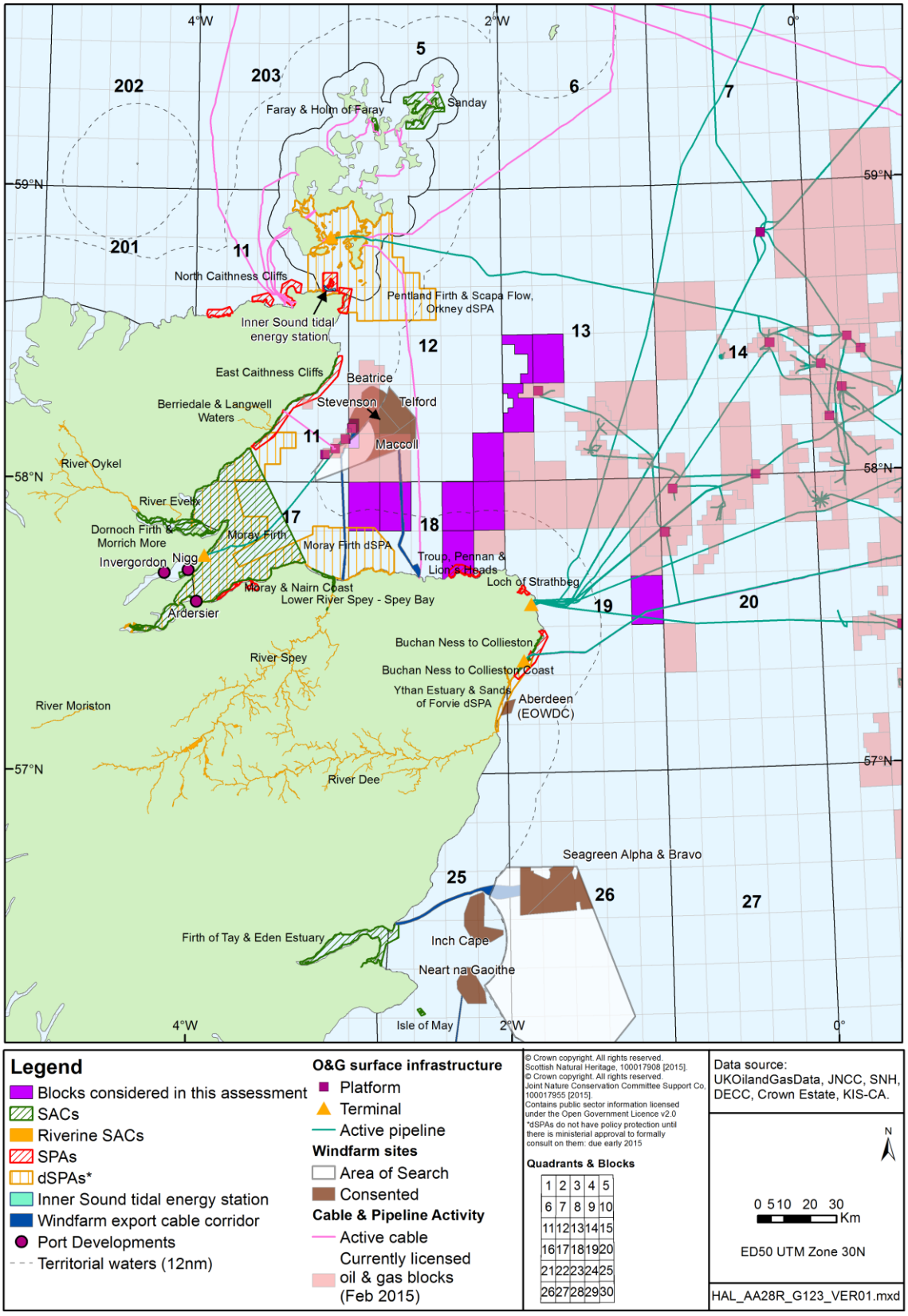
cumulative increase in the period of disturbance that the bottlenose dolphins will be exposed to. Noise levels associated with other activities potentially resulting from licensing of the Blocks such as rig site survey, VSP, drilling and vessel movements, are of a considerably lower magnitude than those resulting from a deep geological seismic survey, and are not expected to adversely affect site integrity in-combination with other activities.

Other offshore wind farm developments in the Forth and Tay are also of potential relevance given the foraging of marine mammals and migratory fish. A combined MS-LOT AA of Seagreen Alpha and Bravo, Inch Cape and Neart na Gaoithe concluded that the developments would not, on their own or in combination with each other (or where appropriate for consideration, other developments already licensed (including those in the Moray Firth), adversely affect the integrity of the following relevant sites (with respect to noise and disturbance): Moray Firth SAC, Firth of Tay and Eden Estuary SAC, Isle of May SAC, River Dee SAC and River South Esk SAC. The proposed seismic survey in Block 12/30 will not significantly increase the risk of disturbance of the qualifying features of any of these sites given the distance of the Block from the Forth and Tay developments.

The Pentland Firth and waters surrounding Orkney are of considerable interest for the development of wave and tidal energy devices. With respect to the MS-LOT list of current projects which have been granted consent, only the MeyGen tidal energy electricity generating station Phase 1 (MeyGen Limited) is of potential relevance (see Table 7.1 and Figure 7.1). In an AA of Phase 1 of the project (September 2013), Marine Scotland ascertained that the installation, operation and decommissioning of MeyGen Tidal Energy Project Phase 1 (restricted to 6 turbines) would not adversely affect the integrity of Natura 2000 sites in the region. Monitoring would be required to inform decisions on future deployments and a further AA will be required before further deployments are authorised to ensure that full consideration is given to any potential increase in impacts. The AA considered the disturbance, displacement and collision risk to relevant SPA qualifying features as well as SACs for migratory fish and marine mammals. Given that the closest 28th Round Block (13/16b) is 65km from the Meygen site and the limited and temporary nature of potential activities following licensing, it is not expected that these activities in-combination with those from Meygen would adversely affect the site integrity of any Natura 2000 sites.

In addition to those activities which may follow licensing of the Moray Firth Blocks and the other potentially relevant developments listed in Table 7.1, there are a variety of other existing (e.g. oil and gas production (see Figure 7.1), fishing, shipping, military exercise areas, wildlife watching cruises) 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 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".*

Figure 7.1: Location of current projects and existing oil and gas infrastructure relevant to the cumulative and in-combination assessment of the Moray Firth Blocks



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[42]". 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 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.

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

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.

Cefas, funded by Defra, are currently scoping out an ambient noise monitoring programme which will be coordinated through the UK Clean and Safe Seas Evidence Group with input from the Underwater Sound Forum and the EU Technical Sub-Group (TSG) on Noise. This project will identify the most appropriate equipment for monitoring ambient noise and provide sample data to determine its suitability for meeting the requirements of the Directive. After this it will be necessary to design and implement an appropriate UK monitoring programme (post/during 2014) which will be developed taking a risk-based approach i.e. identifying those areas where shipping levels are highest. Hydrophone deployments are being undertaken in Northern Irish waters as part of the moored inshore monitoring programme to test the potential for background noise assessments and to help develop the science for making these assessments adequately. This work aims to define background noise levels (using the MSFD descriptor) and to help inform the development of a formal monitoring programme suitable for regional assessments. Marine Scotland is developing a programme for the deployment of monitoring devices off the east coast of Scotland to monitor noise levels from anthropogenic activity. The primary aim is to monitor noise from offshore renewable developments, but the devices are also capable of recording ambient noise at the frequencies required in the MSFD indicators.

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

Of particular relevance would be any damage to shallow sandbank habitats (both within and outside designated areas such as the Moray Firth SAC) as these are potentially important foraging areas for bottlenose dolphins and other marine mammals. The magnitude of physical impacts associated with rig placement and drilling has already been discussed in Section 4.2. Given the spatial separation of the various potential energy developments within the Moray Firth, cumulative impacts on habitats which are also foraging grounds for qualifying species directly connected to the incremental activity associated with the 28th Round is not considered likely. When greater project definition is available for the Blocks (e.g. specific rig siting and timing of activities) then further assessment will be undertaken (e.g. individual rig site survey to inform environmental assessment as part of an EIA and project level HRA where appropriate – see Figure 2.3).

7.4.2 Physical presence

The Beatrice AA noted that in-combination with the MORL site, the main effects to bird species came from a) collision risk with the turbines (of relevance to species which may regularly fly at the same height as the rotating blades e.g. gulls) and b) displacement of birds from potential foraging areas (of relevance to species with more limited foraging ranges or greater flight energetic costs e.g. guillemot, razorbill and puffin). Relevant SPAs assessed included the East Caithness Cliffs SPA and it was concluded that the BOWL and MORL developments would not adversely affect site integrity. The combined AA for the Forth and Tay offshore wind farm developments considered that they would not, in-combination with the BOWL and MORL developments, adversely affect the site integrity of a number of relevant

SPAs (with respect to collision with turbines and displacement effects) including: Buchan Ness to Collieston Coast SPA, Fowlsheugh SPA and Forth Islands SPA.

For most of the 28th Round Blocks, the work programmes propose one drill or drop well therefore a drilling rig will be on location for only a relatively short period of time (weeks to a number of months). The short-term presence of a drilling rig will not significantly increase the risk of collision or displacement of qualifying features from any of the sites listed above.

With respect to the Moray Firth dSPA, conservation objectives for the draft site have not been established. However, given the list of potential qualifying features there is the potential for cumulative and in-combination disturbance effects associated with the port developments listed on Table 7.1 although given that the site has not yet been consulted upon, potential disturbing activities (e.g. piling, dredging, ship movements) may have completed prior to designation. Block 18/1 partly overlaps the dSPA and the work programme proposed one drill or drop well within it or Block 18/2. The short-term presence of a drilling rig is unlikely to significantly increase the risk of disturbance of qualifying features from the Moray Firth dSPA.

The physical presence of offshore oil and gas infrastructure and support activities may also 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. With regards to the Moray Firth, existing oil and gas surface infrastructure is limited in number. The Beatrice (A-C) and Jacky wellhead platforms are located adjacent to/within the Round 3/territorial waters offshore wind farm zones, with the Ross, Buzzard, Captain and Ettrick fields having associated platforms or FPSOs in relatively close proximity to some of the Blocks subject to assessment (Figure 7.1). With respect to oil and gas current and decommissioning projects in the Moray Firth area, DECC's Project Pathfinder[43] (as of February 2015) indicates two single well tie-back projects – one in Block 13/22b and the other between Blocks 20/1N & 14/26a – with first production due in Q4 2017 and Q2 2015, respectively. Of the two decommissioning projects, one in Block 20/2 is for the abandonment of subsea wells and subsea infrastructure, and disconnection of an FPSO, probably in 2018. The other project in Block 14/29a which ceased production in 2011 is proposed to be used as a CO_2 storage facility. Given their relatively small scale and location remote from any Natura 2000 sites, these projects are unlikely to result in significant in-combination effects with proposed activities in the 28th Round Moray Firth Blocks.

Shipping density in the licence blocks is low to moderate, 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

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

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 2011a).

7.5 Conclusions

Available evidence for the Moray Firth 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 Moray Firth (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 to ensure 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 12/21d, 12/26c, 12/30, 13/16b, 13/17, 13/21c, 18/1, 18/2, 18/4, 18/5, 18/9 and 19/15 with those from existing and planned activities in the Moray Firth 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 12/21d, 12/26c, 12/30, 13/16b, 13/17, 13/21c, 18/1, 18/2, 18/4, 18/5, 18/9 and 19/15. 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 Section 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.

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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[44] (version as of 1st September 2014) and SPA[45] (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)[46] 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[47], though not formally subject to Government approval and yet to be formally consulted upon, are listed and shown in relevant maps below.

[44] Version as of 1st September 2014 - http://jncc.defra.gov.uk/page-1461
[45] Version as of 1st September 2014 - http://jncc.defra.gov.uk/page-1409
[46] http://gateway.snh.gov.uk/sitelink/index.jsp
[47] 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

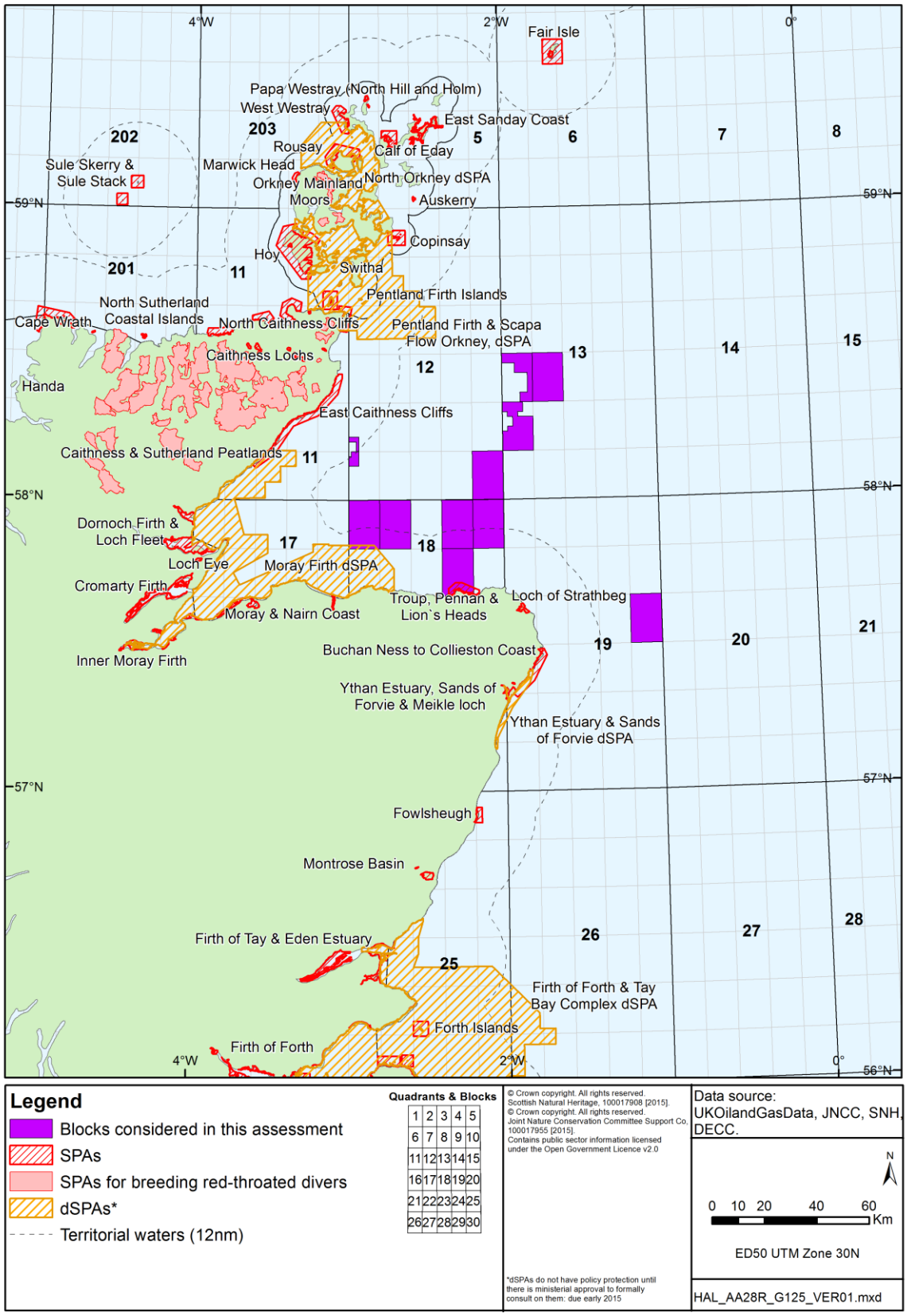


Table A.1: Coastal and marine SPAs and their Qualifying Features

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[48]
SHETLAND				
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
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
North Orkney dSPA	57495.77	Great northern diver Slavonian grebe Red-throated diver Arctic tern	Common eider Long-tailed duck Velvet Scoter Red-breasted merganser Shag	N/A
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
Sule Skerry and Sule Stack SPA	3909.45	Breeding: Leach's storm petrel Storm petrel	Breeding: Gannet Puffin	Breeding: Seabirds
Pentland Firth & Scapa Flow, Orkney dSPA	131751.45	Great northern diver Red-throated diver Black-throated diver	Shag Guillemot Common eider	N/A

[48] 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[48]
		Slavonian grebe Arctic tern	Long-tailed duck Goldeneye Red-breasted merganser	
NORTH COAST OF SCOTLAND				
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
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: Dunlin Common scoter Greenshank Widgeon	N/A
North Caithness Cliffs SPA	14621.14	Breeding: Peregrine	Breeding: Guillemot	Breeding: Seabirds
Caithness Lochs SPA	1378.45	Over winter: Greenland white-fronted goose Whooper swan	Over winter: Greylag goose	N/A
MORAY FIRTH AND ABERDEENSHIRE				
East Caithness Cliffs SPA	11690.92	Breeding: Peregrine	Breeding: Guillemot Kittiwake Razorbill Herring gull Shag	Breeding: Seabirds
Moray Firth dSPA	184183.99	Great northern diver Red-throated diver Slavonian grebe	Scaup Common eider Long-tailed duck Common scoter Velvet scoter Common goldeneye Red-breasted merganser Shag	N/A
Dornoch Firth and Loch Fleet SPA	7836.33	Breeding: Osprey Over winter: Bar-tailed godwit	Over winter: Greylag goose Wigeon	Over winter: Waterfowl
Loch Eye SPA	205.14	Over winter: Whooper swan	Over winter: Greylag goose	N/A
Cromarty Firth SPA	3746.95	Breeding: Common tern Osprey Over winter: Bar-tailed godwit Whooper swan	Over winter: Greylag goose	Over winter: Waterfowl
Inner Moray Firth SPA	2339.23	Breeding: Common tern	Over winter: Greylag goose	Over winter: Waterfowl

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[48]
		Osprey Over winter: Bar-tailed godwit	Red-breasted merganser Redshank Scaup	
Moray and Nairn Coast SPA	2410.25	Breeding: Osprey Over winter: Bar-tailed godwit	Over winter: Greylag goose Pink-footed goose Redshank	Over winter: Waterfowl
Troup, Pennan and Lion's Heads SPA	3367.21	N/A	Breeding: Guillemot	Breeding: Seabirds
Loch of Strathbeg SPA	615.94	Breeding: Sandwich tern Over winter: Barnacle goose Whooper swan	Over winter: Greylag goose Pink-footed goose Goldeneye	Over winter: Waterfowl
Buchan Ness to Collieston Coast SPA	5400.94	N/A	N/A	Breeding: Seabirds
Ythan Estuary and Sands of Forvie dSPA	6303.25	Sandwich tern Little tern	N/A	N/A
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	1016.24	Breeding: Common tern Little tern Sandwich tern	Over winter: Pink-footed goose	Over winter: Waterfowl
Fowlsheugh SPA	1303.54	N/A	Breeding: Guillemot Kittiwake	Breeding: Seabirds
Montrose Basin SPA	984.61	N/A	Over winter: Greylag goose Knot Pink-footed goose Redshank	Over winter: Waterfowl
Firth of Tay and Eden Estuary SPA	6923.29	Breeding: Little tern Marsh harrier Over winter: Bar-tailed godwit	Over winter: Greylag goose Pink-footed goose Redshank	Over winter: Waterfowl
Firth of Forth and Tay Bay Complex dSPA	312,982.11	Red-throated diver Slavonian grebe Little Gull Common tern Arctic tern	Common eider Long-tailed duck Common Scoter Velvet scoter Goldeneye Red-breasted merganser Northern gannet Manx shearwater European shag Black-legged kittiwake Common guillemot Razorbill Atlantic puffin Black-headed gull Common gull	N/A

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[48]
			Herring gull	
Forth Islands SPA	9796.98	Breeding: Roseate tern Common tern Sandwich tern Arctic tern	Breeding: Puffin Lesser black-backed gull Gannet Shag	Breeding: Seabirds
Firth of Forth SPA	6313.72	Over winter: Red-throated diver Bar-tailed godwit Golden plover Slavonian grebe On passage: Sandwich tern	Over winter: Pink-footed goose Turnstone Knot Shelduck Redshank	Over winter: Waterfowl

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	Active raised bogs * Priority feature
	Blanket bogs * Priority feature
	Bog Woodland * Priority feature
	Degraded raised bogs still capable of natural regeneration
	Depressions on peat substrates of the *Rhynchosporion*
	Transition mires and quaking bogs
Caves	Caves not open to the public
Coastal Dunes	Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)
	Coastal dunes with *Juniperus* spp.
	Decalcified fixed dunes with *Empetrum nigrum*
	Dunes with *Hippophae rhamnoides*
	Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)
	Embryonic shifting dunes
	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
Estuaries	Estauries
Fens	Alkaline fens
	Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* * Priority feature
	Petrifying springs with tufa formation (*Cratoneurion*) * Priority feature
Forest	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) * Priority feature
	Old sessile oak woods with *Quercus robur* on sandy plains
	Tilio-Acerion forests of slopes, screes and ravines * Priority feature
	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) * 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
	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites) * Priority feature
	Species-rich *Nardus* grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe) * Priority feature

Annex I Habitat (abbreviated)	Annex I Habitat(s) (full description)
Heaths	Alpine and Boreal heaths
	Dry Atlantic coastal heaths with *Erica vagans*
	European dry heaths
	Northern Atlantic wet heaths with *Erica tetralix*
Inlets and bays	Large shallow inlets and bays
Limestone pavements	Limestone pavements * Priority feature
Machairs	Machairs
Mudflats and sandflats	Mudflats and sandflats not covered by seawater at low tide
Reefs	Reefs
Rocky slopes	Calcareous rocky slopes with chasmophytic vegetation
Running freshwater	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
Salt marshes and salt meadows	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
	Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)
	Salicornia and other annuals colonising mud and sand
	Spartina swards (*Spartinion maritimae*)
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*)
Scrub (mattoral)	*Juniperus communis* formations on heaths or calcareous grasslands
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.
	Mediterranean temporary ponds
	Natural dystrophic lakes and ponds
	Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation
	Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*
Vegetation of drift lines	Annual vegetation of drift lines
Vegetation of stony banks	Perennial vegetation of stony banks

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

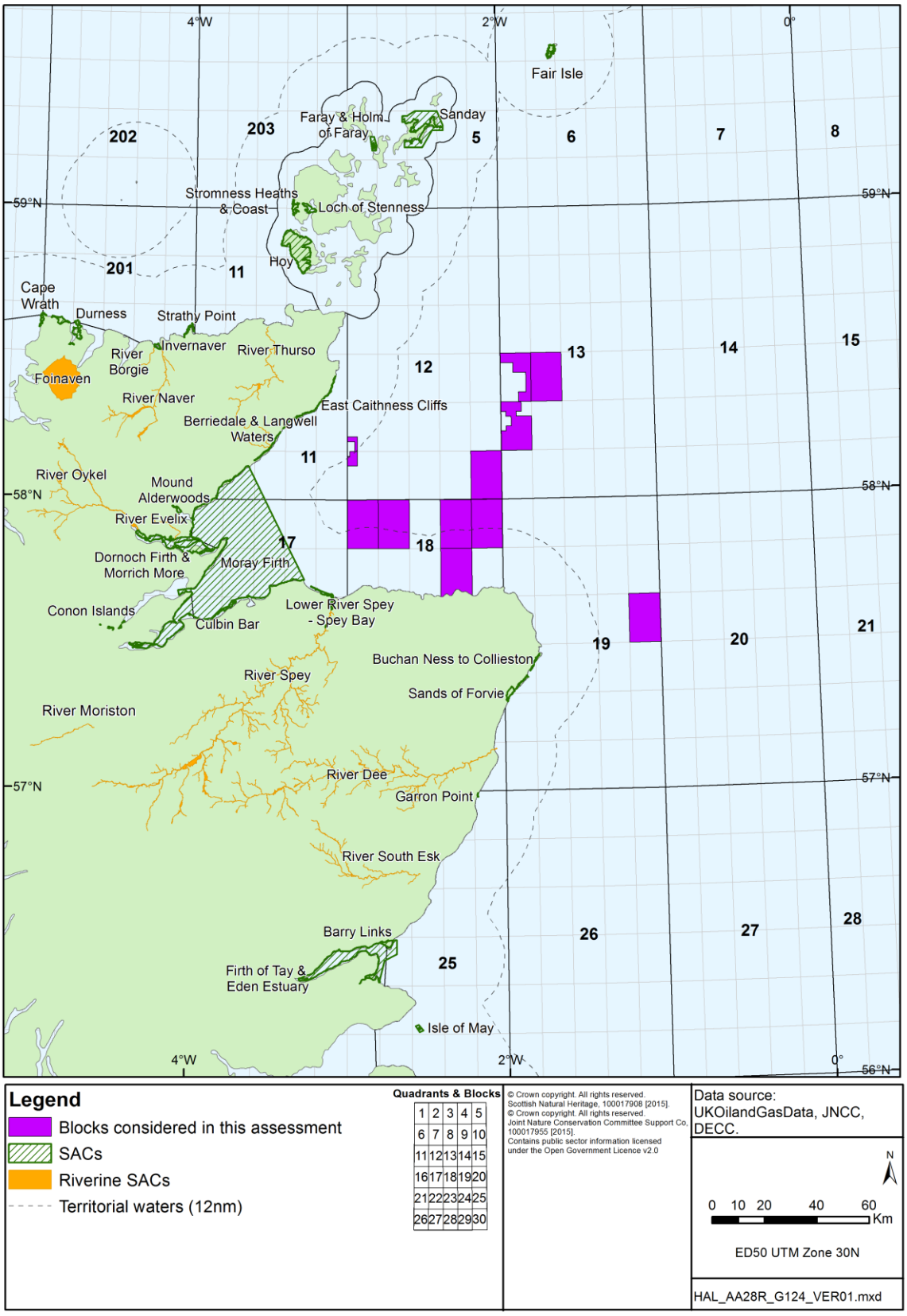


Table A.2: Coastal and marine SACs and their Qualifying Features

Site Name	Area (ha)	Annex 1 Habitat Primary	Annex 1 Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
SHETLAND					
Fair Isle SAC	561.27	Sea cliffs	Heaths	N/A	N/A
ORKNEY					
Hoy SAC	9499.7	Sea cliffs Standing freshwater Heaths Bogs	Heaths 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
Sanday SAC	10971.65	Reefs	Sandbanks Mudflats and sandflats	Harbour seal *Phoca vitulina*	N/A
NORTH COAST OF SCOTLAND					
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 Heaths Grasslands Fens	N/A	Otter *Lutra lutra*
Invernaver SAC	294.54	Coastal dunes Heaths Grasslands	Coastal dunes Fens	N/A	N/A
Strathy Point SAC	203.58	Sea cliffs	N/A	N/A	N/A
MORAY FIRTH AND ABERDEENSHIRE					
East Caithness Cliffs SAC	442.64	Sea cliffs	N/A	N/A	N/A
Mound Alderwoods SAC	297.33	Forests	N/A	N/A	N/A
Moray Firth SAC	151347.17	N/A	Sandbanks	Bottlenose dolphin *Tursiops truncatus*	N/A
Dornoch Firth and Morrich More SAC	8700.53	Estuaries Mudflats and sandflats	Sandbanks Reefs	Otter *Lutra lutra* Harbour seal *Phoca vitulina*	N/A

Site Name	Area (ha)	Annex 1 Habitat Primary	Annex 1 Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
		Saltmarsh and saltmeadows Salt meadows Coastal dunes			
Conon Islands SAC	120.11	Forests	N/A	N/A	N/A
Culbin Bar SAC	612.88	Vegetation of stony banks	Salt meadows Coastal dunes	N/A	N/A
Lower River Spey - Spey Bay SAC	652.6	Vegetation of stony banks Forests	N/A	N/A	N/A
Buchan Ness to Collieston SAC	207.52	Sea cliffs	N/A	N/A	N/A
Sands of Forvie SAC	734.05	Coastal dunes	N/A	N/A	N/A
SOUTH OF ABERDEENSHIRE					
Garron Point SAC	15.58	N/A	N/A	Narrow-mouthed whorl snail *Vertigo angustior*	N/A
Barry Links SAC	789.67	Coastal dunes	N/A	N/A	N/A
Firth of Tay and Eden Estuary SAC	15412.53	Estuaries	Sandbanks Mudflats and sandflats	Harbour seal *Phoca vitulina*	N/A
Isle of May SAC	356.75	N/A	Reefs	Grey seal	N/A

A4 Offshore Special Areas of Conservation

There are no offshore SACs close enough to the Moray Firth Blocks applied for (listed in Section 1.2), for there to be foreseeable effects on site integrity.

A5 Riverine Special Areas of Conservation

Table A.3: 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
River Thurso	-	AS
Berriedale and Langwell Waters	-	AS
River Evelix	✓	-
River Oykel	✓	AS
River Moriston	✓	AS
River Spey	✓	SL, AS
River Dee	✓	AS
River South Esk	✓	AS

Note: [1] SL - Sea lamprey Petromyzon marinus, RL - River lamprey Lampetra fluviatilis, AS - Atlantic salmon Salmo salar

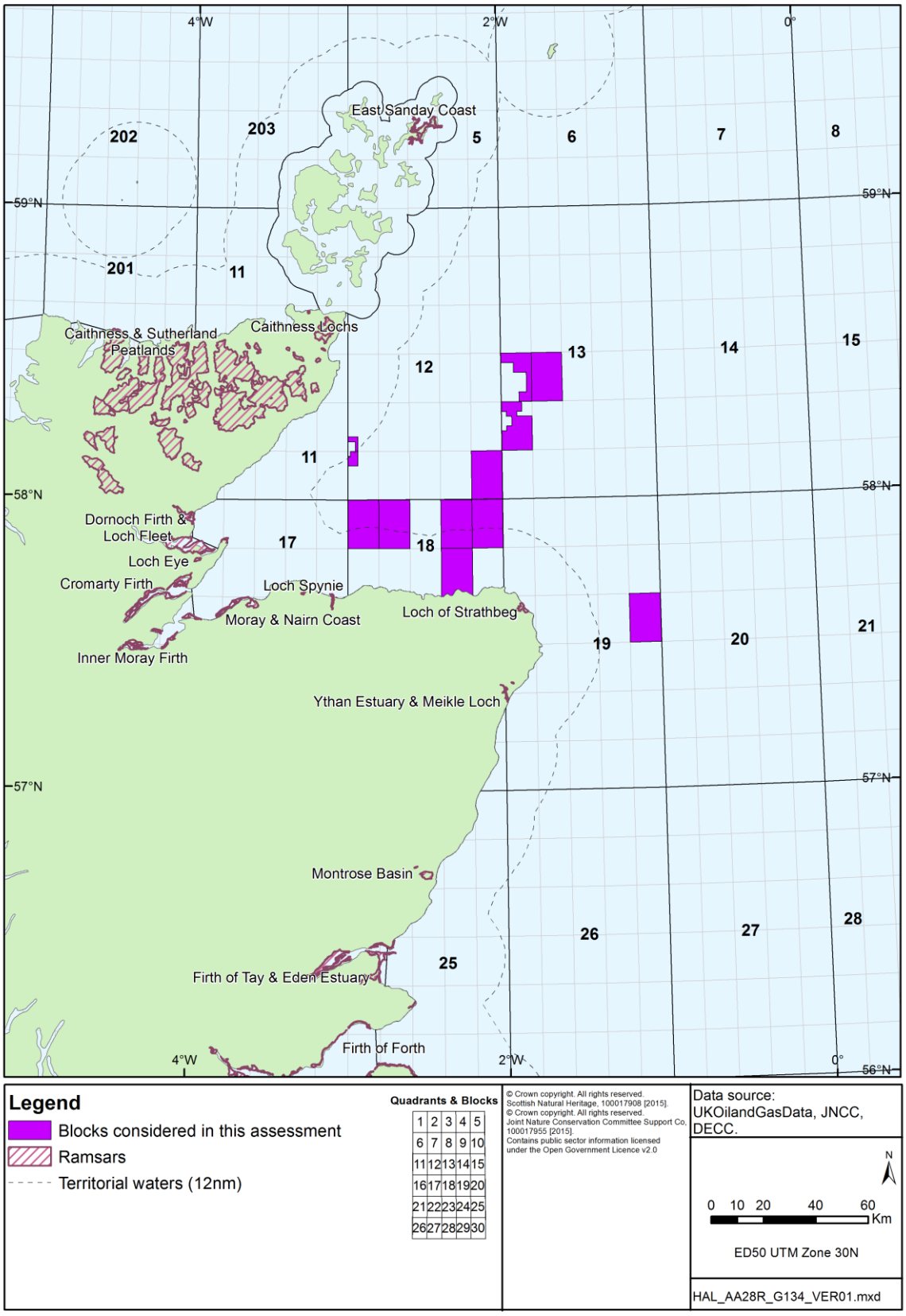
A6 Ramsar sites

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.4: Coastal Ramsar sites and corresponding Natura 2000 sites

Ramsar name	SPA name	SAC name
Caithness and Sutherland Peatlands	Caithness and Sutherland Peatlands	-
Caithness Lochs	Caithness Lochs	-
Cromarty Firth	Cromarty Firth	-
Dornoch Firth and Loch Fleet	Dornoch Firth and Loch Fleet	Dornoch Firth and Morrich More
East Sanday Coast	East Sanday Coast	Sanday
Inner Moray Firth	Inner Moray Firth	Moray Firth
Loch Eye	Loch Eye	Dornoch Firth and Morrich More
Loch of Strathbeg	Loch of Strathbeg	-
Moray and Nairn Coast	Moray and Nairn Coast	-
Ythan Estuary and Meikle Loch	Ythan Estuary, Sands of Forvie and Meikle Loch	Sands of Forvie
Montrose Basin	Montrose Basin	-
Firth of Tay and Eden Estuary	Firth of Tay and Eden Estuary	Firth of Tay and Eden Estuary
Firth of Forth	Firth of Forth	-

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:

- 12/21d & 12/26c - Drill or drop well, obtain 2D seismic
- 12/30 - Drill or drop well, shoot and obtain 3D seismic
- 13/16b & 13/17 - Drill or drop well, reprocess 3D seismic
- 13/21c - Drill or drop well, reprocess 3D seismic
- 18/1 & 18/2 - Drill or drop well, obtain 2D seismic
- 18/4, 18/5 & 18/9 - Drill or drop well, obtain 2D seismic
- 19/15 - Drill or drop well, obtain 2D 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 specific Moray Firth 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								
Fair Isle	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern, wren 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 oil spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features (seabirds) when foraging within and outside the boundaries of the SPA, 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination effects with other activites or future developments (e.g. marine renewables in the Pentland Firth and Orkney area), unlikely given distance of closest Block (13/16b) from site (57km) and limited foraging range of Arctic tern feature (mean 7.1 ± 2.2km, Thaxter *et al*. 2012). **Appropriate Assessment:** See Section 6.3.
Switha	-	✓	-	✓	-	-	-	**Qualifying features** Overwintering geese **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 events of a major crude oil spill from any of the Blocks, weathered spilled crude oil could affect the qualifying features, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Orkney Mainland Moors	✓	✓	-	-	-	-	-	**Qualifying features** Breeding and overwintering birds of prey and owls, breeding red-throated diver **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 affect the qualifying features as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Hoy	✓	-	-	✓	-	-	-	**Qualifying features** Breeding peregrine, red-throated diver and skua. 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 spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Marwick Head	✓	-	-	-	-	-	-	**Qualifying features** Breeding 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 affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Rousay	✓	-	-	✓	-	-	-	**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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
West Westray	✓	-	-	-	-	-	-	**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 affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Papa Westray (North Hill and	✓	-	-	-	-	-	-	**Qualifying features** Breeding tern and skua

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	
Holm)								**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 affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Calf of Eday	✓	-	-	-	-	-	-	**Qualifying features** Breeding 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 affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
North Orkney dSPA	✓	✓	✓	✓	-	-	-	**Qualifying features** Overwintering waterfowl, breeding tern, shag **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 theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, 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.
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 spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Auskerry	✓	-	-	✓	-	-	-	**Qualifying features** Breeding tern and storm petrel **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 theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Copinsay	✓	-	-	✓	-	-	-	**Qualifying features** Breeding 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.

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	
Sule Skerry and Sule Stack	✓	-	-	-	-	-	-	**Qualifying features** Breeding 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 affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Pentland Firth and Scapa Flow, Orkney dSPA	✓	✓	✓	✓	-	-	✓	**Qualifying features** Overwintering divers and waterfowl, shag, guillemot, breeding terns **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 theoretically affect the qualifying features when foraging within and outside the boundaries of the dSPA, although mitigation would be possible. Cumulative: Potential in-combination effects with Pentland Firth and Orkney Round 1 wave and tidal energy development sites and offshore wind (e.g. Meygen site). **Appropriate Assessment** See Section 6.3.
NORTH COAST OF SCOTLAND								
Cape Wrath	✓	-	-	-	-	-	-	**Qualifying features** Breeding 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

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	
								the Blocks, weathered spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
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 is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Caithness and Sutherland Peatlands	✓	-	✓	-	-	-	-	**Qualifying features** Breeding divers and waders, birds of prey **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 affect the qualifying features as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
North Caithness Cliffs	✓	-	-	✓	-	-	✓	**Qualifying features** Breeding peregrine and seabirds **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: 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	
								Accidental spills: In the unlikely event of a major crude spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential in-combination effects with Pentland Firth and Orkney Round 1 wave and tidal energy development sites and offshore wind (e.g. Meygen site). **Appropriate Assessment** See Sections 6.3 and 7.
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 affect the qualifying features as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
MORAY FIRTH AND ABERDEENSHIRE								
East Caithness Cliffs	✓	-	-	✓	-	-	✓	**Qualifying features** Breeding peregrine, seabirds and gulls **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: No underwater noise effects given the limited sensitivity of the qualifying features and that new seismic only proposed for Block 12/30 (*ca*. 58km from site). Accidental spills: In the unlikely event of an accidental spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (physical

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	
								disturbance) effects with respect to other developments (e.g. offshore wind developments) in the area. **Appropriate Assessment** See Sections 6.3 and 7.
Moray Firth dSPA		✓	✓	✓	✓	-	✓	**Qualifying features:** Overwintering divers and waterfowl, shag **Consideration of likely significant effects** Physical disturbance: Conservation objectives (once confirmed) could potentially be undermined by physical disturbance and drilling effects given that Block 18/1 partly overlaps with site and Block 18/2 is 1km from site. Underwater noise: No underwater noise effects given the limited sensitivity of the qualifying features and that new seismic only proposed for Block 12/30 (*ca*. 40km from site). Accidental spills: In the unlikely event of an accidental spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the dSPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (physical disturbance) effects with respect to other developments (e.g. offshore wind developments, port developments) in the area. **Appropriate Assessment** See Sections 4.3, 6.3 and 7.
Dornoch Firth and Loch Fleet	✓	✓	-	✓	-	-	-	**Qualifying features** Breeding osprey, overwintering waders and 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination effects with other activites or future developments (e.g. offshore wind, port

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	
								developments), unlikely given distance of closest Block (18/1) from site (*ca*. 59km). **Appropriate Assessment** See Section 6.3.
Loch Eye	-	✓	-	-	-	-	-	**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 affect the qualifying features as the site does not include marine habitats. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Cromarty Firth	✓	✓	-	✓	-	-	-	**Qualifying features** Breeding tern and osprey, overwintering waders and 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination effects with other activites or future developments (e.g. port developments), unlikely given distance of closest Block (18/1) from site (*ca*. 64km). **Appropriate Assessment:** See Section 6.3.
Inner Moray Firth	✓	✓	-	✓	-	-	-	**Qualifying features** Breeding tern and osprey, overwintering waders and waterfowl **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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination effects with other activites or future developments (e.g. port developments), unlikely given distance of closest Block (18/1) from site (*ca*. 67km). **Appropriate Assessment** See Section 6.3.
Moray and Nairn Coast	✓	✓	-	✓	-	-	-	**Qualifying features** Breeding tern and osprey, overwintering waders and waterfowl **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: No underwater noise effects given the limited sensitivity of the qualifying features and that new seismic only proposed for Block 12/30 (*ca*. 64km from site). Accidental spills: In the unlikely event of a major crude spill from either Block, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Troup, Pennan and Lion's Heads	✓	-	-	✓	✓	-	-	**Qualifying features** Breeding seabirds **Consideration of likely significant effects** Physical disturbance**:** Conservation objectives could be undermined by physical disturbance and drilling effects given that Block 18/9 partly overlaps with site. Underwater noise: No underwater noise effects given the limited sensitivity of the qualifying features and that new seismic only proposed for Block 12/30 (*ca*. 32km from site). Accidental spills: In the unlikely event of an accidental spill from any of

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	
								the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 4.3 and 6.3.
Loch of Strathbeg	✓	✓	-	✓	-	-	-	**Qualifying features** Breeding tern and 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Buchan Ness to Collieston Coast	✓	-	-	✓	-	-	✓	**Qualifying features** Breeding 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination effects (physical disturbance) with respect to other developments (e.g. European Offshore Wind Deployment Centre) in the area. **Appropriate Assessment:** See Sections 6.3 and 7.
Ythan Estuary and Sands of Forvie dSPA	✓			✓	-	-	✓	**Qualifying features:** Breeding terns **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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the dSPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (physical disturbance) effects with respect to other developments (e.g. European Offshore Wind Deployment Centre) in the area. **Appropriate Assessment:** See Sections 6.3 and 7.
Ythan Estuary, Sands of Forvie and Meikle Loch	✓	✓	-	✓	-	-	✓	**Qualifying features** Breeding terns and 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (physical disturbance) effects with respect to other developments (e.g. European Offshore Wind Deployment Centre) in the area. **Appropriate Assessment** See Sections 6.3 and 7.
Fowlsheugh	✓	-	-	✓	-	-	✓	**Qualifying features** Breeding 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (physical disturbance) effects with respect to other developments (e.g. European

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	
								Offshore Wind Deployment Centre) in the area. **Appropriate Assessment:** See Sections 6.3 and 7.
Montrose Basin	-	✓	✓	✓	-	-	-	**Qualifying features** Overwintering waterfowl 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 spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment:** See Section 6.3.
Firth of Forth and Tay Bay Complex dSPA	✓	✓	✓	✓	-	-	-	**Qualifying features** Seabird aggregations, foraging areas for breeding terns and shag, inshore wintering 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 could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment:** See Section 6.3.
Firth of Tay and Eden Estuary	✓	✓	✓	✓	-	-	-	**Qualifying features** Overwintering waterfowl, waders and cormorant **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 theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA,

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	
								although mitigation would be possible. Cumulative: N/A **Appropriate Assessment:** See Section 6.3.
Forth Islands	✓		✓	✓	-	-	-	**Qualifying features** Breeding seabirds and terns **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 theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment:** See Section 6.3.
Firth of Forth	-	✓	✓	✓	-	-	-	**Qualifying features** Overwintering waterfowl 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 spill from any of the Blocks, weathered spilled oil could theoretically affect the qualifying features when foraging within and outside the boundaries of the SPA, although mitigation would be possible. Cumulative: N/A **Appropriate Assessment:** See Section 6.3.

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							
Fair Isle	✓	-	-	-	-	-	**Qualifying features** Sea cliffs, heaths **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
ORKNEY							
Hoy	✓	-	-	-	-	-	**Qualifying features** Sea cliffs, standing freshwater, heaths, bogs, fens, rocky slopes **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Loch of Stenness	✓	-	-	-	-	-	**Qualifying features** Coastal lagoons **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: 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	
							Appropriate Assessment No foreseeable interaction between plan activities and site negates likely significant effect
Stromness Heaths and Coasts	✓	-	-	-	-	-	**Qualifying features** Sea cliffs, heaths Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
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 the Blocks, weathered spilled oil could theoretically affect the qualifying feature when foraging outside the site, although mitigation would be possible. Cumulative: Potential in-combination effects with Pentland Firth and Orkney Round 1 wave and tidal energy development sites (e.g. Meygen site). **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
Sanday	✓	✓	✓	-	✓	✓	**Qualifying features** Reefs, sandbanks, mudflats and sandflats, and 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 oil could theoretically affect the qualifying feature when foraging outside the site, although mitigation would be possible.

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: Potential in-combination effects with Pentland Firth and Orkney Round 1 wave and tidal energy development sites (e.g. Meygen site). **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
NORTH COAST OF SCOTLAND							
Cape Wrath	✓	-	-	-	-	-	**Qualifying features** Sea cliffs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Durness	✓	✓	-	-	-	-	**Qualifying features** Coastal dunes, standing freshwater, grasslands, limestone pavements, heaths, fens, otter **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Invernaver	✓	-	-	-	-	-	**Qualifying features** Coastal dunes, heaths, grasslands, fens **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: 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	
							Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Strathy Point	✓	-	-	-	-	-	**Qualifying features** Sea cliffs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
MORAY FIRTH AND ABERDEENSHIRE							
East Caithness Cliffs	✓	-	-	-	-	-	**Qualifying features** Sea cliffs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Mound Alderwoods	✓	-	-	-	-	-	**Qualifying features:** Forests **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: 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	
							Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Moray Firth	✓	✓	✓	-	✓	✓	**Qualifying features** Sandbanks, bottlenose dolphin **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 oil could theoretically affect the sandbank habitat and the species feature both within the SAC and when forging more widely, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore wind developments, port developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
Dornoch Firth and Morrich More	✓	✓	✓	-	✓	✓	**Qualifying features** Estuaries, mudflats and sandflats, saltmarsh and saltmeadows, coastal dunes, reefs, otter & 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 oil could theoretically affect the habitat features and seal feature both within the SAC and when forging more widely, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore

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	
							wind developments, port developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
Conon Islands	✓	-	-	-	-	-	**Qualifying features** Forests **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Culbin Bar	✓	-	✓	-	-	-	**Qualifying features** Vegetation of stony banks, salt meadows, coastal dunes **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: In the unlikely events of a major crude oil spill from any of the Blocks, weathered spilled crude oil could affect sensitive qualifying features (salt meadows), although mitigation would be possible. Much of the site above MHWS and not generally vulnerable to surface oil pollution. Vegetation of stony banks habitat could be physically impacted by intensive clean-up activity if they are used as an access route to the shore or as a laydown area for equipment (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Lower River Spey - Spey Bay	✓	-	✓	-	-	-	**Qualifying features** Vegetation of stony banks, forests **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Much of the site above MHWS and not generally vulnerable

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	
							to surface oil pollution. Coastal habitats above the level of spring high tides may be physically impacted by intensive clean-up activity if used as an access route to the shore or as a laydown area for equipment. Those that will be particularly vulnerable include vegetated shingle ridge communities (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Buchan Ness to Collieston	✓	-	-	-	-	-	**Qualifying features** Sea cliffs **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying feature not generally sensitive to surface oil pollution and much of the site is above MHWS and therefore unlikely to be impacted by surface oil pollution. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Sands of Forvie	✓	-	✓	-	-	-	**Qualifying features** Coastal dunes **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying feature largely above MHWS and not generally vulnerable to surface oil pollution. Sand dunes above the level of spring high tides may be physically impacted by intensive clean-up activity if they are used as an access route to the shore or as a laydown area for equipment (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** See Section 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	
SOUTH OF ABERDEENSHIRE							
Garron Point	-	✓	-	-	-	-	**Qualifying features** Narrow-mouthed whorl snail **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying feature not generally sensitive to surface oil pollution and much of the site is above MHWS and therefore unlikely to be impacted by surface oil pollution. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Barry Links	✓	-	✓	-	-	-	**Qualifying features** Coastal dunes **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying feature largely above MHWS and not generally vulnerable to surface oil pollution. Sand dunes above the level of spring high tides may be physically impacted by intensive clean-up activity if they are used as an access route to the shore or as a laydown area for equipment (Law *et al*. 2011). Cumulative: N/A **Appropriate Assessment** See Section 6.3.
Firth of Tay and Eden Estuary SAC	✓	✓	✓	-	✓	✓	**Qualifying features** Estuaries, 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 oil could theoretically affect the habitat features and seal feature both within the SAC and when forging more widely,

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	
							although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. offshore wind developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
Isle of May	✓	✓	✓	-	✓	✓	**Qualifying features** 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 oil could theoretically affect the qualifying feature when foraging outside the site, although mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. offshore wind developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.

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: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
River Borgie	-	✓	-	-	-	-	**Qualifying features:** Freshwater pearl mussel, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
River Naver	-	✓	-	-	-	-	**Qualifying features:** Freshwater pearl mussel, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying

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	
							features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
River Thurso	-	✓	-	-	-	-	**Qualifying features** Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: N/A Accidental spills: Qualifying features not considered particularly sensitive to spills (Law *et al*. 2011). Spilled oil is not likely to affect the qualifying features given the geographical location of the site with respect to the Blocks. Cumulative: N/A **Appropriate Assessment** No foreseeable interaction between plan activities and site negates likely significant effect
Berriedale and Langwell Waters	-	✓	✓	-	✓	✓	**Qualifying features** Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on 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 theoretically affect the qualifying features although only if present in shallow coastal areas and mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore wind developments, port developments) in the area. **Appropriate Assessment:** See Sections 5.3, 6.3 and 7.
River Evelix	-	✓	✓	-	✓	✓	**Qualifying features** Freshwater pearl mussel

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: 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: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect salmon although only if present in shallow coastal areas and mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore wind developments, port developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7
River Oykel	-	✓	✓	-	✓	✓	**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 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 theoretically affect salmon although only if present in shallow coastal areas and mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore wind developments, port developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
River Moriston	-	✓	✓	-	✓	✓	**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

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	
							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: In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect salmon although only if present in shallow coastal areas and mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore wind developments, port developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
River Spey	-	✓	✓	-	✓	✓	**Qualifying features** Freshwater pearl mussel, sea lamprey, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on 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 theoretically affect the qualifying features although only if present in shallow coastal areas and mitigation would be possible. Cumulative: Potential for cumulative and in-combination (underwater noise) effects with respect to other developments (e.g. BOWL and MORL offshore wind developments) in the area. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
River Dee	-	✓	✓	-	✓	✓	**Qualifying features** Freshwater pearl mussel, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on 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 theoretically affect the

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	
							qualifying features although only if present in shallow coastal areas and mitigation would be possible. Cumulative: Potential in-combination effects with proposed renewable (offshore wind) energy development in Aberdeen Bay. **Appropriate Assessment** See Sections 5.3, 6.3 and 7.
River South Esk	-	✓	✓	-	✓	-	**Qualifying features** Freshwater pearl mussel, Atlantic salmon **Consideration of likely significant effects** Physical disturbance: N/A Underwater noise: Potential for underwater noise effect on 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 theoretically affect the qualifying features only if present in shallow coastal areas and mitigation would be possible. Cumulative: N/A **Appropriate Assessment** See Sections 5.3 and 6.3.

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

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: 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]	

Site Name: Fair Isle SPA
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 Islands SPA	
Location	Grid Ref: ND387842 (central point) Latitude 58º44'30"N Longitude 03º03'30"W
Area (ha)	170.51
Summary	The Pentland Firth Islands are located between the Orkney Islands and the mainland coast of northeast Scotland. They are a group of two main islands, Swona and Muckle Skerry, and a group of rocky skerries in the Pentland Firth. The islands contain a variety of habitats, including cliffs, rocky shores, maritime heath, moorland, rough grassland, marsh and open freshwater. They provide strategic nesting localities for Arctic tern which feed outside the SPA in the rich surrounding waters of the Pentland Firth.
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 (4 year mean 1992-1995) [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: Switha SPA	
Location	Grid Ref: ND364891 (central point) Latitude 58º47'08"N Longitude 03º06'00"W
Area (ha)	57.39
Summary	Switha is a small, uninhabited, low-lying grassy island at the southern end of the Orkney archipelago in northern Scotland. It lies 2km east of South Walls (Hoy) and 2km south of the island of Flotta. Switha has a rocky coastline with cliffs along the north, east and west shores, and is almost totally covered by maritime grassland, with smaller areas of heath and bog. Switha is of importance as a winter roosting site for Greenland barnacle goose *Branta leucopsis*.
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: **Overwinter:** Barnacle goose *Branta leucopsis*, 1,120 individuals representing at least 4% of the British and world populations of this species [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: Hoy SPA	
Location	Grid Ref: ND238974 (central point) Latitude 58º51'30"N Longitude 03º19'10"W
Area (ha)	18,122.17
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. On the west coast, Old Red Sandstone cliffs reach 339m 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. Red-throated diver 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) [favourable maintained] Red-throated diver *Gavia stellata*, 58 territories representing at least 6.0% of the breeding population in Great Britain (1994 National Survey) [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:** Great skua *Catharacta skua*, 1,900 pairs representing at least 14.0% of the breeding World population (Seabird Census Register) [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 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* and great skua *Catharacta skua* [all favourable maintained, except puffin, kittiwake, guillemot and fulmar: 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: 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 [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.*** 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* [unfavourable declining; except guillemot and fulmar, favourable recovered]	
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	Grid Ref: Latitude Longitude	HY413853 (central point) 59º09'27"N 03º00'96"W
Area (ha)	57,495.77	
Summary	N/A	
Qualifying features for which the site is to be designated:		
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: **Annex I species:** Great northern diver Slavonian grebe Red-throated diver Arctic tern **On migration:** Eider Long-tailed duck Velvet scoter Red-breasted merganser Shag		
Conservation objectives:		
To be announced.		
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: Auskerry SPA	
Location	Grid Ref: HY674163 (central point) Latitude 59º02'00"N Longitude 02º34'00"W
Area (ha)	101.97
Summary	Auskerry is a small, uninhabited low-lying island situated 5km south of Stronsay in the Orkney Islands. The shore is a mixture of rocky platforms interspersed with low cliffs and boulder/shingle beaches. The site is important as a nesting area for a number of breeding seabirds. These birds feed outside the SPA in the waters surrounding the island, as well as more distant waters.

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*, 780 pairs representing at least 1.8% of the breeding population in Great Britain (4 year mean, 1992-1995) [favourable maintained]
Storm petrel *Hydrobates pelagicus*, 3,600 pairs representing at least 4.2% of the breeding population in Great Britain (Count, as at 1995) [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: Copinsay SPA	
Location	Grid Ref: HY611015 (central point) Latitude 58°54'00"N Longitude 02°40'30"W
Area (ha)	3,607.7
Summary	Copinsay lies 4km off the east coast of Orkney Mainland. It consists of the island of Copinsay and three islets (Corn Holm, Ward Holm and Black Holm). The three holms are vegetated and a storm beach connects them to Copinsay at low water. Copinsay is formed of Old Red Sandstone with the largely horizontal bedding planes providing ideal breeding ledges for seabirds (auks and kittiwake), especially on the sheer cliffs of the southeast of Copinsay which reach to over 60m. The seabirds feed outside the SPA in the nearby waters, as well as more distantly.
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 70,000 individual seabirds including: guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, great black-backed gull *Larus marinus* and fulmar *Fulmarus glacialis* [unfavourable declining, except kittiwake: unfavourable recovering; and fulmar and great black-backed gull: 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: Pentland Firth and Scapa Flow dSPA	
Location	Grid Ref: ND483478 (central point) Latitude 58º43'62"N Longitude 02º53'38"W
Area (ha)	131,751.45
Summary	N/A
Qualifying features for which the site is to be designated:	
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: **Annex I species:** Great northern diver Slavonian grebe Red-throated diver Arctic tern Black-throated diver **On migration:** Shag Guillemot Eider Long-tailed duck Goldeneye Red-breasted merganser	
Conservation objectives:	
To be announced	
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. 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) [N/A]

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) [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 110,000 individual seabirds including: puffin *Fratercula arctica*, razorbill *Alca torda*, kittiwake *Rissa tridactyla*, fulmar *Fulmarus glacialis*, guillemot *Uria aalge* [favourable maintained, except kittiwake and razorbill: 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: East Caithness Cliffs SPA	
Location	Grid Ref: ND214331 (central point) Latitude 58º16'49"N Longitude 03º20'21"W
Area (ha)	11,690.92
Summary	The East Caithness Cliffs SPA is located on the east coast of Caithness in northern Scotland. The site comprises most of the sea-cliff areas between Wick and Helmsdale. The cliffs are formed from Old Red Sandstone and are generally between 30-60m high, rising to 150m at Berriedale. Cliff ledges, stacks and geos provide ideal nesting sites for internationally important populations of seabirds, especially gulls and auks. The seabirds nesting on the East Caithness Cliffs feed outside the SPA in inshore waters as well as further away. The cliffs also provide important nesting habitat for peregrine. The cliffs overlook the Moray Firth, an area that provides rich feeding areas for fish-eating seabirds.

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) [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*, 106,700 individuals representing at least 3.1% of the north Atlantic biogeographic population [favourable maintained]

Herring gull *Larus argentatus*, 9,400 pairs representing at least 1.0% of the Northwestern Europe biogeographic population [unfavourable declining]

Kittiwake *Rissa tridactyla*, 32,500 pairs representing at least 1.0% of the north Atlantic biogeographic population [favourable maintained]

Razorbill *Alca torda*, 15,800 individuals representing at least 1.8% of the total *A. t. islandica* biogeographic population [favourable maintained]

Shag *Phalacrocorax aristotelis*, 2,300 pairs representing at least 1.8% of the north Europe biogeographic population [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 300,000 individual seabirds including: puffin *Fratercula arctica*, great black-backed gull *Larus marinus*, cormorant *Phalacrocorax carbo*, fulmar *Fulmarus glacialis*, razorbill *Alca torda*, guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, herring gull *Larus argentatus*, shag *Phalacrocorax aristotelis* [favourable maintained, except shag, cormorant, great black-backed gull and herring gull: 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Moray Firth dSPA		
Location	Grid Ref: Latitude Longitude	NJ096228 (central point) 57°48'91"N 03°31'18"W
Area (ha)	184,183.99	
Summary	N/A	
Qualifying features for which the site is to be designated:		
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: **Annex I species:** Great northern diver Red-throated diver Slavonian grebe **On migration:** Scaup Eider Long-tailed duck Common scoter Velvet scoter Goldeneye Red-breasted merganser Shag		
Conservation objectives:		
To be announced		
Likely significant effects associated with activities that could follow Block licensing:		
• Physical disturbance (see Section 4.3) • Accidental spills (see Section 6.3) • Cumulative and in-combination effects (see Section 7)		

Site Name: Dornoch Firth and Loch Fleet SPA	
Location	Grid Ref: NH7888623 (central point) Latitude 57°51'00"N Longitude 04°02'30"W
Area (ha)	7,836.33
Summary	The Dornoch Firth is located in north-eastern Scotland and is one of the two northernmost estuaries in the Moray Basin ecosystem. The Dornoch Firth and Loch Fleet SPA is one of the best examples in northwest Europe of a large complex estuary which has been relatively unaffected by industrial development, whilst Loch Fleet itself is an example of a shallow, bar-built estuary. Extensive sand-flats and mud-flats are backed by saltmarsh and sand dunes with transitions to dune heath and alder woodland. The tidal flats support internationally important numbers of waterbirds on migration and in winter, and are the most northerly and substantial extent of intertidal habitat for wintering waterbirds in the UK, as well as Europe. The Firth is also of importance as a feeding area for locally breeding osprey. Dornoch Firth and Loch Fleet SPA forms an integral ecological component of Moray Basin Firths and Bays of which it forms the most northerly component area.

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:
Osprey *Pandion haliaetus*, 10 pairs representing at least 10.0% of the breeding population in Great Britain (Count as at early 1990's) [favourable maintained]

Over winter:
Bar-tailed godwit *Limosa lapponica*, 1,300 individuals representing at least 2.5% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) [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:
Greylag goose *Anser anser,* 2,079 individuals representing at least 2.1% of the wintering Iceland/UK/Ireland population (5 year peak mean 1991/2 - 1995/6) [favourable maintained]

Wigeon *Anas penelope*, 15,022 individuals representing at least 1.2% of the wintering Western Siberia/Northwestern/Northeastern Europe population (5 year peak mean 1991/2 - 1995/6) [favourable maintained]

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 35,202 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: curlew *Numenius arquata*, dunlin *Calidris alpina alpina*, oystercatcher *Haematopus ostralegus*, teal *Anas crecca*, wigeon *Anas penelope*, greylag goose *Anser anser,* bar-tailed godwit *Limosa lapponica* [all 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: Cromarty Firth SPA	
Location	Grid Ref: NH688680 (central point) Latitude 57°41'00"N Longitude 04°12'00"W
Area (ha)	3,746.95
Summary	The Cromarty Firth is located in north-eastern Scotland and is one of the major firths on the east shore of the Moray Firth. It contains a range of high-quality coastal habitats including extensive intertidal mud-flats and shingle bordered locally by areas of saltmarsh, as well as reedbeds around Dingwall. The rich invertebrate fauna of the intertidal flats, with beds of eelgrass *Zostera* spp., glasswort *Salicornia* spp., and *Enteromorpha* algae, all provide important food sources for large numbers of wintering and migrating waterbirds (swans, geese, ducks and waders). With adjacent estuarine areas elsewhere in the Moray Firth, it is the most northerly major wintering area for wildfowl and waders in Europe. The Firth is also of importance as a feeding area for locally breeding Osprey as well as for breeding terns. Cromarty Firth SPA forms an integral ecological component of Moray Basin Firths and Bays.

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:
Common tern *Sterna hirundo*, 294 pairs representing at least 2.4% of the breeding population in Great Britain (5 year mean, 1989-1993) [unfavourable no change]

Osprey *Pandion haliaetus*, 1 pair representing at least 1.0% of the breeding population in Great Britain (Early 1990s) [favourable maintained]

Over winter:
Bar-tailed godwit *Limosa lapponica*, 1,355 individuals representing at least 3% of the wintering population in Great Britain (5 year peak mean, 1992/3-1996/7) [favourable maintained]

Whooper swan *Cygnus cygnus,* 64 individuals representing at least 1.0% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) [unfavourable no change]

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

Over winter:
Greylag goose *Anser anser,* 1,782 individuals representing at least 2% of the wintering Iceland/UK/Ireland population (5 year peak mean, 1992/3-1996/7) [favourable maintained]

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 30,200 individual waterfowl (5 year peak mean, 1992/3-1995/6) including: redshank *Tringa totanus*, curlew *Numenius arquata*, dunlin *Calidris alpina alpina*, knot *Calidris canutus*, oystercatcher *Haematopus ostralegus*, red-breasted merganser *Mergus serrator*, scaup *Aythya marila*, pintail *Anas acuta*, wigeon *Anas penelope*, greylag goose *Anser anser,* bar-tailed godwit *Limosa lapponica*, whooper swan *Cygnus cygnus* [favourable maintained, except whooper swan, scaup and common tern: unfavourable no change]

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: Inner Moray Firth SPA	
Location	Grid Ref: NN564745 (central point) Latitude 56°50'25"N Longitude 04°21'15"W
Area (ha)	2,339.23
Summary	The Inner Moray Firth is located to the north of Inverness in Scotland and is one of the major arms of the Moray Firth. It comprises the Beauly Firth and Inverness Firth (including Munlochy Bay) which together form the easternmost estuarine component of the Moray Basin ecosystem. The site contains extensive intertidal flats and smaller areas of saltmarsh. The rich invertebrate fauna of the intertidal flats, with beds of eelgrass *Zostera spp*., glasswort *Salicornia spp*., and *Enteromorpha* algae, all provide important food sources for large numbers of wintering and migrating waterbirds (geese, ducks and waders). With adjacent estuarine areas elsewhere in the Moray Firth, this site is the most northerly major wintering area for wildfowl and waders in Europe. The Firth is also of importance as a feeding area for locally breeding osprey as well as for breeding terns. The Inner Moray Firth SPA forms an integral ecological component of Moray Basin Firths and Bays.

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:
Common tern *Sterna hirundo*, 310 pairs representing at least 2.5% of the breeding population in Great Britain (Seabird Census Register) [unfavourable no change]

Osprey *Pandion haliaetus*, 1 pair representing at least 2.0% of the breeding population in Great Britain (Early 1990s) [favourable maintained]

Over winter:
Bar-tailed godwit *Limosa lapponica*, 1,090 individuals representing at least 1% of the wintering population in Great Britain (5 year peak mean, 1992/3-1996/7) [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:
Greylag goose *Anser anser,* 2,651 individuals representing at least 3% of the wintering Iceland/UK/Ireland population (5 year peak mean, 1992/3-1996/7) [favourable maintained]

Red-breasted merganser *Mergus serrator*, 1,184 individuals representing at least 1% of the wintering Northwestern/Central Europe population (5 year peak mean, 1992/3-1996/7) [unfavourable no change]

Redshank *Tringa totanus*, 1,621 individuals representing at least 1% of the wintering Eastern Atlantic - wintering population (5 year peak mean, 1992/3-1996/7) [favourable maintained]

Scaup *Aythya marila*, 97 individuals representing <0.1% of the wintering Northern/Western Europe population (Counts 1991-96) [favourable maintained]

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 33,148 individual waterfowl (5 year peak mean 1991/2 - 1995/6), including: scaup *Aythya marila*, curlew *Numenius arquata*, oystercatcher *Haematopus ostralegus*, goosander *Mergus merganser*, goldeneye *Bucephala clangula*, teal *Anas crecca*, wigeon *Anas penelope*, cormorant *Phalacrocorax carbo*, redshank *Tringa totanus*, red-breasted merganser *Mergus serrator*, greylag goose *Anser anser,* bar-tailed godwit *Limosa lapponica* [favourable maintained, except cormorant, red-breasted merganser and goosander: unfavourable no change]

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: Moray and Nairn Coast SPA	
Location	Grid Ref: NH967633 (central point) Latitude 57°38'54"N Longitude 03°43'48"W
Area (ha)	2,410.25
Summary	The Moray and Nairn Coast SPA is located on the south coast of the Moray Firth and comprises the intertidal flats, saltmarsh and sand dunes of Findhorn Bay and Culbin Bar, and the alluvial deposits and associated woodland of the Lower River Spey and Spey Bay. It is of outstanding nature conservation and scientific importance for coastal and riverine habitats and supports a range of wetland birds throughout the year. In summer it supports nesting osprey, whilst in winter it supports large numbers of Iceland/Greenland pink-footed goose, Icelandic greylag goose and other waterbirds, especially ducks, sea-ducks and waders. The geese feed away from the SPA on surrounding agricultural land during the day. The sea-ducks feed, loaf and roost over inundated intertidal areas within the site, but also away from the SPA in the open waters of the Moray Firth. Moray and Nairn Coast SPA forms an integral ecological component of the Moray Basin Firths and Bays, of which it is the easternmost unit.

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:
Osprey *Pandion haliaetus*, 7 pairs representing at least 7.0% of the breeding population in Great Britain (Count, as at early 1990s) [favourable maintained]

Over winter:
Bar-tailed godwit *Limosa lapponica*, 1,156 individuals representing at least 2.2% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) [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:
Greylag goose *Anser anser*, 2,679 individuals representing at least 2.7% of the wintering Iceland/UK/Ireland population (5 year peak mean 1991/2 - 1995/6) [favourable maintained]

Pink-footed goose *Anser brachyrhynchus*, 139 individuals representing <0.1% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2 - 1995/6) [unfavourable declining]

Redshank *Tringa totanus*, 862 individuals representing at least 0.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 91/2 to 95/6) [favourable maintained]

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter:
The area regularly supports 17,473 individual waterfowl (5 year peak mean 91/2) to 95/6including: pink-footed goose *Anser brachyrhynchus*, dunlin *Calidris alpina alpina*, oystercatcher *Haematopus ostralegus*, red-breasted merganser *Mergus serrator*, velvet scoter *Melanitta fusca*, common scoter *Melanitta nigra*, long-tailed duck *Clangula hyemalis*, wigeon *Anas penelope*, redshank *Tringa totanus*, greylag goose *Anser anser*, bar-tailed godwit *Limosa lapponica* [favourable maintained, except pink-footed goose: unfavourable declining]

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

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

- Accidental spills (see Section 6.3)

Site Name: Troup, Pennan and Lion's Head SPA	
Location	Grid Ref: NH782677 (central point) Latitude 57°41'00"N Longitude 02°15'05"W
Area (ha)	3,367.21
Summary	Troup, Pennan and Lion's head SPA is a 9km stretch of sea-cliffs along the Banff and Buchan coast of Aberdeenshire in north-east Scotland. As well as cliffs, the site also includes adjacent areas of grassland and heath, and several small sand or shingle beaches punctuate the otherwise rocky shore. The cliffs rise to 150m and provide ideal nesting sites for seabirds, which feed in the rich waters offshore and outside the SPA. Different parts of the cliffs are used by different species of seabirds according to varying ecological requirements. The site is particularly important for its numbers of gulls and auks.
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*, 44,600 individuals representing at least 4% of the British and 1% of total population of the sub-species *U. a. aalge* and *U. a. albionis* [unfavourable declining] Kittiwake *Rissa tridactyla*, 31,600 pairs representing 6% of the British population and 1% of the total population of the sub-species *R. t. tridactyla* [unfavourable no change]	
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 150,000 individual seabirds (Count, as at 1995) including: razorbill *Alca torda*, kittiwake *Rissa tridactyla*, herring gull *Larus argentatus*, fulmar *Fulmarus glacialis*, guillemot *Uria aalge* [all unfavourable declining, except herring gull: unfavourable no change]	
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:	
• Physical disturbance (see Section 4.3) • Accidental spills (see Section 6.3)	

Site Name: Loch of Strathbeg SPA	
Location	Grid Ref: NK070592 (central point) Latitude 57°37'24" N Longitude 01°53'00" W
Area (ha)	615.94
Summary	The Loch of Strathbeg is a shallow, naturally eutrophic loch with adjoining reedbeds, freshwater marshes, and alder and willow. The calcareous dunes and dune slacks within the site are relatively undisturbed and contain a rich flora. The loch constitutes the largest dune slack pool in the UK (200ha) and the largest waterbody in the northeast Scottish lowlands. It is separated from the sea by a 0.5-1km wide dune system. The SPA provides wintering habitat for a number of important wetland bird species, particularly wildfowl (swans, geese and ducks), and is also an important staging area for migratory wildfowl from Scandinavia and Iceland/Greenland. In summer, coastal parts of the site are an important breeding area for sandwich tern, which feed outside the SPA in adjacent 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:** Sandwich tern *Sterna sandvicensis*, 530 pairs representing up to 3.8% of the breeding population in Great Britain (5 year mean, 1993-1997) [unfavourable declining] **Over winter:** Barnacle goose *Branta leucopsis*, 226 individuals representing up to 1.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) [favourable maintained] Whooper swan *Cygnus cygnus*, 183 individuals representing up to 3.3% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) [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:** Greylag goose *Anser anser*, 3,325 individuals representing up to 3.3% of the wintering Iceland/UK/Ireland population (winter peak means) [unfavourable no change] Pink-footed goose *Anser brachyrhynchus*, 39,924 individuals representing up to 17.7% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2 - 1995/6) [favourable maintained]	
Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl ***Assemblage qualification: A wetland of international importance.*** Over winter, the area regularly supports 49,456 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: teal *Anas crecca*, greylag goose *Anser anser*, pink-footed goose *Anser brachyrhynchus*, barnacle goose *Branta leucopsis*, whooper swan *Cygnus cygnus* [all 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: Buchan Ness to Collieston SPA	
Location	Grid Ref: NK100345 (central point) Latitude 57°26'20" N Longitude 01°48'30" W
Area (ha)	5,400.94
Summary	Buchan Ness to Collieston Coast SPA is located on the coast of Aberdeenshire in north-east Scotland. It is a 15km stretch of south-east facing cliff formed of granite, quartzite and other rocks running to the south of Peterhead, interrupted only by the sandy beach of Cruden Bay. The low, broken cliffs (generally less than 50m high) show many erosion features such as stacks, arches, caves and blowholes. The varied coastal vegetation on the ledges and cliff tops includes maritime heath, grassland and brackish flushes. The site is of importance as a nesting area for a number of seabird species (gulls and auks). These birds feed outside the SPA in the nearby waters, as well as more distantly.
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 95,000 individual seabirds (Count, as at mid-1980s) including: guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, herring gull *Larus argentatus*, shag Phalac*rocorax aristotelis*, fulmar *Fulmarus glacialis*. [all unfavourable no change except guillemot: favourable declining and fulmar: 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) • Cumulative and in-combination effects (see Section 7)	

Site Name: Ythan Estuary and Sands of Forvie dSPA		
Location	Grid Ref: Latitude Longitude	ND182743 (central point) 57°48'91"N 03°31'18"W
Area (ha)	184,183.99	
Summary	N/A	
Qualifying features for which the site is to be designated:		
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: **Annex I species:** Sandwich tern Little tern		
Conservation objectives:		
To be announced		
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: Ythan Estuary, Sands of Forvie and Meikle Loch SPA	
Location	Grid Ref: NK025279 (central point) Latitude 57°20'30" N Longitude 01°57'30" W
Area (ha)	1,016.24
Summary	Ythan Estuary, Sands of Forvie and Meikle Loch are located north of Aberdeen on the east coast of Scotland. The site comprises the long, narrow estuary of the River Ythan and Meikle Loch. At its mouth, the river splits an extensive area of sand dunes with the Forveran Links on the west bank and the Sands of Forvie dune system on the east bank. Extensive mud-flats in the upper reaches of the estuary are replaced by coarser gravels with mussel *Mytilus edulis* beds closer to the sea. The margins of the estuary are varied, with areas of saltmarsh, reedbed and poor fen. Meikle Loch is an important roost site for geese, which feed away from the SPA on surrounding farmland in winter. It is a eutrophic loch supporting limited aquatic vegetation. In summer the coastal habitats of the dunes and estuary provide an important breeding site for three species of tern, whilst in winter the estuary holds large numbers of waders, ducks and geese.

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:
Common tern *Sterna hirundo*, 265 pairs representing up to 2.2% of the breeding population in Great Britain (Count, as at early 1990s) [unfavourable declining]

Little tern *Sterna albifrons*, 41 pairs representing up to 1.7% of the breeding population in Great Britain (Count, as at early 1990s) [favourable maintained]

Sandwich tern *Sterna sandvicensis*, 600 pairs representing up to 4.3% of the breeding population in Great Britain (Seabird Census Register) [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:
Pink-footed goose *Anser brachyrhynchus,* 17,213 individuals representing up to 7.7% of the wintering Eastern Greenland/Iceland/UK population (winter peak means) [favourable maintained]

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 51,265 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: redshank *Tringa totanus*, lapwing *Vanellus vanellus*, eider *Somateria mollissima*, pink-footed goose *Anser brachyrhynchus* [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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Fowlsheugh SPA	
Location	Grid Ref: NO889805 (central point) Latitude 56°55'00" N Longitude 02°10'56" W
Area (ha)	1,303.54
Summary	Buchan Ness to Collieston Coast SPA is located on the coast of Aberdeenshire in north-east Scotland. It is a 15km stretch of south-east facing cliff formed of granite, quartzite and other rocks running to the south of Peterhead, interrupted only by the sandy beach of Cruden Bay. The low, broken cliffs (generally less than 50m high) show many erosion features such as stacks, arches, caves and blowholes. The varied coastal vegetation on the ledges and cliff tops includes maritime heath, grassland and brackish flushes. The site is of importance as a nesting area for a number of seabird species (gulls and auks). These birds feed outside the SPA in the nearby waters, as well as more distantly.
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, 56,450 individuals representing 5% of the Great Britain population (SCRC 1985-1988) [favourable maintained]* Kittiwake *Rissa tridactyla*, 36,650 pairs representing 7.5% of the Great Britain population (SCRC 1985-1988) [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 145,000 individual seabirds (SCRC 1985-1988) including: razorbill Alca torda, herring gull Larus argentatus and fulmar Fulmarus glacialis [all favourable maintained except herring gull: 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) • Cumulative and in-combination effects (see Section 7)	

Site Name: Montrose Basin SPA	
Location	Grid Ref: NO691578 (central point) Latitude 56º42'40"N Longitude 02º30'20"W
Area (ha)	984.61
Summary	The Montrose Basin is located on the east coast of Scotland in Angus. It is an enclosed tidal basin fed by the River South Esk and contains areas of mud-flat, marsh and agricultural land, and Dun's Dish, a small eutrophic loch. It is a good natural example of an estuary, relatively unaffected by development, with high species diversity in the intertidal zone and supporting a large population of wintering waterbirds. The site is important for wintering populations of Iceland/Greenland Pink-footed Goose *Anser brachyrhynchus* and Icelandic Greylag Goose *Anser anser*, along with ducks and waders. The geese feed away from the SPA on surrounding agricultural land during the day.

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:

Over winter:
Greylag Goose *Anser anser*, 1,080 individuals representing at least 1.1% of the wintering Iceland/UK/Ireland population (5 year peak mean, 1987/8-1991/2)

Knot *Calidris canutus,* 4,500 individuals representing at least 1.3% of the wintering Northeastern Canada/Greenland/Iceland/Northwestern Europe population (5 year peak mean 1991/2-1995/6)

Pink-footed goose *Anser brachyrhynchus,* 31,622 individuals representing at least 14.1% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2-1995/6)

Redshank *Tringa totanus*, 2,259 individuals representing at least 1.5% of the wintering Eastern Atlantic – wintering population (5 year peak mean 1991/2-1995/6)

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 54,917 individual waterfowl (5 year peak mean 1991/2-1995/6) including: Dunlin *Calidris alpina alpina*, Oystercatcher *Haematopus ostralegus*, Eider *Somateria mollissima*, Wigeon *Anas penelope*, Shelduck *Tadorna tadorna*, Redshank *Tringa totanus*, Knot *Calidris canutus*, Greylag goose *Anser anser,* Pink-footed goose *Anser brachyrhynchus*.

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: Firth of Forth and Tay Bay Complex dSPA	
Location	Grid Ref: NT720299 (central point) Latitude 56º10'69"N Longitude 02º27'08"W
Area (ha)	312,982.11
Summary	N/A
Qualifying features for which the site is to be designated:	
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: **Annex I species:** Red-throated diver Slavonian grebe Little gull Common tern Arctic tern **Migratory species:** Eider Long-tailed duck Common scoter Velvet scoter Goldeneye Red-breasted merganser Northern gannet Manx shearwater Shag Black-legged kittiwake Guillemot Razorbill Puffin Black-headed gull Common gull Herring gull	
Conservation objectives:	
To be announced	
Likely significant effects associated with activities that could follow Block licensing:	
• Accidental spills (see Section 6.3)	

Site Name: Firth of Tay and Eden Estuary SPA	
Location	Grid Ref: NO332245 (central point) Latitude 56º24'30"N Longitude 03º05'00"W
Area (ha)	6,923.29
Summary	The Firth of Tay and Eden Estuary is located on the east coast of central Scotland. The Firth stretches for some 35km along the estuary from near Newburgh to the estuary mouth. For much of its length the main channel of the estuary lies close to the southern shore and the most extensive intertidal flats are on the north side, west of Dundee. In Monifieth Bay, to the east of Dundee, the substrate becomes sandier and there are also Mussel *Mytilus edulis* beds. The south shore consists of fairly steeply shelving mud and shingle. The Inner Tay Estuary is particularly noted for the continuous dense stands of Common Reed *Phragmites australis* along its northern shore. These reedbeds, inundated during high tides, are amongst the largest in Britain. Eastwards, as conditions become more saline, there are areas of saltmarsh, a relatively scarce habitat in eastern Scotland. The site is of importance in summer for breeding terns and Marsh Harrier *Circus aeruginosus*, whilst in the migration periods and in winter the estuary holds major concentrations of waterbirds, especially waders, sea-ducks and geese. Sea-ducks also feed, loaf and roost outside the SPA in the open waters of the Firth.

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:
Little tern *Sterna albifrons*, 44 pairs representing at least 1.8% of the breeding population in Great Britain (Seabird Census Register)

Marsh harrier *Circus aeruginosus*, 4 pairs representing at least 2.5% of the breeding population in Great Britain (1997)

Over winter:
Bar-tailed godwit *Limosa lapponica*, 2,400 individuals representing at least 4.5% of the wintering population in Great Britain (winter peak mean)

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

Over winter:
Greylag goose *Anser anser,* 1,355 individuals representing at least 1.4% of the wintering Iceland/UK/Ireland population (5 year peak mean 1991/2-1995/6)

Pink-footed goose *Anser brachyrhynchus*, 3,769 individuals representing at least 1.7% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2-1995/6)

Redshank *Tringa totanus*, 1,800 individuals representing at least 1.2% of the wintering Eastern Atlantic - wintering population (winter peak mean)

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 34,074 individual waterfowl (5 year peak mean 1991/2-1995/6) including: Velvet scoter *Melanitta fusca*, Pink-footed goose *Anser brachyrhynchus*, Greylag goose *Anser anser,* Redshank *Tringa totanus*, Cormorant *Phalacrocorax carbo*, Shelduck *Tadorna tadorna*, Eider *Somateria mollissima*, Bar-tailed godwit *Limosa lapponica*, Common scoter *Melanitta nigra*, Black-tailed godwit *Limosa limosa islandica*, Goldeneye *Bucephala clangula*, Red-breasted merganser *Mergus serrator*, Goosander *Mergus merganser*, Oystercatcher *Haematopus ostralegus*, Grey plover *Pluvialis squatarola*, Sanderling *Calidris alba*, Dunlin *Calidris alpina alpina*, Long-tailed duck *Clangula hyemalis*.

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: Forth Islands SPA	
Location	Grid Ref: NT522900 (central point) Latitude 56º11'10"N Longitude 02º33'20"W
Area (ha)	9,796.98
Summary	The Firth of Forth Islands are located in or near to the Firth of Forth on the east coast of central Scotland. The SPA comprises a number of separate islands or island groups, principally Inchmickery (together with the nearby Cow and Calves) off Edinburgh, Fidra, Lamb and Craigleith together with the Bass Rock off North Berwick, and the much larger Isle of May in the outer part of the Firth. The site also includes additional other small islands. The inner islands are very low lying whilst those in the outer Firth are higher, steeper and rockier. This applies especially to the Bass Rock which is a volcanic plug rising to over 100m, and to the Isle of May, which is surrounded by cliffs up to 50m. The islands support important numbers of a range of breeding seabirds, in particular terns, auks and gulls. The colony of Gannets *Morus bassanus* is the largest on the east coast of the UK. The seabirds feed outside the SPA in nearby waters, as well as more distantly in the North Sea.

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*, 540 pairs representing at least 1.2% of the breeding population in Great Britain (Mean 1992 to 1996)

Common tern *Sterna hirundo*, 800 pairs representing at least 6.5% of the breeding population in Great Britain (Seabird Census Register)

Roseate tern *Sterna dougallii*, 9 pairs representing at least 15.0% of the breeding population in Great Britain (5 year mean 1994-1998)

Sandwich tern *Sterna sandvicensis*, 22 pairs representing at least 0.2% of the breeding population in Great Britain (5 year mean, 1993-1997)

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*, 34,400 pairs representing at least 13.1% of the breeding North Atlantic population (Count, as at 1994)

Lesser black-backed Gull *Larus fuscus*, 2,920 pairs representing at least 2.4% of the breeding Western Europe/Mediterranean/Western Africa population (Count, as at 1994)

Puffin *Fratercula arctica*, 21,000 pairs representing at least 2.3% of the breeding population (Count, as at 1992)

Shag *Phalacrocorax aristotelis*, 2,887 pairs representing at least 2.3% of the breeding Northern Europe population (Count as at 1987)

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

During the breeding season, the area regularly supports 90,000 individual seabirds (Three year mean, 1986-1988) including: Razorbill *Alca torda*, Guillemot *Uria aalge*, Kittiwake *Rissa tridactyla*, Herring gull *Larus argentatus*, Cormorant *Phalacrocorax carbo*, Fulmar *Fulmarus glacialis*, Puffin *Fratercula arctica*, Lesser black-backed Gull *Larus fuscus*, Shag *Phalacrocorax aristotelis*, Gannet *Morus bassanus*, Arctic tern *Sterna paradisaea*, Common tern *Sterna hirundo*, Roseate tern *Sterna dougallii*, Sandwich tern *Sterna sandvicensis*.

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: Firth of Forth SPA	
Location	Grid Ref: NS970823 (central point) Latitude 56º00'57"N Longitude 03º15'59"W
Area (ha)	6313.72
Summary	The Firth of Forth is located on the east coast of central Scotland. It is a complex estuarine site, stretching for over 100km from the River Forth at Stirling eastwards past Edinburgh and along the coasts of Fife and East Lothian to a wide estuary mouth. A wide range of coastal and intertidal habitats is found within the site, including saltmarshes, dune systems, maritime grasslands, heath and fen, cliff slopes, shingle and brackish lagoons. Extensive mud-flats occur particularly in the Inner Firth, notably at Kinneil Kerse and Skinflats on the south shore and Torry Bay on the north shore. Typically, the flats support a rich invertebrate fauna, with Eelgrass *Zostera* spp. growing on the main mud-flats, both features providing important food sources for the large numbers of migrating and wintering waterbirds that depend on the estuary. In the Outer Firth, the shoreline diversifies, with sandy shores, some rocky outcrops, mussel beds and some artificial sea walls. The North Berwick coast includes cliffs and dune grassland, with extensive dune systems at Aberlady. The Firth is of major importance for a rich assemblage of waterbirds in the migration periods and through the winter, including divers, sea-ducks, geese, other ducks, waders and terns. Some of these species, notably the sea-ducks and divers, also feed, loaf and roost outside the SPA in the open waters of the estuary.

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:

On Passage:
Sandwich tern *Sterna sandvicensis*, 1,611 individuals representing at least 3.8% of the population in Great Britain

Over winter:
Bar-tailed Godwit *Limosa lapponica*, 2,600 individuals representing at least 4.9% of the wintering population in Great Britain (winter peak mean)

Golden Plover *Pluvialis apricaria*, 2,970 individuals representing at least 1.2% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

Red-throated Diver *Gavia stellata*, 88 individuals representing at least 1.8% of the wintering population in Great Britain (WeBS 1992 to 1997 mean)

Slavonian Grebe *Podiceps auritus*, 71 individuals representing at least 17.8% of the wintering population in Great Britain (5 year mean 1992/3-1996/7)

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

Over winter:
Knot *Calidris canutus*, 8,013 individuals representing at least 2.3% of the wintering Northeastern Canada/Greenland/Iceland/Northwestern Europe population (winter peak mean)

Pink-footed Goose *Anser brachyrhynchus*, 12,400 individuals representing at least 5.5% of the wintering Eastern Greenland/Iceland/UK population (winter peak mean)

Redshank *Tringa totanus*, 3,700 individuals representing at least 2.5% of the wintering Eastern Atlantic - wintering population (winter peak mean)

Shelduck *Tadorna tadorna*, 3,586 individuals representing at least 1.2% of the wintering Northwestern Europe population (winter peak mean)

Turnstone *Arenaria interpres*, 1,286 individuals representing at least 1.8% of the wintering Western Palearctic - wintering population (winter peak mean)

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl
Assemblage qualification: A wetland of international importance.

Over winter, the area regularly supports 86,067 individual waterfowl (WeBS 1991/2-95/6) including: Scaup *Aythya marila*, Slavonian Grebe *Podiceps auritus*, Golden Plover *Pluvialis apricaria*, Bar-tailed Godwit *Limosa lapponica*, Pink-footed Goose *Anser brachyrhynchus*, Shelduck *Tadorna tadorna*, Knot *Calidris canutus*, Redshank *Tringa totanus*, Turnstone *Arenaria interpres*, Great Crested Grebe *Podiceps cristatus*, Cormorant *Phalacrocorax carbo*, Red-throated Diver *Gavia stellata*, Mallard *Anas platyrhynchos*, Curlew *Numenius arquata*, Eider *Somateria mollissima*, Long-tailed duck *Clangula hyemalis*, Common Scoter *Melanitta nigra*, Velvet Scoter *Melanitta fusca*, Goldeneye *Bucephala clangula*, Red-breasted Merganser *Mergus serrator*, Oystercatcher *Haematopus ostralegus*, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*,

Site Name: Firth of Forth SPA
Lapwing *Vanellus vanellus*, Dunlin *Calidris alpina alpina*, Wigeon *Anas penelope*.
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)

C1 Special Areas of Conservation

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) • Cumulative and in-combination effects (see Section 7)	

Site Name: Sanday SAC	
Location	Grid Ref: HY715442 (central point) Latitude 59º17'00"N Longitude 02º30'00"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* [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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Moray Firth SAC	
Location	Grid Ref: NH976821 (central point) Latitude 57°49'00"N Longitude 03°43'36"W
Area (ha)	151,341.67
Summary	The Moray Firth SAC is one of the largest marine SACs in the UK. The designated site lies west of a line between Helmsdale on the Sutherland coast and Lossiemouth on the Moray coast and includes the Beauly/Inverness Firths, and the outer reaches of the Dornoch and Cromarty Firths. The Moray Firth supports the only known resident population of bottlenose dolphin in the North Sea.

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

Annex I Habitat
Primary feature: None
Secondary features: Sandbanks which are slightly covered by sea water all the time [favourable maintained]

Annex II Species
Primary features: Bottlenose dolphin *Tursiops truncatus* [favourable recovered]
Secondary features: None

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitat (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 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 (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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Dornoch Firth and Morrich More SAC	
Location	Grid Ref: NH788863 (central point) Latitude 57°51'00"N Longitude 04°02'30"W
Area (ha)	8,700.53
Summary	The Dornoch Firth is the most northerly complex estuary in the UK. Situated on the Scottish east coast, the estuary contains extensive areas of soft coastal features of international importance including saltmarshes, dunes and mudflats and sandflats. The area supports a good population of otters in what is the only east coast estuarine site selected for the species in Scotland. The estuary is also home to a significant proportion of the inner Moray Firth population of the harbour seal. Their numbers represent almost 2% of the UK population.

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

Annex I Habitat
Primary features: Estuaries, mudflats and sandflats not covered by seawaters at low tide, *Salicornia* and other annuals colonising mud and sand [favourable maintained], Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [favourable maintained], embryonic shifting dunes [favourable maintained], shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') [favourable maintained], fixed dunes with herbaceous vegetation ('grey dunes') (*priority feature*) [unfavourable no change], decalcified fixed dunes with *Empetrum nigrum* (*priority feature*) [unfavourable no change], Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) (*priority feature*), humid dune slacks [favourable maintained], coastal dunes with *Juniperus* spp. (*priority feature*) [unfavourable no change]
Secondary features: Sandbanks which are slightly covered by sea water all the time, reefs [both favourable maintained]

Annex II Species
Primary features: Otter *Lutra lutra* [favourable maintained], harbour seal *Phoca vitulina* [unfavourable recovering]
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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Culbin Bar SAC	
Location	Grid Ref: NH940613 (central point) Latitude 57º37'35"N Longitude 03º46'36"W
Area (ha)	612.88
Summary	Historically, Culbin Bar in north-east Scotland formed part of the same shingle aggregation as Lower River Spey – Spey Bay to the east. Although sea-level rise has separated the sites, they are still linked, being maintained by the same coastal processes. Culbin Bar and the Lower River Spey – Spey Bay are, individually, the two largest shingle sites in Scotland and together form a shingle complex unique in Scotland. They represent Perennial vegetation of stony banks in the northern part of its range in UK. Culbin Bar is 7km long. It has a series of shingle ridges running parallel to the coast that support the best and richest examples of northern heath on shingle. Dominant species are heather *Calluna vulgaris*, crowberry *Empetrum nigrum* and juniper *Juniperus communis*. The natural westward movement of the bar deposits new ridges for colonisation. Being virtually unaffected by damaging human activities, Culbin Bar is an example of a system with natural structure and function.

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

Annex I Habitat
Primary feature: Perennial vegetation of stony banks [favourable maintained]
Secondary features: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [unfavourable declining], Embryonic shifting dunes [unfavourable declining]

Annex II Species
Primary features: None
Secondary features: None

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitat (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 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

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

- Accidental spills (see Section 6.3)

Site Name: Lower River Spey – Spey Bay SAC	
Location	Grid Ref: NJ334650 (central point) Latitude 57º40'12"N Longitude 03º07'00"W
Area (ha)	652.6
Summary	Historically, Lower River Spey – Spey Bay in north-east Scotland formed part of the same shingle aggregation as Culbin Bar to the west. Although sea-level rise has separated the sites, they are still linked, being maintained by the same coastal processes. Lower River Spey – Spey Bay and Culbin Bar are, individually, the two largest shingle sites in Scotland and together form a shingle complex unique in Scotland. They represent this habitat type in the northern part of its range in the UK. Lower River Spey – Spey Bay contains significant areas of both bare and naturally vegetated parallel shingle ridges, although some of these have been planted with trees. The most significant feature of the site is the complex of wet and dry vegetation types, depending on the physical relief of the shingle ridges and hollows. Species-rich dry heath and grassland occurs on the ridges, while in the wetter hollows there is species-rich wet heath and transitions to a vegetation type comparable to that of dune slacks. Large areas of scrub, mainly of gorse *Ulex europaeus*, also occur. The Lower River Spey in north-east Scotland is unique within Britain in comprising an extensively braided channel along the whole length of the river. The active river channel provides a mosaic of substrates, and in more stable, damper situations large stands of valley alder *Alnus glutinosa* woods occur, along with willows *Salix* spp., ash *Fraxinus excelsior* and bird cherry *Prunus padus*. The ground flora includes both southern and northern elements such as wood speedwell *Veronica montana* and wood stichwort *Stellaria nemorum*.
Qualifying features for which the site is designated [condition]:	
Annex I Habitat **Primary features:** Perennial vegetation of stony banks, Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) **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: Sands of Forvie SAC	
Location	Grid Ref: NK020270 (central point) Latitude 57°19'60"N Longitude 01°58'00"W
Area (ha)	734.05
Summary	Sands of Forvie is one of three sites on the east coast of Scotland which represent the northern part of the UK range of embryonic shifting dunes. It is one of the most geomorphologically active dune systems in the UK, and as a result, the site contains significant representation of dune types associated with shifting sand. Identifiable zones of both lyme-grass *Leymus arenarius* and sand couch *Elytrigia juncea* are present, although, as is common with this habitat type, they may be narrow and discontinuous. The dunes that cover part of Sands of Forvie form one of three sites on the east coast of Scotland selected to represent shifting dunes along the shoreline with *Ammophila arenaria*. They are exceptionally mobile, with large areas of bare sand, and there are extensive areas of this habitat type on the site. The dune heath complex can, in this case, be confidently defined as Decalcified fixed dunes with *Empetrum nigrum*, because crowberry *Empetrum nigrum* is widespread throughout the heath. Free-draining heath is interspersed with a number of wet hollows in which important acidic examples of Annex I type 2190 humid dune slacks are present, typically supporting cross-leaved heath *Erica tetralix*. Early stages in slack development occur, with the dune slack flora characterised by common sedge *Carex nigra* and marsh pennywort *Hydrocotyle vulgaris*. Higher zones have more creeping willow *Salix repens* ssp. *argentea*, which tends to invade and replace the wet heath.

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

Annex I Habitat
Primary features: Embryonic shifting dunes, Shifting dunes along the shoreline with *Ammophila arenaria* "white dunes", Decalcified fixed dunes with *Empetrum nigrum*, Humid dune slacks
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: Barry Links SAC	
Location	Grid Ref: NO538321 (central point) Latitude 56º28'37"N Longitude 02º45'04"W
Area (ha)	789.67
Summary	Barry Links is a virtually intact dune system, composed predominantly of base-poor sand on the east coast of Scotland. The slacks range from species-rich, open types to those with a closed canopy of scrub. The hydrology of the site is well-conserved and successional processes can be seen operating. The site has some morphological similarities to Braunton Burrows, though the range of communities is different owing to the different soil base-status and climate.

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

Annex I Habitat
Primary feature: Embryonic shifting dunes, Shifting dunes along the shoreline with *Ammophila arenaria* "white dunes", fixed coastal dunes with herbaceous vegetation ('grey dunes'), Atlantic decalcified fixed dunes (*Calluno-Ulicetea*), Humid dune slacks.
Secondary features: None

Annex II Species
Primary features: None
Secondary features: None

Conservation objectives:

For Annex I Habitats
To avoid deterioration of the qualifying habitat (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 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

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

- Accidental spills (see Section 6.3)

Site Name: Firth of Tay & Eden Estuary SAC	
Location	Grid Ref: NO420294 (central point) Latitude 56º27'13"N Longitude 02º56'34"W
Area (ha)	15,412.53
Summary	The Firth of Tay and the Eden estuary are two high-quality estuarine areas. The two estuaries have been proposed within a single site because they are integral components of a large, geomorphologically complex area that incorporates a mosaic of estuarine and coastal habitats. The Tay is the least-modified of the large east coast estuaries in Scotland, while the Eden estuary represents a smaller 'pocket' estuary. The inner parts of the estuaries are largely sheltered from wave action, while outer areas, particularly of the Tay, are exposed to strong tidal streams, giving rise to a complex pattern of erosion and deposition of the sandbank feature at the firths' mouth. The sediments within the site support biotopes that reflect the gradients of exposure and salinity, and are typical of estuaries on the east coast of the UK. The abundance, distribution and composition of the associated plant and animal communities are ecologically representative of northern North Sea estuaries.

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

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

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 habitat (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 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 (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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Isle of May SAC	
Location	Grid Ref: NT644999 (central point) Latitude 56º11'25"N Longitude 02º34'25"W
Area (ha)	356.75
Summary	The Isle of May lies at the entrance to the Firth of Forth on the east coast of Scotland. The island is tilted in an easterly direction, gradually sloping down to sea level from the vertical cliffs on the western coast. The cliffs reach a height of 60m and have numerous arches, stacks and caves. Fault lines have divided the island into a number of islets separated by intertidal channels – North Ness, Rona and the main island. The coastline is predominantly rocky with bedrock extending sublittorally onto boulder slopes and cobble and shell gravel plains. Conditions of wave exposure range from sheltered to exposed. Occasional pockets of sediment are restricted to the bays. The island forms a natural sanctuary for seabirds and for an internationally important breeding colony of grey seals, *Halichoerus grypus*.

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

Annex I Habitat
Primary features: None
Secondary features: Reefs [favourable maintained]

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 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: Berriedale and Langwell Waters SAC	
Location	Grid Ref: ND107238 (central point) Latitude 58º11'40"N Longitude 03º31'10"W
Area (ha)	57.62
Summary	The Berriedale and Langwell Waters on the north-east coast of Scotland support small, but high-quality salmon *Salmo salar* populations. The rivers have two separate catchments, but share a short length of river just before they meet the sea. Both rivers are oligotrophic, draining the southern edge of the Caithness and Sutherland peatlands, and show only limited ecological variation along their length. Whilst they are comparatively small rivers and support only a small proportion of the Scottish salmon resource, their long history of low management intervention means that they score highly for naturalness. Recent records indicate that the full range of Atlantic salmon life-history types return to the river, with grilse, spring and summer salmon all being caught.

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

Annex I Habitat
Primary feature: None
Secondary features: None

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 (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 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

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

- Underwater noise (see Section 5.3)
- Accidental spills (see Section 6.3)
- Cumulative and in-combination effects (see Section 7)

Site Name: River Evelix SAC	
Location	Grid Ref: NH744915 (central point) Latitude 57º53'45"N Longitude 04º07'10"W
Area (ha)	20.17
Summary	The Evelix is the only remaining small east coast river in Scotland that supports a surviving functional freshwater pearl mussel *Margaritifera margaritifera* population, particularly within the upper reaches of the river. Mussels have also occur in the lower stretches of the river, but in lower numbers than upstream and with fewer juveniles were present. Pearl-fishing is thought to be the principal reason for the decreased numbers in the lower stretches, but the presence of juveniles in the upper sections indicates that despite losses, the population is successfully recruiting.

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

Annex I Habitat
Primary feature: None
Secondary features: None

Annex II Species
Primary features: Freshwater pearl mussel *Margaritifera margaritifera*
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 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: River Oykel SAC	
Location	Grid Ref: NH494999 (central point) Latitude 57°58'20"N Longitude 04°44'00"W
Area (ha)	960.42
Summary	The Oykel is a long, meandering river in the northern Highlands of Scotland that flows into the Kyle of Sutherland on the east coast. The river supports an excellent, high-quality freshwater pearl mussel *Margaritifera margaritifera* population with high densities recorded at some locations, including a bed numbering several thousand individuals. Surveys have also recorded high percentages of juveniles within the population, indicating that there has been recent successful recruitment. There is also evidence of unsurveyed pearl mussel populations in deep water that may increase the conservation importance of the river.

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

Annex I Habitat
Primary feature: None
Secondary features: None

Annex II Species
Primary features: Freshwater pearl mussel *Margaritifera margaritifera* [unfavourable recovering]
Secondary features: Atlantic salmon *Salmo salar* [unfavourable recovering]

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 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: River Moriston SAC	
Location	Grid Ref: NH297125 (central point) Latitude 57°10'20"N Longitude 04°49'00"W
Area (ha)	194.53
Summary	The River Moriston flows into the northern side of Loch Ness, and supports a functional freshwater pearl mussel *Margaritifera margaritifera* population. Pearl mussels are present from downstream of a hydro-electric dam to the confluence with Loch Ness. Due to illegal pearl-fishing the population is not abundant but survey results show that 40% of the population is composed of juveniles. This is the highest percentage recorded in any Scottish pearl mussel population and indicates that recent successful recruitment has taken place.

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

Annex I Habitat
Primary feature: None
Secondary features: None

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 (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 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: River Spey SAC	
Location	Grid Ref: NJ095319 (central point) Latitude 57°22'15"N Longitude 03°30'00"W
Area (ha)	5,729.48
Summary	The River Spey is a large Scottish east coast river that drains an extensive upland catchment and supports an outstanding freshwater pearl mussel population in its middle to lower reaches. In parts of the River Spey, extremely dense mussel colonies have been recorded (225m^2) and the total population is estimated at several million. As the population also shows evidence of recent recruitment and a high proportion of juveniles, the River Spey is considered to support a pearl mussel population of great international significance. The Spey supports one of the largest Atlantic salmon *Salmo salar* populations in Scotland, with little evidence of modification by non-native stocks. Adults spawn throughout virtually the whole length of the river, and good quality nursery habitat is found in abundance in the main river and numerous tributaries. Salmon in the Spey system are little affected by artificial barriers to migration, and the waters in the catchment are largely unpolluted (the river is oligotrophic throughout its length). For a system of its size, the Spey is also relatively free from flow modifications such as abstractions, diversions and impoundments. The salmon population includes fish of all ages including migrating smolts and returning adults, possibly reflecting genetic differences within the Spey stock. The River Spey represents the sea lamprey *Petromyzon marinus* in the northern part of its range in the UK. Recent surveys show that sea lamprey larvae are widely distributed throughout the middle and lower reaches of the river, where the particularly fast-flowing waters of the River Spey provide ideal spawning conditions for this species. In addition, as an unpolluted and relatively little modified system, the River Spey matches the other key habitat requirements of the sea lamprey in terms of good water quality, clean gravels and marginal silts and an unhindered migration route to the sea. The Spey represents an important otter *Lutra lutra* site in Scotland, with good quality freshwater habitat. Surveys have identified high levels of otter presence throughout the Spey catchment. Riverine habitat features which are known to be important to otters are present, such as reedbeds and islands, and populations of important prey species are relatively healthy. The persistence of a strong population of otter on this river indicates that habitat conditions are particularly favourable for the survival of the species.

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

Annex I Habitat
Primary feature: None
Secondary features: None

Annex II Species
Primary features: Freshwater pearl mussel *Margaritifera margaritifera* [unfavourable recovering], sea lamprey *Petromyzon marinus* [favourable maintained], Atlantic salmon *Salmo salar* [unfavourable recovering], otter *Lutra lutra* [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 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: River Dee SAC	
Location	Grid Ref: NO493981 (central point) Latitude 57º03'20"N Longitude 03º04'30"W
Area (ha)	2,446.82
Summary	The Dee is a major east coast Scottish river, which flows uninterrupted for some 130km from its upland reaches in the high Cairngorms to the North Sea. It supports a functional population of freshwater pearl mussel *Margaritifera margaritifera*, which is common in the Dee, recorded from a location approximately 30km from the river source to approximately 6-7km upstream from its mouth. Juveniles make up approximately 30% of the recorded population, among the highest proportions recorded in Scotland. This indicates that the population is recruiting strongly and is one of the most important in the UK. The River Dee supports a high-quality Atlantic salmon *Salmo salar* population in a river draining a large catchment on the east coast of Scotland. There is a weak nutrient gradient along its length, but it is essentially a nutrient-poor river. The high proportion of the river accessible to salmon has resulted in it supporting the full range of life-history types found in Scotland, with sub-populations of spring, summer salmon and grilse all being present. The headwaters which drain the southern Cairngorm and northern Grampian mountains are particularly important for multi sea-winter spring salmon, but there has been a significant decline in their abundance in recent years. The extensive areas accessible to salmon means the River Dee supports a significant proportion of the Scottish salmon resource. Surveys have indicated that the otter *Lutra lutra* is found throughout Dee catchment, from its mouth at Aberdeen to many of the high-altitude lochs. The river system contains extensive areas of suitable habitat for otter feeding, resting and breeding, including watercourses with a high fish biomass and islands and marshy areas for resting. This is a strong, high quality population, representative of north-east Scotland.

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

Annex I Habitat
Primary feature: None
Secondary features: None

Annex II Species
Primary features: Freshwater pearl mussel *Margaritifera margaritifera* [unfavourable no change], Atlantic salmon *Salmo salar* [favourable maintained], otter *Lutra lutra* [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 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)
- Cumulative and in-combination effects (see Section 7)

Site Name: River South Esk SAC	
Location	Grid Ref: NO450567 (central point) Latitude 56º42'10"N Longitude 02º55'00"W
Area (ha)	478.62
Summary	Freshwater pearl mussels *Margaritifera margaritifera* are abundant in the River South Esk, representing the south-eastern range of the species in Scotland. The pearl mussel population is most abundant in the middle reaches of the river where they attain densities >20m^2. The conservation importance of the site is further increased by the abundance of juveniles which comprise approximately 20% of the population. The presence of juvenile pearl mussels less than 20 mm long indicates that there has been successful recruitment since 1996. The South Esk supports a large, high-quality salmon *Salmo salar* population in a river draining a moderate-sized catchment on the east coast of Scotland. It has a strong nutrient gradient along its length, rising in the nutrient-poor Grampians and flowing for half of its length through the rich agricultural lands of Strathmore. The high proportion of the South Esk which is accessible to salmon and the range of ecological conditions in the river allows it to support the full range of life-history types found in Scotland, with sub-populations of spring, summer salmon and grilse all being present.

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

Annex I Habitat
Primary feature: None
Secondary features: None

Annex II Species
Primary features: Freshwater pearl mussel *Margaritifera margaritifera* [unfavourable declining], 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 (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 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)
- Cumulative and in-combination effects (see Section 7)

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

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