DEPARTMENT OF ENERGY & CLIMATE CHANGE

Offshore Oil & Gas Licensing

25th Seaward Round

Outer Moray Firth
Blocks 12/16a, 12/17c, 12/22b and 12/23b

Phase 2 Screening/
Appropriate Assessment

February 2010

CONTENTS

1 INTRODUCTION

1.1 Background and purpose

On 20th February 2008, the Secretary of State for Energy and Climate Change (through the Department of Energy and Climate Change, DECC) (then as the Secretary of State for Business, Enterprise and Regulatory Reform, BERR) invited applications for licences in the 25th Seaward Licensing Round.

To comply with obligations under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended) (OPAR 2001), in summer 2008, 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 European conservation site, either individually or in combination with other plans or projects (DECC 2008).

In so doing, the test set out by the European Court of Justice in the ***Waddenzee*** case (Case C-127/02) was applied, as follows:

> Any plan or project not directly connected with or necessary to the management of a site must be subject to an Appropriate Assessment 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.

An initial screening assessment (including consultation with the statutory agencies/bodies), identified 46 Blocks as requiring further assessment prior to decisions on whether to grant licences. Because of the wide distribution of these Blocks around the UKCS, the second phase of screening and, where necessary, the Appropriate Assessments (AA), in respect of each potential licence award, are contained in four regional reports as follows:

- Southern North Sea
- Eastern Irish Sea
- Outer Moray Firth
- West of Orkney and the Wyville Thomson Ridge/Darwin Mounds area

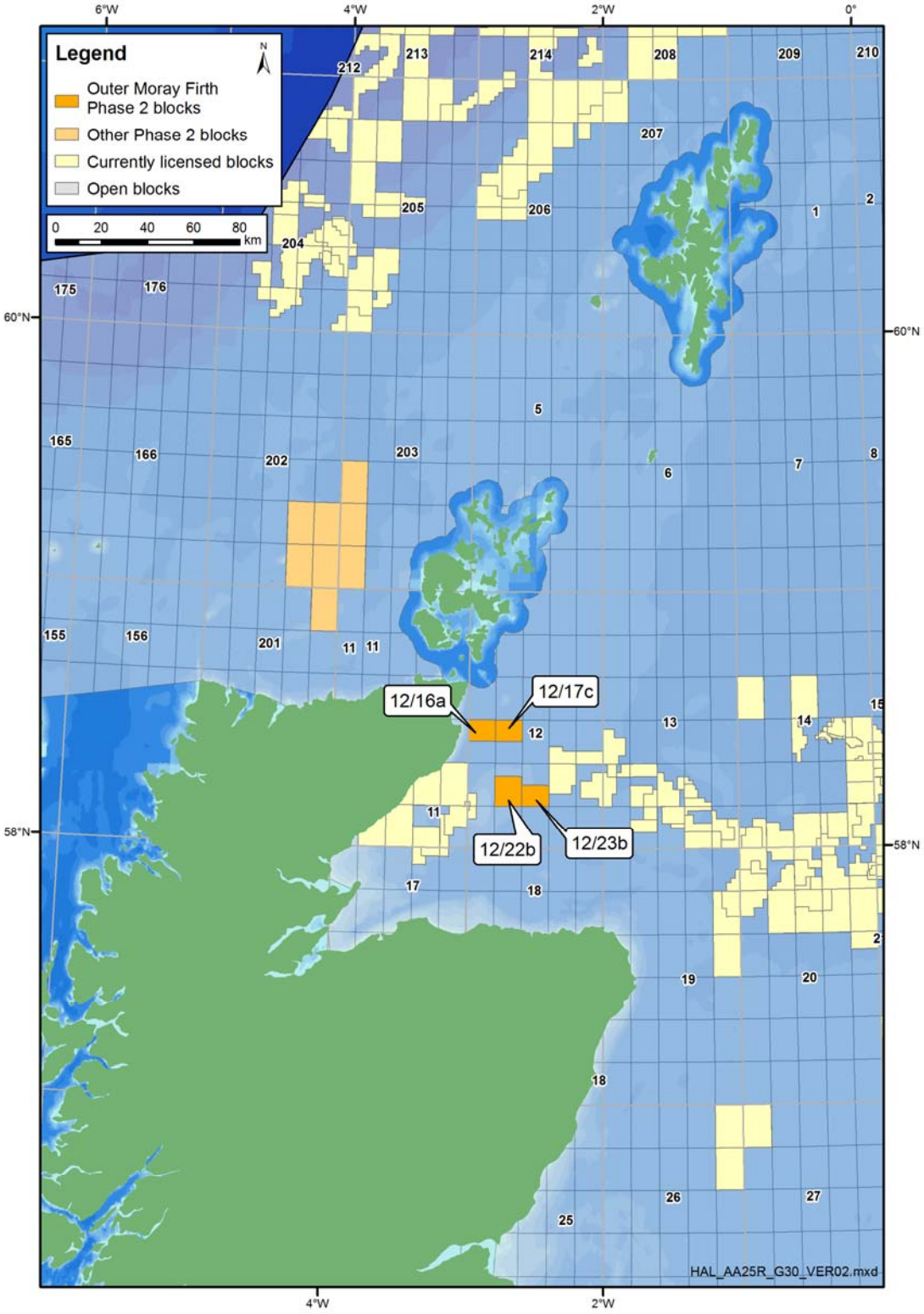
This report documents the further assessment in relation to four Blocks in the outer Moray Firth area (see Section 1.2).

1.2 Outer Moray Firth Blocks

The outer Moray Firth Blocks applied for in the 25th Round and considered in this document are listed below and shown in dark orange in Figure 1.1 overleaf.

- 12/16a
- 12/17c
- 12/22b
- 12/23b

Figure 1.1 – Location of outer Moray Firth Blocks



2 LICENSING AND ACTIVITY

2.1 Licensing

The exclusive rights to search for, 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* gives the Secretary of State the power to grant licences to explore for and exploit such petroleum. A Seaward Production Licence grants exclusive rights to the holders "to search and bore for, and get, petroleum" in the area covered by the licence, which may be the whole or part of a specified Block or a group of Blocks.

There are three types of Seaward Production Licences:

- **Traditional Production Licences** are the standard type of Seaward Production Licences and run for three successive periods or Terms. Each licence expires automatically at the end of each Term, unless the Licensee has made enough progress to earn the chance to move into the next Term. The Initial Term lasts for four years and the licence will only continue into a Second Term of four years if the agreed Work Programme has been completed and if 50% of the acreage has been relinquished. The licence will only continue into a Third Term of 18 years if a development plan has been approved, and all the acreage outside that development has been relinquished.

- **Frontier Production Licences** are a variation of the Traditional Production Licence with four Terms rather than three. A Frontier Production Licence has a longer exploration phase (six years as opposed to four) with the objective of allowing companies to screen larger areas, during a three year Initial Term so they can look for a wider range of prospects. At the end of the Initial Term, the Licensee must relinquish 75% of the licensed acreage. The Second Term lasts three years at the end of which (i.e. when the licence is six years old), the exploration Work Programme must have been completed and the Licensee must relinquish, 50% of what is left (i.e. leaving one eighth of the original licensed area). In this sense, the end of a Frontier Licence's Second Term corresponds to the end of a Traditional Licence's Initial Term.

- In the 21st Offshore Oil and Gas Licensing Round (2002) the then Department of Trade and Industry introduced **Promote Licences**. The general concept of the Promote Licence is that the Licensee is given two years after award to attract the technical, environmental and financial capacity to complete an agreed Work Programme. In effect, DECC will defer (not waive) its financial, technical and environmental checks until the preset Check Point. Promote Licensees are not allowed to carry out field operations until they have met the full competence criteria. The way this is implemented is that each Promote Licence carries a "Drill-or-Drop" Initial Term Work Programme. The licence will therefore expire after two years if the Licensee has not made a firm commitment to DECC to complete the Work Programme (e.g. to drill a well). By the same point, it must also have satisfied DECC of its technical, environmental and financial capacity to do so.

- The terms and conditions of the licences to be granted in this Licensing Round are contained in the *Petroleum Licensing (Production) (Seaward Areas) Regulations 2008* (SI 2008/225).

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

2.2 Activity

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

- A **Firm Drilling Commitment** is a commitment to the Secretary of State to drill a well. Applicants are required to make firm drilling commitments on the basis that, if there were no such commitment, the Secretary of State could not be certain that potential licensees would make full use of their licences. However, the fact that a licensee has been awarded a licence on the basis of a "firm commitment" to undertake a specific activity should not be taken as meaning that the licensee will actually be able to carry out that activity. This will depend upon the outcome of all relevant environmental assessments.

- A **Contingent Drilling Commitment** is also a commitment to the Secretary of State to drill a well, but it includes specific provision for DECC to waive the commitment in light of further technical information.

- A **Drill-or-Drop (D/D) Drilling Commitment** is conditional with the proviso, discussed above, that the licence is relinquished if a well is not drilled.

Note that Drill or Drop and Contingent work programmes (subject to further studies by the Licensees) will probably only result in an actual well being drilled in less than 50% of the cases.

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. Field activities, such as seismic survey or drilling, are subject to further individual controls by DECC, 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 approach used here has been to take the proposed activity for a given Block as being the maximum of any application for that Block, and to assume that all activity takes place as a result of the structuring of licences. The estimates of work commitments for the Blocks derived by DECC from the range of applications received are as follows:

- 12/16a & 12/17c - obtain 2D and 3D seismic with drill or drop well
- 12/22b - obtain 2D seismic, Atomic Dielectric Resonance (ADR) scanner survey with drill or drop well
- 12/23b - ADR survey with drill or drop well

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). Discoveries that are developed may require further drilling, wellhead infrastructure, pipelines and possibly production facilities such as platforms, although most recent developments are tiebacks to existing production facilities rather than stand alone developments.

The extent and timescale of development, if any, which may ultimately result from the licensing of these Blocks is therefore uncertain.

3 RELEVANT NATURA 2000 SITES

Relevant Natura 2000 sites (also referred to as 'European Sites') considered in this screening/assessment include coastal, marine and offshore Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), whose location in relation to the four Blocks (see Section 1.2 above) which have been applied for, indicate the possibility of interactions.

Guidance on selection of the relevant Natura 2000 sites is given by Planning Policy Statement 9 (ODPM 2005) which states that: "*The Habitats Regulations do not provide statutory protection for potential Special Protection Areas (pSPAs) or to candidate Special Areas of Conservation (cSACs) before they have been agreed with the European Commission. For the purposes of considering development proposals affecting them, as a matter of policy, the Government wishes pSPAs and cSACs included in a list sent to the European Commission, to be considered in the same way as if they had already been classified or designated*."

In accordance with Government policy (as set out in PPS9 and above), the relevant sites considered in this screening/assessment include classified and potential SPAs, designated and candidate SACs. The relevant sites include:

- Coastal and marine Natura 2000 sites along the Scottish mainland coast and islands from Cape Wrath to the Tay (including the Moray Firth SAC), and Orkney and Shetland.
- Inland SPAs for breeding red-throated diver (*Gavia stellata*) which forage in neighbouring coastal waters off the Scottish mainland and islands from Cape Wrath to the Tay and Orkney and Shetland.
- Riverine SACs within the area for migratory fish and/or the freshwater pearl mussel.

There are no offshore Natura 2000 sites (i.e. sites located in the UK's offshore marine area[1]) which it is considered are relevant with respect to the identification of potential effects from licensing or activity in the four outer Moray Firth Blocks under consideration. The closest offshore SAC, the Scanner pockmark, lies approximately 200km to the east.

Summaries of the sites, together with their features of interest, and location maps are given in Appendix A (Maps A.1 and A.2 and Tables A.1 to A.4).

[1] Defined (in the *Offshore Marine Conservation (Natural Habitats, & c.) Regulations, 2007 (as amended)*) as: (a) any part of the seabed and subsoil situated within the UK's Continental Shelf (the area designated under section 1(7) of the Continental Shelf Act 1964); and (b) any part of the waters within British fishery limits (except the internal waters of, and the territorial sea adjacent to, the United Kingdom, the Channel Islands and the Isle of Man).

4 PHASE 2 SCREENING

The Phase 2 screening assessed the potential implications for Natura 2000 sites of the award of licences for the four UKCS Blocks listed in Section 1.2 in the 25th Licensing Round. The award of such licences may or may not give rise to subsequent development activity, the implications of which have been considered in this screening as far as possible. Where relevant, such future activities will themselves be subject to the screening procedure and tests under the Habitats Directive.

An initial screening assessment identified these Blocks as requiring further screening and potentially AA prior to licences being granted (DECC 2008). This is due to the potential for a significant effect on listed habitats or species from a consideration of the geographic location of the Blocks in relation to the sites, and the general characteristics of habitat and species present.

For all four outer Moray Firth Phase 2 Blocks, no new information has become available, which would alter the conclusions of the November 2008 screening. Therefore, it is considered that all four Blocks require AA.

It is noted that seaward extensions to a number of the relevant seabird colony SPAs are proposed.

5 ASSESSMENT OF THE EFFECTS OF THE PROJECT OR PLAN ON SITE INTEGRITY

5.1 Process

In carrying out this AA so as to determine whether it is possible to grant licences in accordance with Regulation 5(1) of OPAR 2001 (as amended), DECC:

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

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

- Produced a draft AA Report for consultation with its statutory advisors.

- Will consider whether, in the light of comments received, it is possible to go ahead with the plan.

In considering the above, DECC used the tests set out by the ECJ in the *Waddenzee* case, namely 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. That is the case where no reasonable scientific doubt remains as to the absence of such effects.

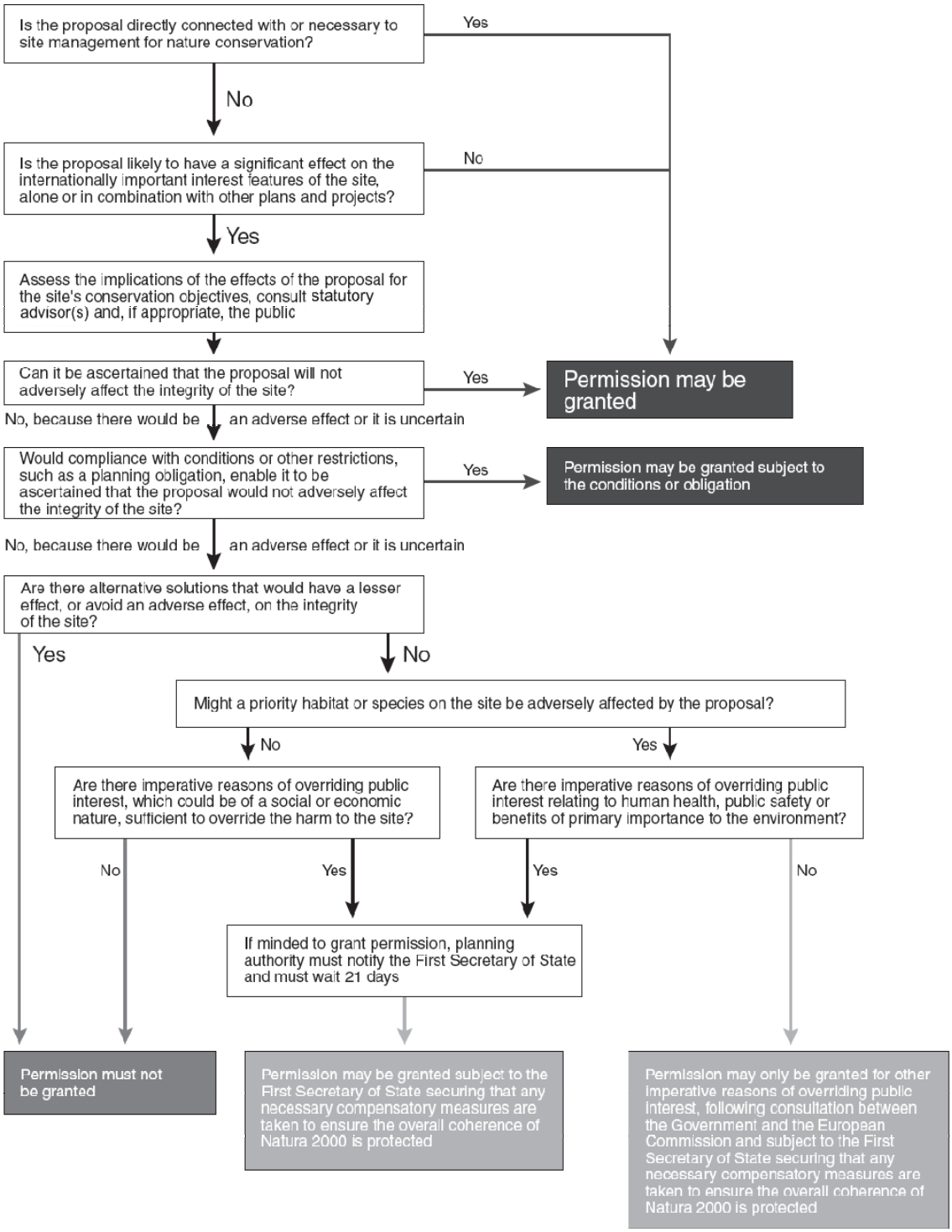
A flowchart summarising the process is shown in Figure 5.1.

Site integrity

Site integrity is defined by the ODPM Circular 06/2005 to accompany PPS9 (ODPM 2005b) as follows: "The integrity of a site is 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." As clarified by Section 4.6.3 of the EC Guidance (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. 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 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), 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. For sites

where the potential for adverse affects has been identified, their conservation objectives are listed in full within Appendix C.

Figure 5.1 - Summary of procedures under the Habitats Directive for consideration of plans or projects affecting Natura 2000 sites



Note: 'Statutory advisor(s)' refers to the relevant statutory Government advisor(s) on nature conservation issues. Source: After ODPM (2005b).

5.2 Assessment

The approach to ascertaining the absence or otherwise of adverse effects on the integrity of a European Site is set out in Section 5.1 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), the Planning and Policy Statement note 9 (ODPM 2005a & b) and English Nature Research Reports, No 704 (Hoskin & Tyldesley 2006).

Appendix A lists, maps and summarises the relevant European Sites as defined in Section 3. Appendix B then presents the results of a screening exercise of these sites to identify the potential effects of activities that could follow the licensing of Blocks 12/16a, 12/17c, 12/22b and 12/23b during the 25th Round. Where potential effects are identified, more detailed information on the relevant sites is provided in Appendix C.

Detailed assessments are made in Sections 6-9 of the implications for the integrity of the relevant European Sites and their qualifying features and species, were a licence for any of the four outer Moray Firth Blocks to be granted. The assessment is based on an indication of the potential work programme for the block and likely hydrocarbon resources if present, along with the characteristics of the relevant sites as described in the Appendices. As noted in Section 2.2, the potential work programme is taken as the maximum of any application for that Block; however, on past experience, less activity actually takes place than is bid at the licence application stage. Activities which may be carried out following the grant of a licence, and which by themselves or in combination with other activities can affect the conservation objectives of relevant European Sites, are discussed under the following broad headings:

- Oil spills (including all liquid phase hydrocarbons)
- Physical disturbance and other effects (e.g. pipeline trenching, marine discharges)
- Underwater noise (in particular, seismic surveys)
- In-combination effects (e.g. cumulative and synergistic and secondary/indirect effects).

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. The Regulation 33 Advice 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 EIA and permitting processes they are mitigated by timing, siting or technology requirements (or a combination of one or more of these). There is an expectation that these options would be evaluated in the environmental assessments required as part of activity consenting.

6 CONSIDERATION OF POTENTIAL EFFECTS FROM OIL SPILLS ON RELEVANT SITES

6.1 Overview of spill effects and context

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 25th Round, including the recent Offshore Energy SEA. Previous SEAs have concluded that in relation to existing exposure to risk as a result of shipping, the incremental risk associated with exploration and production (E&P) is moderate or low.

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*).

Direct mortality of seabirds in the event of oil spill is highly relevant in the context of coastal breeding sites classified as SPAs (and possible SPA extensions). Waterbird vulnerability to surface pollution has been quantified for each month on a block by block basis by JNCC in terms of the Offshore Vulnerability Index (OVI).

For activities in proximity to sensitive shorelines, the Department's guidance (DTI 2002) requires that the risk of shoreline contamination be determined through an appropriate risk assessment, and operators with oil spill scenarios which suggest that a potential spill could impact the shoreline must have access to appropriate oil spill response resources suitable for shoreline clean-up operations. These resources should be capable of mobilising to prioritised locations within the estimated beaching time established through oil spill modelling under worst case conditions (normally a 30 knot onshore wind).

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 European Sites by activities resulting from the proposed licensing of the four outer Moray Firth Blocks in the 25th Round. As risks tend to be generic between sites, these have been categorised based on ecological sensitivity and an evaluation of spill probability and severity.

6.2 Spill risk

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.

Historical spill scenarios and frequency

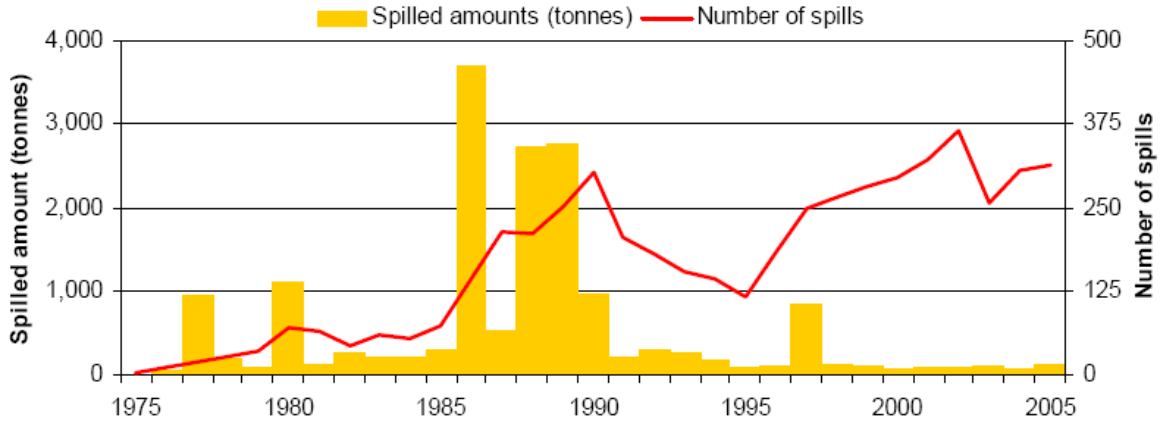
Hydrocarbon spills have been reported from exploration and production facilities on the UKCS since 1974 under PON1 (formerly under CSON7). Well control incidents (i.e. "blowouts" involving uncontrolled flow of fluids from a wellbore or wellhead) have been too infrequent on the UKCS for a meaningful analysis of frequency based on historic UKCS

data. The only significant blowouts on the UKCS to date have been from West Vanguard (1985) and Ocean Odyssey (1988), both involving gas.

The major 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. A large proportion of reported oil spills in recent years (since about 1990) have resulted from process upsets (leading to excess oil in produced water).

Analysis of statistics of oil spills from the oil and gas industry (UKOOA 2006) showed that from 1975 to 2005, for every million tonnes of oil equivalents (TOE) produced on the UKCS, an average of 0.94 spills occurred, and with those the discharge of 3.06 tonnes of oil. An increasing trend in the number of reported spills occurred over the period 1975-1990 followed by a downward trend from 1991-1995 and an upward trend thereafter (see Figure 5.1). The latter trend reflects a lower level of overall production with an increasing number of smaller fields (UKOOA 2006).

Figure 5.1 - Number and volume of reported oil spills from UKCS oil and gas installations over the period 1975-2005



Source: UKOOA (2006)

Over the period 1975-2005, 46% of all oil spills were of crude oil, 18% diesel, 8% hydraulic oil, 4% oily water, 2% condensate and 8% of unknown type. The relative number of diesel, condensate and hydraulic oil spills has increased over the past 10 years. A shift can also be observed towards smaller oil spill volumes over the years. In the period 1975-1981, most spills were between 1 and 10 tonnes; between 2000 and 2005, most spills were between 1 and 100kg. This indicates that the oil spill risk (a function of likelihood and spill size) of the offshore oil and gas industry has reduced over the years. This trend is even clearer when the data are normalised against the number of fields in production (UKOOA 2006).

An annual review of reported oil and chemical spills in the UKCS – covering both vessels and offshore installations – is made on behalf of the Maritime and Coastguard Agency (MCA) by the Advisory Committee on Protection of the Sea (e.g. ACOPS 2008). This includes all spills reported by POLREP reports by the MCA and PON1 reports to DECC. A total of 280 accidental discharges were attributed to oil and gas installations during 2007; this figure is the same as the mean annual total over the period 2000-2006. Of these 280 discharges, 65% were fuel, lubrication or hydraulic oils; additionally, of the 276 discharges with volume information, 95% were less than 455 litres. A total of 42 discharges of 2 tonnes or more originating from offshore oil and gas installations were reported during 2007; the

vast majority of these consisted of non-oil chemicals and hydraulic fluids, with only 6.62 tonnes of crude, 3.67 tonnes of diesel and 51.86 tonnes of OBM spilled (ACOPS 2008).

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 2003 was 0.0001 litres). 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 2006 totalled 4,356 tonnes.

Historic major spill events from UKCS production facilities include the 1986 Claymore pipeline leak (estimated 3,000 tonnes), 1988 Piper Alpha explosion (1,000 tonnes), 1996 Captain spill (685 tonnes) and 2000 Hutton TLP spill (450 tonnes). Although potentially significant at a local scale, these volumes are minor when compared to other inputs of oil to the marine environment, such as riverine inputs (OSPAR 2000).

Trajectory and fate of spilled oil

The main oil weathering processes following a surface oil spill are spreading, evaporation, dispersion, emulsification, dissolution, oxidation, sedimentation and biodegradation. The anticipated reservoir hydrocarbon type in the outer Moray Firth Blocks is oil. 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 would disperse naturally in about 8 hours and travel some 24km under extreme conditions of a constant unidirectional 30 knot wind.

Coincident with these weathering processes, surface and dispersed oil will be transported as a result of tidal (and other) currents, wind and wave action. Although strong winds can come from any direction and in any season, the predominant winds in the UK are from the southwest which for the outer Moray Firth Blocks would push spilled oil away from the coast. To support environmental assessments of individual drilling or development projects, modelling is usually carried out for a major crude oil release, corresponding to a blowout, and for smaller diesel or fuel oil releases which are expected to be less persistent. Representative modelling cases from various parts of the UKCS have been reviewed by successive SEAs.

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 and loss of insulating properties, and ingestion of oil during preening. Pollution of the sea by oil, predominantly from merchant shipping, can be a major cause of seabird mortality. Although locally important numbers of birds have been killed on the UKCS directly by oil spills from tankers, for example common scoter off Milford Haven following the Sea Empress spill in 1996, population recovery has generally been rapid. Chronic pollution resulting from illegal dumping or tank washing probably has a greater chronic impact on seabirds than accidental spills from shipping casualties.

The Offshore Vulnerability Index (OVI) developed by JNCC (Williams *et al*. 1994) is used to assess the vulnerability of bird species to surface pollution; it considers four factors:

- the amount of time spent on the water
- total biogeographical population
- reliance on the marine environment
- potential rate of population recovery

Vulnerability scores for offshore areas are determined by combining the density of each species of bird present with its vulnerability index score. Of the species commonly present offshore in UK offshore waters, gannet, skua and auk species may be considered to be most vulnerable to oil pollution due to a combination of heavy reliance on the marine environment, low breeding output with a long period of immaturity before breeding, and the regional presence of a large percentage of the biogeographic population. In contrast, the aerial habits of the fulmar and gulls, together with large populations and widespread distribution, reduce vulnerability of these species.

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.

Oil spill risks to marine mammals have been reviewed by successive SEAs and their supporting technical reports (e.g. Hammond *et al*. 2008, Murphy *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. 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.

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 common seals) and particularly the pupping season (October-December in grey seals and June-July in common 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.

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.

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.

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 macrobenthic 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 has been conducted, 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).

Those coastal and marine Annex I habitats which are most sensitive to oil spills are identified in Table 5.1, below. Generally, sheltered habitats of lower exposure to wave energy are considered most vulnerable; oil may persist for considerable periods of time in such environments.

6.3 Implications for relevant European Sites

Potentially affected sites have been screened in Appendix B and all sites where the potential for effects were identified are listed in detail in Appendix C. The identification of potential effects from oil spills on specific European Sites considers the following factors:

- The ecological sensitivity of the qualifying feature(s) to oil spills
- Oil spill probability and severity (taking into account distance from blocks under offer, and probable hydrocarbon type)

Special Areas of Conservation

The ecological sensitivity of the qualifying features of relevant sites to oil spills varies. Several Annex I habitats and Annex II species are not considered to be particularly vulnerable and are not considered further in this assessment; these include:

- **Submerged reefs and sandbanks** – not generally vulnerable to surface oil pollution, except possibly following application of chemical dispersants (generally not permitted in waters shallower than 20m).

- **Lagoons, dunes** – sites above Mean High Water Springs not generally vulnerable to surface oil pollution, except possibly to wind-blown oil or evaporated hydrocarbons.
- **Sea cliffs, sea caves** – generally not considered sensitive due to wave reflection and rapid recovery (e.g. Gundlach & Hayes 1978).
- **Migratory fish** – not generally vulnerable to surface oil pollution due to the absence or paucity of time spent at the water's surface.
- **Terrestrial and freshwater aquatic species** – generally not considered vulnerable to surface oil pollution as not utilising marine or estuarine environments. Includes: narrow-mouthed whorl snail (*Vertigo angustior*), freshwater pearl mussel (*Margaritifera margaritifera*), and non-coastal otter populations (*Lutra lutra*).

Table 6.1 provides information on those categories of Annex I habitats and Annex II species which are potentially vulnerable to oil spills. Those sites where the potential for effects from fuel and/or crude oil spills has been identified (see Appendix B) are listed. Due to the relatively close proximity to each other of the outer Moray Firth Blocks under consideration, site vulnerability is considered relevant for all four Blocks. Note: several sites are represented in more than one risk category.

Table 6.1 - Annex I habitat types and Annex II species potentially vulnerable to oil spills

Mudflats and sandflats
Particularly vulnerable in sheltered areas where wave energy is low. The biological communities associated with these sites are related to the degree of sheltering and subsequent sediment type; sheltered sites with fine, muddy sediments may support a high diversity and abundance of invertebrates and waterfowl. **Sites potentially at risk:** Sanday SAC, Dornoch Firth and Morrich More SAC
Estuaries
Complexes of several subtidal and intertidal habitats with varying freshwater influence. The sediments of estuaries support various biological communities, while the water column provides an important habitat for free-living species, such as fish, and juvenile stages of benthic plants and animals. Estuaries often contain several different Annex I habitats. **Sites potentially at risk:** Culbin Bar SAC, Dornoch Firth and Morrich More SAC
Saltmarshes
Comprise intertidal mud and sandflats colonised by vegetation due to protection from strong wave action. Pioneering saltmarsh vegetation exists where tidal flooding is frequent, with progression to more diverse, stable communities in upper reaches where tidal flooding is less frequent. Upper reaches can be valuable for plants, invertebrates and wintering or breeding waterfowl. **Sites potentially at risk:** Culbin Bar SAC, Dornoch Firth and Morrich More SAC
Inlets and Bays
Large indentations of the coast and generally more sheltered from wave action than the open coast. They are relatively shallow, with water depth rarely exceeding 30m, and support a variety of subtidal and intertidal habitats and associated biological communities. **Sites potentially at risk:** None
Bottlenose dolphins
Sites comprise a variety of marine habitats utilised by bottlenose dolphins (*Tursiops truncatus*) for foraging and other activities, with extensive areas beyond the site boundary also utilised. Vulnerable to oil spills due to their dependence on the sea surface for breathing. **Sites potentially at risk:** Moray Firth SAC

Seals
Designated sites comprise coastal habitats (beaches, estuaries, sandflats and rocky shores) supporting important breeding colonies of common seals (*Phoca vitulina*) and/or grey seals (*Halichoerus grypus*). Seals spend considerable periods of time at these sites during the breeding season and during the moult. Seals forage for prey in surrounding waters and also travel considerable distances beyond the boundaries of sites (particularly grey seals). **Sites potentially at risk:** Faray and Holm of Faray SAC, Sanday SAC, Dornoch Firth and Morrich More SAC
Coastal otters
Sites contain shallow, inshore coastal areas utilised by important populations of otter (*Lutra lutra*) for feeding. **Sites potentially at risk:** Dornoch Firth and Morrich More SAC

Special Protection Areas

Table 6.2 provides information on those SPA types which are potentially vulnerable to oil spills. Those sites where the potential for effects from fuel and/or crude oil spills has been identified (see Appendix B) are listed. Due to the relatively close proximity to each other of the outer Moray Firth Blocks under consideration, site vulnerability is considered relevant for all four Blocks. Note: several sites are represented in more than one risk category.

Note: while Switha SPA and Caithness Lochs SPA fall under the category of *firths, lochs and estuaries supporting wintering waterfowl*, they are not considered to be vulnerable to oil spills and are not listed in Table 6.2. The qualifying geese and swan species use the sites for roosting and primarily forage in surrounding agricultural and freshwater wetland habitats; their use of adjacent marine environments is very limited.

Table 6.2 - SPA types potentially vulnerable to oil spills

Cliff-breeding seabird colonies
Designated for colonial breeding seabirds (including auks, fulmar, kittiwake, cormorant, and gannet) which nest either on, or generally associated with sea cliffs. Birds extensively utilise adjacent coastal waters for a variety of activities, and also forage beyond site boundaries. In Scotland, these sites are typically subject to proposed seaward extensions of 1-2km. **Sites potentially at risk:** Fair Isle SPA, Hoy SPA, Calf of Eday SPA, Copinsay SPA, North Caithness Cliffs SPA, East Caithness Cliffs SPA, Troup, Pennan and Lion's Heads SPA
Petrel, tern, skua or gull breeding populations
Designated for breeding seabirds, which generally forage over sea areas adjacent to (or in some cases at considerable distance from) breeding sites. In Scotland, several of these sites are subject to proposed seaward extensions. **Sites potentially at risk:** Fair Isle SPA, Pentland Firth Islands SPA, Hoy SPA, Calf of Eday SPA, Auskerry SPA, Copinsay SPA, East Caithness Cliffs SPA, Cromarty Firth SPA, Inner Moray Firth SPA, Troup, Pennan and Lion's Heads SPA, Loch of Strathbeg SPA
Red-throated diver breeding populations utilising coastal waters
Inland sites designated for breeding red-throated diver (*Gavia stellata*) which forage in neighbouring coastal waters. **Sites potentially at risk:** Orkney Mainland Moors SPA, Hoy SPA, Caithness and Sutherland Peatlands SPA

Open coastline supporting wintering waders and seaduck
Contain coastal and intertidal habitats which support a variety of wintering waders and seaduck, often in large aggregations. The birds feed on wetlands and the surrounding shallow waters. **Sites potentially at risk:** East Sanday Coast SPA, Moray and Nairn Coast SPA
Firths, lochs and estuaries supporting wintering waterfowl
Contain enclosed and semi-enclosed coastal and intertidal habitats (particularly wetlands) supporting a variety of wintering waterfowl and waders, often in large aggregations. Some species (e.g. seaducks) feed beyond the boundaries of sites. **Sites potentially at risk:** Dornoch Firth and Loch Fleet SPA, Cromarty Firth SPA, Inner Moray Firth SPA, Loch Eye, Loch of Strathbeg SPA

6.4 Regulation, contingency planning and response capabilities

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.

Offshore, primary responsibility for oil spill response lies with the relevant Operator, although the Secretary of State's Representative may intervene if necessary. The Maritime and Coastguard Agency is responsible for a National Contingency Plan and maintains four Emergency Towing Vessels stationed around the UK, which remain on standby at sea. In addition, the MCA maintains a contractual arrangement for provision of aerial spraying and surveillance, with aircraft based at Coventry and Inverness. Within two days, aircraft can deliver sufficient dispersant to treat a 16,000 tonne spill within 50 miles of the coast anywhere around the UK. DECC is a partner in this arrangement and undertakes regular aerial surveillance of offshore installations. 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.

Similar response capabilities, providing a tiered response capability, must be available to Operators prior to commencing drilling or production activities. These provisions are made under various long-term commercial contracts with specialist contractors, supplemented where necessary (e.g. for remote locations) with additional stockpiles. Site-specific Oil Spill Contingency Plans must also be submitted to DECC for approval prior to operations. Additional conditions can be imposed by DECC, through block-specific licence conditions (i.e. "Essential Elements").

6.5 Conclusions

Individual European Sites have been categorised in terms of potential vulnerability, based on location and known hydrocarbon prospectivity of proposed licence blocks and therefore the nature and magnitude of credible risks. Two categories of vulnerability were identified:

- Some sites are considered to be at low risk with the potential for impacts from significant spills of crude oil, bunker or lube oil.
- Many sites are considered not to be at risk of oil spills associated with activities in proposed blocks, due to location and sensitivity of 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 very low. This results from the combination of low probability and low severity (since most spills would be relatively small). 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 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.

Following licensing, specific activities considered to present a risk to European Sites would be evaluated by DECC under mandatory contingency planning and Habitats Regulations Assessment 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 implemented for offshore exploration and production.

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 enables prosecutions. It is not possible to say that in spite of the regulatory controls and other preventative measures, an oil spill will never occur as a result of 25th Round licensing in the outer Moray Firth area; however, as oil spills are not intended activities, a risk-based assessment is appropriate.

Given the availability of mitigation measures, DECC considers that exploration and production activities that could follow the licensing of Blocks 12/16a, 12/17c, 12/22b and 12/23b in so far as they may cause oil spills, will not adversely affect the integrity of European Sites.

7 CONSIDERATION OF SITES AND POTENTIAL PHYSICAL AND OTHER EFFECTS

7.1 Introduction

Several activities associated with oil and gas exploration and production can lead to physical disturbance, damage, alteration or contamination of seabed habitats and geomorphological features, with consequent effects on benthic communities. The prime potential sources of effect are summarised below, followed by a consideration of the foreseeable effects on European Sites assessed to be at potential risk.

7.2 Physical damage at the seabed

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

- **Anchoring of semi-submersible rigs**. Semi-submersible rigs use anchors to hold position, typically between 8 and 12 in number at a radius determined by water depth, and cause seabed disturbance from the anchors and chain or cables, and in cohesive sediments, leave 'anchor mounds' after their retrieval.

- **Placement of jack-up rigs**. Jack-up rigs, normally used in shallower water, leave three or four depressions from the feet of the rig (the spud cans) around 15-20m in diameter. In locations with an uneven seabed, material such as grout bags may be placed on the seabed to stabilise the rig feet.

- **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 would be removed. The seabed "footprint" of the well is therefore removed.

- **Production platform jacket installation**. Limited physical footprint similar to a drilling rig, but present on site for longer period. Physical disturbance associated with platform removal during decommissioning is comparable to that of installation.

- **Subsea template and manifold installation**. Limited physical footprint at seabed, smaller than a drilling rig, but present on site for longer period. Physical disturbance associated with subsea template and manifold removal during decommissioning is comparable to that of installation.

- **Pipeline, flowline and umbilical installation, trenching and potentially, placement of rock armour**. Anticipated hydrocarbons are oil and given the location of the 4 Blocks applied for, it is anticipated that new field developments will be 'tied back' to existing infrastructure. Large pipes (greater than 16" diameter) do not have to be trenched according to a general industry agreement as they will not be moved by fishing gear, but

they may still need to be trenched for reasons of temperature loss or upheaval buckling (due to buoyancy). Trenches may require several passes before they are of the required depth, or it may be impossible to achieve the required depth due to obstructions, in which case rock is usually placed on the pipeline (rock dump) to protect and stabilise it.

Oil and gas SEAs have compared the physical disturbance effects of oilfield activities to those of fishing and natural events in shallow water (e.g. storm wave action), and concluded that oilfield effects are typically minor on a regional scale. It is generally accepted that the principal source of human physical disturbance of the seabed and seabed features, is trawl fishing. Trawl scarring is a major cause of concern with regard to conservation of shelf and slope habitats and species (e.g. Witbaard & Klein 1993, de Groot and Lindeboom 1994, Kaiser *et al*. 2002a, Kaiser *et al*. 2002b, Gage *et al*. 2005). On the basis that seabed disturbance is qualitatively similar to the effects of severe storms, sand and gravel habitat recovery from the processes of anchor scarring, anchor mounds and cable scrape is likely to be relatively rapid (1-5 years) in most shallower and exposed (as opposed to sheltered) areas.

The broadscale distribution of biotopes of conservation importance is relatively well understood in the outer Moray Firth, and none are currently known in the Blocks applied for. Within the boundaries of designated and potential SACs, the occurrence of habitats of interest is usually known with greater precision. The routine sources of potential physical damage are controlled by a range of statutory measures including Consent to Locate, PON15B, Environmental Statement, Pipeline Works Authorisation and, were relevant, AA. Based on the results of the assessments including AA, DECC may require additional mitigation measures to avoid or minimise any adverse effects, or where this is not possible, refuse consent.

7.3 Marine discharges

As described in previous oil and gas SEAs, marine discharges from exploration and production activities include produced water, sewage, cooling water, drainage, drilling wastes and surplus water based mud (WBM), which in turn may contain a range of hydrocarbons in dissolved and suspended droplet form, various production and utility chemicals, metal ions or salts (including Low Specific Activity radionuclides). In addition to these mainly platform-derived discharges, a range of discharges is associated with operation of subsea infrastructure (hydraulic fluids), pipeline testing and commissioning (treated seawater), and support vessels (sewage, cooling and drainage waters). Discharges from offshore oil and gas facilities have been subject to increasingly stringent regulatory controls over recent decades, and oil concentrations in the major streams (drilling wastes and produced water) have been substantially reduced or eliminated. The effects of marine discharges are judged to be negligible in the context of proposed licensing and the Natura 2000 sites in the area and are not considered further here. They would also be considered in detail in project specific Environmental Statements, AAs (where necessary) and chemical risk assessments under existing permitting procedures.

7.4 Other effects

Through the transport and discharge of vessel ballast waters (and associated sediment), and to a lesser extent fouling organisms on vessel/rig hulls, non-native species may be introduced to the marine environment. Should these introduced species survive and form established breeding populations, they can exert a variety of negative effects on the environment. These include: displacing native species by preying on them or out-competing them for resources such as prey and habitat; irreversible genetic pollution through

hybridisation with native species; increased occurrence of toxic algal blooms. The economic repercussions of these ecological effects can also be very significant. In response to these risks, a number of technical and procedural measures have been proposed (such as the use of ultraviolet radiation to treat ballast water) or introduced such as a mid-ocean exchange of ballast water (the most common mitigation against introductions of non-native species). International management of ballast waters is addressed by the International Maritime Organisation (IMO) through the International Convention for the Control and Management of Ships Ballast Water & Sediments, which was ratified in 30 States in 2005. The Convention includes regulations with specified technical standards and requirements (IMO Globallast website).

The potential effects of light on birds have been raised in connection with offshore oil and gas over a number of years (e.g. Weise *et al*. 2001). As part of navigation and worker safety, oilfield installations and associated vessels are lit at night and the lights will be visible at distance (some 10-12nm in good visibility). Furthermore, the flaring of hydrocarbons generates a bright light which may also be visible over a considerable distance. Platform illumination and flares have been shown to have an attractive effect on many species of seabird; this attraction is enhanced by conditions of poor visibility such as fog, haze and drizzle (Weise *et al*. 2001 and references therein). Bird mortality resulting from collisions with the structure and flare (leading to incineration) is the primary concern, although any such mortality will be several orders of magnitude lower than that of natural or other anthropogenic mortality (e.g. predation by domestic cats) and is not considered to be significant at a population-level. The lights on installations and vessels are primarily non-flashing so the strong behavioural effects noted by Bruderer *et al*. (1999) in response to a strong searchlight being switched on and off are not anticipated. Potential effects can be mitigated through the control or avoidance of well test and routine flaring during production, and timing controls can be used since drilling and construction are temporary activities. It is therefore concluded that light effects will not affect site integrity.

Physical disturbance of seaduck and other waterbird flocks by vessel and aircraft traffic associated with oil and gas exploration and production are possible, particularly in SPAs established for shy species such as common scoter. Such disturbance can result in repeated disruption of bird feeding, loafing and roosting. It is considered this source of potential effect will not result in significant effects at Natura 2000 sites because of the location of the SPAs relative to the Blocks applied for, the absence of marine SPAs designated for particularly sensitive (shy) species in the outer Moray Firth, the projected limited scale and nature of developments, and because mitigation is possible which would be identified during activity specific assessment and permitting processes. Available mitigation measures include strict use of existing shipping and aircraft routes, timing controls on temporary activities to avoid sensitive periods. It is therefore concluded that adverse effects from physical disturbance are not expected.

7.5 Implications for relevant European Sites

The screening process (Appendix B) did not identify the potential for physical disturbance, discharge effects or light effects in any relevant sites. Additionally, any potentially damaging activities that could follow licensing of the four Blocks would be subject to statutory risk assessment, mitigation and permitting measures, which would include assessment of the potential effects on the integrity of Natura 2000 sites.

7.6 Conclusions

All blocks under consideration in the outer Moray Firth area are at least several kilometres offshore and remote from Natura 2000 sites. Any adverse effects from consequent activities will therefore not influence site integrity. It is unlikely that any new terminals would be built as a result of developments following 25th Round Licensing. While new pipelines could conceivably come ashore at existing terminals, either through or near to coastal SACs and SPAs, there are well proven methods to prevent significant impacts. There is a legal framework, via e.g. EIA regulations and those implementing the Habitats Directive, to ensure that there are no adverse effects on Natura 2000 sites.

Taking into account the information presented above and in the Appendices, it is concluded that activities arising from the licensing of Blocks 12/16a, 12/17c, 12/22b and 12/23b will not cause an adverse effect on the integrity of the European Sites.

8 CONSIDERATION OF SITES AND POTENTIAL ACOUSTIC EFFECTS

8.1 Overview of effects of acoustic disturbance

Of all marine organisms, marine mammals are regarded as the most sensitive to acoustic disturbance. This is due to their use of acoustics for echolocation and vocal communication, and their possession of large, gas filled organs 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. Otters in coastal habitats may also experience acoustic disturbance from seismic exploration or piling. However, they generally occupy shallow, inshore areas where the propagation of seismic noise is very limited.

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). Relevant sites in the region include several designated for the presence of the Annex II species Atlantic salmon and two species of lamprey. Specific to Atlantic salmon, Knudsen *et al*. (1994) showed that a source of intense low frequency sound (10Hz) within a river acted as an acoustic barrier to young salmon, with fish being displaced to an area where the intense sound was absent. Furthermore, numerous fish species present in the region provide important components of the diet of qualifying species of other relevant European Sites, such as bottlenose dolphin *Tursiops truncatus*, common seal *Phoca vitulina*, grey seal *Halichoerus grypus* and several seabird species.

There are currently no UK Natura 2000 sites with mobile marine invertebrates as qualifying features. However, invertebrates such as crabs and squid may form an important component of the diet of qualifying Annex II species, for example bottlenose dolphin. The study of effects of seismic noise on invertebrates is limited, and it has been suggested that no reliable conclusions can be made that negative effects exist or not (Moriyasu *et al.* 2004). Recent studies into the effects of seismic exploration on crustaceans have shown no significant long term effects on physiology, behaviour or catch rates (Christian *et al*. 2003, DFO 2004, Parry & Gason 2006). Due to their well developed nervous system, cephalopods such as squid may be more sensitive to seismic noise than other invertebrates; however, evidence for effects of seismic noise on them is very limited (review in Moriyasu *et al*. 2004).

Direct effects on seabirds because of seismic exploration noise 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 (penguins) 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 has 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).

Airborne noise, for example from helicopter overflights, could potentially disturb birds in coastal SPAs, although in the context of other military and civilian aircraft activities the anticipated level of E&P related noise is insignificant. In specific cases of concern, mitigation through routeing restrictions would be implemented.

8.2 Noise sources and propagation

Compared to the noise derived from seismic surveys and piling, noise from other oil and gas activities is relatively minor; previous DECC SEAs have assessed noise in some detail, and the following discussion is focussed on seismic noise as the primary concern. The potential for significant effect is therefore largely related to the anticipated type, extent and duration of seismic survey associated with proposed licensing. The range over which noise propagates (and effects may result) varies with water depth, density stratification, substrate and other factors, and is therefore area-specific.

Seismic survey

With the exception of explosives and modern military sonar (and possibly windfarm monopile piling), airgun arrays used for seismic surveys are the highest energy man made sound sources in the sea; broadband peak-to-peak (p-p) source levels of 248-259dB re 1µPa are typical of large arrays (Richardson *et al*. 1995). 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 higher frequencies are low relative to that at the peak frequency but are still loud in absolute terms and relative to background levels.

Current levels of seismic survey in the UKCS are around 20-30 surveys per year, which has been the case for the past few years. This has declined from 75 surveys in 1997 (DECC database of PON14 closeout submissions).

The offshore energy SEA process has reviewed general aspects of noise propagation. Most environmental assessments of noise disturbance in deeper water use simple spherical propagation models to predict sound pressure levels at varying distances from source. However, additional signal modification and attenuation may result from a combination of reflection from sub-surface geological boundaries, sub-surface transmission loss due to frictional dissipation and heat; and scattering within the water column and sub-surface due to reflection, refraction and diffraction in the propagating medium. In shallow water, reflection of high frequency signals from the seabed results in approximately cylindrical propagation and therefore higher received spectrum levels than for spherically propagated low frequency signals (which penetrate the seabed).

In general, as distance from the array increases, higher frequencies are attenuated more rapidly and beyond a few kilometres, the main contribution is in the 2kHz region. Finally beyond around 12km it will be the main low-frequency pulse of around 250Hz that has the main contribution. However, local propagation effects may have significant influence: for example frequency dependence due to destructive interference also forms an important part

of the weakening of a noise signal. Simple models of geometric transmission loss may therefore be unreliable in relatively shallow water; in areas of complex seabed topography and acoustic reflectivity; where vertical density stratification is present in deep water; and where the noise does not originate from a point source. In the St George's Channel, Goold and Fish (1998) recorded 8kHz sounds above background levels at a range of 8km from the source, even in a high noise environment.

Other activities

Available measurements indicate that drilling activities produce mainly low-frequency continuous noise from several separate sources on the drilling unit (Richardson *et al*. 1995, Lawson *et al*. 2001). The primary sources of noise are various types of rotating machinery, with noise transmitted from a semi-submersible rig to the water column through submerged parts of the drilling unit hull, risers and mooring cables, and (to a much smaller extent) across the air-water interface. Noise transmission from jack-up rigs used in shallower water is less because of limited coupling with the water column. Under some circumstances, cavitation of thruster propellers is a further appreciable noise source, as may be the use of explosive cutting methods (e.g. for conductor removal).

Measured farfield sound pressure of around 170dB re 1µPa, in the frequency range 10-2,000Hz (Davis *et al.* 1991) is probably typical of drilling from a semi-submersible rig and is of the same order and dominant frequency range as that from large merchant vessels (e.g. McCauley 1994). Drilling noise has also been monitored west of Shetland, in the vicinity of the Foinaven and Schiehallion developments (Swift & Thompson 2000). High and variable levels of noise were initially believed to result from drilling related activity on two semi-submersible rigs operating in the area. However, subsequent analysis found more direct correlation between the use of thrusters and anchor handlers during rig moves and high levels of noise (Swift & Thompson 2000). Further measurements of drilling and pipelay noise in the North Sea have been sponsored by the industry (Nedwell & Needham 2001, Nedwell *et al*. 2001, Nedwell *et al*. 2002). Drilling duration may range from a few weeks for an exploration well, to years in the case of a large development programme.

Pipelay operations will result mainly in continuous noise (associated with rotating machinery), with relatively little impulse or percussive noise in comparison to many other marine construction activities. The overall source levels resulting from pipelay operations on the UKCS have not been measured, although near-field cumulative sound levels associated with pipelay for the Clair field development were predicted to be a maximum of 177dB (Lawson *et al*. 2001), with a duration of weeks or months.

Although there is little published data, noise emission from production platforms is thought to be qualitatively similar to that from ships, and is produced mainly by rotating machinery (turbines, generators, compressors) (Richardson *et al*. 1995).

A further source of noise associated with all stages of the offshore oil industry is helicopter overflights. There is relatively little quantitative information on the transmission of helicopter airborne noise to the marine environment (Richardson *et al*. 1995). Measurements of an air-sea rescue helicopter over the Shannon estuary (Berrow *et al*. 2002) indicated that due to the large impedance mismatch when sound travels from air to water, the penetration of airborne sound energy from the rotor blades was largely reflected from the surface of the water with only a small fraction of the sound energy coupled into the water.

8.2.1 Effects thresholds in marine mammals

Richardson *et al.* (1995) defined a series of zones of noise influence on marine mammals, which have been generally adopted by SEAs and EAs undertaken in relation to previous Licensing Rounds. Similarly, data on marine mammal responses have been exhaustively reviewed (e.g. Richardson *et al*. 1995, Gordon *et al*. 1998, Lawson *et al*. 2001, Simmonds *et al*. 2003, Nowacek *et al*. 2007, Weilgart 2007, Southall *et al*. 2007). Four zones are recognised which will generally occur at increasing sound level: (1) the zone of audibility; (2) zone of responsiveness; (3) zone of masking; (4) zone of hearing loss, discomfort or injury. Potential acute effects include physical damage, noise-induced hearing loss (temporary and permanent threshold shifts, TTS and PTS respectively) and short-term behavioural responses. Postulated chronic effects (for which evidence is almost entirely absent) include long term behavioural responses, exclusion, and indirect effects. The most likely physical/physiological effects are generally considered to be shifts in hearing thresholds and auditory damage.

Behavioural responses to anthropogenic noise have generally been studied by visual or acoustic monitoring of abundance. Visual monitoring of cetaceans during seismic surveys has been carried out for several years throughout the UKCS. Statistical analysis of 1,652 sightings during 201 seismic surveys, representing 44,451 hours of observational effort, was reported by Stone (2003) and Stone & Tasker (2006). Sighting rates of white-sided dolphins, white-beaked dolphins, *Lagenorhynchus* spp., all small odontocetes combined and all cetaceans combined were found to be significantly lower during periods of shooting on surveys with large airgun arrays. In general, small odontocetes showed the strongest avoidance response to seismic activity, with baleen whales and killer whales showing some localised avoidance, pilot whales showing few effects and sperm whales showing no observed effects.

Injury and behavioural criteria

The Offshore Energy SEA (DECC 2009) reviewed recent data and recommendations for injury and behavioural criteria for noise assessment in marine mammals. The difficult issue of determining when noise causes biologically significant effects in marine mammals has been addressed by NRC (2005). This clarifies the term biologically significant in the context of the US Marine Mammal Protection Act (MMPA), which considers two levels of harassment – level A and level B harassment; in turn specified by National Marine Fisheries Service (NMFS) criteria as noise pressure thresholds of 180 and 160 dB re 1 µPa rms respectively. These values were derived by the High Energy Seismic Survey (HESS) team panel of experts convened in 1999 to assess noise exposure criteria for marine mammals exposed to seismic pulses. The consensus was that, given the best available data at that time, exposure to airgun pulses with received levels above 180dB re 1 µPa (averaged over the pulse duration) was "likely to have the potential to cause serious behavioural, physiological, and hearing effects." The panel noted the potential for ± 10dB variability around the 180dB re 1 µPa level, depending on species, and that more information was needed.

The NMFS has continued to use a "do not exceed" exposure criterion of 180dB re 1 µPa for mysticetes and (recently) all odontocetes exposed to sequences of pulsed sounds, and a 190dB re 1 µPa criterion for pinnipeds exposed to such sounds. Behavioural disturbance criteria for pulsed sounds have typically been set at an SPL value of 160dB re 1 µPa, based mainly on the earlier observations of mysticetes reacting to airgun pulses. However, the relevance of the 160dB re 1 µPa disturbance criterion for odontocetes and pinnipeds exposed to pulsed sounds is not at all well-established. Although these criteria have been applied in various regulatory actions (principally in the U.S.) for more than a decade, they remain controversial, have not been applied consistently in the U.S., and have not been

widely accepted elsewhere (Southall *et al*. 2007). Southall *et al*. (2007) have recently proposed injury criteria composed both of unweighted peak pressures and M-weighted sound exposure levels which are an expression for the total energy of a sound wave. The M-weighted function also takes the known or derived species-specific audiogram into account. For three functional hearing categories of cetaceans, proposed injury criteria are an unweighted 230dB re 1µPa p-p for all types of sounds and an M-weighted sound exposure level of 198 or 215dB re 1 $\mu Pa^2 \cdot s$ for pulsed and non-pulsed sounds respectively. For pinnipeds, the respective criteria are 218dB 1µPa p-p for all types of sound and 186 (pulsed) or 203 (non-pulse) dB re 1 $\mu Pa^2 \cdot s$ (M-weighted). These proposals are based on the level at which a single exposure is estimated to cause onset of permanent hearing loss (PTS), by extrapolating from available data for TTS.

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For multiple pulse and non-pulse (i.e. continuous) sources, they were unable to derive explicit and broadly applicable numerical threshold values for delineating behavioural disturbance. A scoring paradigm was used to numerically rank, in terms of severity, behavioural responses observed in either field or laboratory conditions. However, due to various statistical and methodological problems, much of this data was not considered to provide sufficient scientific credence for establishment of exposure criteria. Southall *et al*. (2007) noted the importance of contextual variables in determining behavioural response; together with the presence or absence of acoustic similarities between the anthropogenic sound and biologically relevant natural signals (e.g. calls of conspecifics, predators, prey). They suggest that the concept of a context-based approach to deriving noise exposure criteria for behavioural responses will be necessary.

Based on NMFS and Southall *et al*.'s (2007) proposed criteria relating to pinnipeds and single pulsed sounds from a typical seismic survey, the range exceeding the injury criteria (onset of PTS) would extend to approximately 9m (p-p) from source, and for significant behavioural disturbance (onset of TTS) approximately 22m (p-p) from source.

Seismic array / propagation characteristics

Source Level	250 dB
array loss (horizontal directivity)	18 dB
propagation loss factor (logarithmic)	15 dB

Effect threshold	
Southall criteria	
single pulse PTS onset, pinnipeds	218 dB
single pulse TTS onset, pinnipeds	212 dB
NMFS A (18dB corr to p-p)	198 dB
NMFS B (18dB corr to p-p)	178 dB
Lucke (porpoise TTS)	184 dB
Required transmission loss (TL)[1]	
PTS single pulse range TL	14 dB
TTS single pulse range TL	20 dB
NMFS A (18dB corr to p-p)	34 dB
NMFS B (18dB corr to p-p)	54 dB
Lucke (porpoise TTS)	48 dB
Required range[2]	
PTS single pulse range	9 m
TTS single pulse range	22 m
NMFS A (18dB corr to p-p)	185 m
NMFS B (18dB corr to p-p)	4.0 km
Lucke (porpoise TTS)	1.6 km

1 TL = SL-array loss-effect threshold
2 Range = 10^(TL/propagation loss factor)

These ranges represent a tiny proportion of the marine areas used by seals associated with European Sites of the UK east coast; therefore, disturbance effects beyond site boundaries are not expected to have consequent effects on site integrity.

Popper *et al*. (2006) suggested interim criteria for injury of fish exposed to pile driving operations, although note that the majority of the evidence base for such criteria is derived from studies of seismic and explosive noise sources. A peak sound pressure level of 208dB re 1µPa for single pulses is proposed. This is supported by the findings of Popper *et al*. (2005) who showed that TTS onset (physiological fatigue and not damage) in three species of fish exposed to seismic air-gun pulses occurred within the range of 205-210dB re 1 µPa (p-p). Popper *et al*. (2006) considered available data as too sparse to set clear-cut science-based criteria for behavioural disturbance of fish or auditory masking from pile driving.

Seismic exploration noise could potentially result in direct effects on seabirds through physical damage, or through disturbance of normal behaviour. Diving seabirds (e.g. auks) may be most at risk of physical damage. 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 little penguins would be high, hence only at short ranges would penguins be adversely affected. Mortality of seabirds has not been observed during extensive seismic operations in the North Sea and elsewhere. A study of seabird abundance in Hudson Strait (Atlantic Canada) during seismic surveys over three years (Stemp 1985) compared periods of shooting and nonshooting, found no significant difference in the abundance of fulmar, kittiwake and thickbilled murre (Brünnich's guillemot). Lacroix *et al*. (2003) in a study of long tailed ducks in the Beaufort Sea, found no difference in indices of site fidelity or diving intensity between the seismic area and two control areas although they could not discount subtle effects. It is therefore considered that offshore

seismic noise will not result in significant injury or behavioural disturbance to seabirds in the general area.

8.3 Implications for relevant European Sites

As discussed above, it is considered that marine mammals and migratory fish are the only qualifying species which may potentially be affected (in terms of conservation status) by acoustic disturbance, although consultation feedback has indicated that birds associated with the East Caithness Cliffs should also be included. The screening process (Appendix B) identified the potential for acoustic disturbance in the following sites:

Faray and Holm of Faray SAC

(Primary Annex II species: grey seal *Halichoerus grypus*)

The islands, located in the northern part of Orkney, support the second-largest breeding colony in the UK, contributing around 9% of annual UK pup production. Their condition has been assessed as favourable (maintained). Derived from aerial surveys of breeding colonies, grey seal pup production for Orkney as a whole in 2007 was estimated as 18,952, representing a slight decrease over 2006 (-2.0%); the average annual change in pup production over the period 2002-2007 is +0.9% (SCOS 2008).

Models of grey seal habitat preference supported by satellite telemetry data suggest that foraging movements are on two geographical scales: long and distant trips from one haul-out site to another; and local repeated trips to discrete offshore areas. Foraging destinations at sea are typically localised areas characterized by a gravel/sand seabed sediment, the preferred burrowing habitat of sandeels, an important component of grey seal diet. Grey seals forage widely around Orkney, with the greatest densities of animals observed in the Pentland Firth and waters immediately to the east (Matthiopoulos *et al*. 2004, Murphy *et al*. 2008).

Simple calculations of sound propagation can be made to estimate the likely maximum received sound levels at the boundaries of relevant European Sites should a typical seismic survey occur in any one of the Blocks applied for; the results of these are presented in Table 8.1. Most environmental assessments of noise disturbance use simple spherical propagation models of the form SPL = SL – 20log(R), where SL = source level, R = source-receiver range, to predict sound pressure levels (SPL) at varying distances from source. Cylindrical spreading, SPL = SL – 10log(R), is usually assumed in shallow water, depth < R. However, several workers have measured or modelled additional signal modification and attenuation due to a combination of reflection from sub-surface geological boundaries, sub-surface transmission loss due to frictional dissipation and heat; and scattering within the water column and sub-surface due to reflection, refraction and diffraction in the propagating medium (see SEA 4 Environmental Report). In shallow water, reflection of high frequency signals from the seabed results in approximately cylindrical propagation and therefore higher received spectrum levels than for spherically propagated low frequency signals (which penetrate the seabed). Attenuation of signal with distance is frequency dependent, with stronger attenuation of higher frequencies with increasing distance from the source. Frequency dependence due to destructive interference also forms an important part of the weakening of a noise signal.

Propagation has been measured for sounds from pile-driving as well as sounds from operating wind turbines (Madsen *et al*. 2006. For the transient impact sounds from pile-driving, the available data suggest that transmission losses are close to spherical spreading

(in the range 11log(R) to 35log(R) up to ranges of more than 1km. Similarly, quantitative modelling of seismic noise propagation in Queen Charlotte Basin, Canada (MacGillivray & Chapman 2005) predicted that received noise levels would be lowest in those areas of the basin with shallow bathymetry due to scattering and absorption of sound at the seabed.

In the case of Faray and Holm of Faray SAC, land barriers between the site and Blocks applied for preclude tangible simple calculations of direct linear range and received noise levels within the sites. However, minimum distance from the Pentland Firth (known to support high densities of foraging grey seals) to the nearest Block (12/16a) is approximately 15km, giving a propagation loss (assuming 15logR) of around 63dB, or a received sound level of 167dB re 1μPa p-p for a typical seismic survey. This level is considerably lower than the injury criteria proposed by Southall *et al.* (2007) in pinnipeds for both pulsed and non-pulsed sounds, and also below those proposed for the onset of TTS (postulated as significant behavioural disturbance) for pulsed sounds.

Table 8.1 - Estimated received sound levels in relevant European Sites associated with a typical seismic survey

Block	Faray and Holm of Faray SAC		Sanday SAC	
	Minimum distance (km)	Received sound level (dB re 1μPa peak-to-peak)	Minimum distance (km)	Received sound level (dB re 1μPa peak-to-peak)
12/16a	n/a	n/a	80	156
12/17c	n/a	n/a	80	156
12/22b	n/a	n/a	100	155
12/23b	n/a	n/a	105	155
Block	**Moray Firth SAC**		**Dornoch Firth and Morrich More SCI**	
	Minimum distance (km)	**Received sound level (dB re 1μPa peak-to-peak)**	**Minimum distance (km)**	**Received sound level (dB re 1μPa peak-to-peak)**
12/16a	52	159	83	156
12/17c	60	158	92	156
12/22b	47	160	76	157
12/23b	54	159	85	156

Notes: Assumes a source level of 250dB re 1μPa peak-to-peak, a correction factor of -20dB to compensate for horizontal array effects, and a propagation loss of 15log(R). Figures are rounded to the nearest whole number.

While seismic survey occurring in the proposed licence blocks is unlikely to be audible to seals within the SAC itself, noise will be audible over a large area in the outer Moray Firth and waters to the east of the Pentland Firth and Orkney. These areas support relatively high densities of foraging grey seals. The exact effects which this may have are unknown, although available evidence suggests that significant effects at a population level are unlikely.

Noise levels suggested to cause auditory damage in phocids are rapidly attenuated with distance from source, and therefore have very limited potential for spatial overlap with seals foraging beyond the boundary of the SAC. Furthermore, distances over which hearing damage may occur are well within the effective range of the mitigation measures which would be employed to minimise disturbance to marine mammals. Additionally, any future seismic survey plans would be subject to an extensive source- and site-specific assessment of the potential for adverse effects, including AA where necessary.

If significant ecological effects on prey species were to occur, even at considerable distances from Faray and Holm of Faray SAC, these may influence the breeding population of the site. However, noise levels suggested to cause injury to fish (the primary prey species of seals) 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 have significant effects on relevant qualifying species at a population level.

Noise levels associated with other activities potentially resulting from the 25th Licensing Round such as a drilling, vessel movements, pipe-laying operations, are of a considerably lower magnitude than those resulting from seismic survey, and are not expected to have significant effects on relevant qualifying species at a population level.

Sanday SAC

(Primary Annex II species: common seal *Phoca vitulina*)

Sanday, situated in the northeast part of Orkney, supports the largest group of common seal at any discrete site in Scotland, representing over 4% of the UK population. Their condition has been assessed as favourable (maintained). Derived from aerial surveys of breeding colonies, the minimum number[2] of common seals on Orkney as a whole in 2007 was estimated as 3,400[3] (SCOS 2008). While a high degree of uncertainty surrounds any apparent population trends, SCOS (2008) describe the common seal population of Orkney as possibly declining. This relates to declines in minimum estimates of common seals on Orkney from 7,752 in 2001 and 4,256 in 2006 (SCOS 2007). Large declines have also been observed in Shetland over the same period. A targeted research programme has been established including increased monitoring to confirm the magnitude and geographical extent of the declines (SCOS 2008).

Recent studies of foraging at sea by common seals have been funded by SNH and DECC (Sharples *et al*. 2005, 2008). These indicate high site fidelity to haul-out sites, but ranging over substantial distances at sea. Common seals forage widely around Orkney, with the greatest densities of animals observed in waters around the northern islands and in several discrete areas to the east (Sharples *et al*. 2008). Simple sound propagation calculations suggest received sound levels at the site boundary of 155-156dB re 1μPa p-p for a typical seismic survey occurring in any of the four Blocks applied for (see Table 8.1). This level is considerably lower than the injury criteria proposed by Southall *et al.* (2007) in pinnipeds for both pulsed and non-pulsed sounds, and also below those proposed for the onset of TTS (postulated as significant behavioural disturbance) for pulsed sounds.

Noise from a typical seismic survey in any of the four Blocks applied is likely to be audible over a large area to the east of the Pentland Firth and Orkney, the northern areas of which support relatively high densities of foraging common seals. The exact effects which this may have are unknown, although available evidence suggests that significant effects at a population level are unlikely. Noise levels suggested to cause auditory damage in phocids are rapidly attenuated with distance from source, and therefore have very limited potential for spatial overlap with seals foraging beyond the boundary of the SAC. Furthermore, distances over which hearing damage may occur are well within the effective range of the mitigation measures which would be employed to minimise disturbance to marine mammals. Additionally, any future seismic survey plans would be subject to an extensive source- and site-specific assessment of the potential for adverse effects, including AA where necessary.

[2] Numbers are counts of hauled-out seals from aerial surveys and provide a minimum population estimate, likely to represent approximately 60-70% of the total population.
[3] Figure rounded to nearest 100.

If significant ecological effects on prey species were to occur, even at considerable distances from Sanday SAC, these may influence the breeding population of the site. However, noise levels suggested to cause injury to fish (the primary prey species of seals) 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 have significant effects on relevant qualifying species at a population level.

Noise levels associated with other activities potentially resulting from the 25th Licensing Round such as a drilling, vessel movements, pipe-laying operations, are of a considerably lower magnitude than those resulting from seismic survey, and are not expected to have significant effects on relevant qualifying species at a population level.

Moray Firth SAC

(Primary Annex II species: bottlenose dolphin *Tursiops truncatus*)

The Moray Firth SAC represents a core area within the range of the eastern Scottish bottlenose dolphin population. The population ranges from north of the Moray Firth to south of the Firth of Forth, and has occasionally been sighted offshore in the North Sea. In the 1980s, the core of the population's range was focused in the inner Moray Firth, typically within three main areas; the Kessock Channel, Chanonry Narrows, and around the mouth of the Cromarty Firth (Wilson *et al*. 1997, 2004; Hastie *et al*. 2003). While dolphins are seen in these areas throughout the year, an apparent influx of animals is observed from May-September. Since the early 1990s, the population's range has expanded south and now includes waters off Aberdeenshire, St Andrew's Bay and the Firth of Forth (Wilson *et al*. 2004). Dolphins are present year round off Aberdeenshire, with a peak in abundance during March-May (Stockin *et al*. 2006). Peak sightings in St Andrews Bay occur in June-August (Hammond *et al*. 2004). Two social units appear to exist within the population: those which are only observed in the inner Moray Firth, and those which are observed throughout the known range (Lusseau *et al*. 2006).

Surveys along the southern coast of the Moray Firth from 2001-2005 encountered bottlenose dolphins along the majority of the coastline, primarily in waters <25m depth (Robinson *et al*. 2007). Understanding of these animals' offshore distribution is poor due to limited survey effort away from the coast. Occasional visual and acoustic surveys in offshore waters of the Moray Firth have encountered very few bottlenose dolphins (Hastie *et al*. 2003, Bailey 2006, Talisman 2006, SCANS-II 2008). The Whale and Dolphin Conservation Society coordinated marine mammal surveys of the outer Moray Firth throughout 2008; when available, results should improve understanding of bottlenose dolphin (and other species) distribution in the wider Moray Firth region. A major study of cetacean distribution, and potentially of responses to seismic noise in the inner-central Moray Firth was initiated by DECC in early 2009. The first report of this study (Thompson *et al*. 2010) indicates that harbour porpoises are the most commonly encountered cetacean throughout inshore and offshore waters of the Moray Firth, and almost all bottlenose dolphin sightings are within 15km of the coast in the inner part of the Moray Firth SAC or the coastal strip along the southern Moray Firth. There are few records of bottlenose dolphins in the outer Moray Firth, with most sightings of dolphins there being of common dolphins or white beaked dolphins. Minke whales appear to be the second most commonly sighted species in offshore waters after harbour porpoises.

Based on data primarily from the inner Moray Firth and mouth of the Cromarty Firth, population size in 1992 was estimated as 129 ± 15 individuals (95% CI = 110-174) (Wilson *et al*. 1999). Using the same method, Thompson *et al*. (2004) present abundance estimates based on data over the entire known range of the population to vary between 75-200 from

1990-2002. Estimates were typically subject to considerable uncertainty and highly variable between some years. No clear trend in abundance is apparent. Estimates of dolphins using the inner Moray Firth showed a slight decline over the period 1990-2000 (Wilson *et al*. 2004), and a slight increase from 2002-2004. For 2004, it was estimated that 102 different individuals used the SAC (Thompson *et al*. 2006).

SNH have noted[4] that annual estimates of the number of dolphins using the SAC show considerable variability from year to year, and that the current condition assessment is wholly based on survey observations collected in the summer months and largely concentrated on core areas constituting approximately 30% of the entire SAC area. There is very little information for the remaining 70% of the site.

Bottlenose dolphins as a feature of the Moray Firth SAC were not considered to be favourable at the time of site designation and, following assessment as part of SNH's programme of Site Condition Monitoring this interest was assessed as unfavourable (recovering) in the first reporting cycle. It is presently unclear whether recent changes in observed dolphin numbers and the usage of the SAC are due to long term large scale environmental variability (change) or local anthropogenic effects.

The population can be described as vulnerable due its small size and location - at the northernmost limit of its natural range. The population has also been shown to have a low mitochondrial genetic diversity and potentially be geographically isolated (Parsons *et al*. 2002). Management measures are described in the Moray Firth SAC Management Scheme and components such as the Dolphin Space Programme; these are regularly reviewed. At present there is no conclusive evidence for any anthropogenic impacts on the dolphin population, but there are concerns in relation to disturbance/boat traffic, water quality/contamination and fishing activity. These are currently being monitored at a local level and a review of their overall impacts will be assessed in future monitoring reports.

Simple noise propagation calculations suggest maximum received sound levels at the site boundary of 160dB re 1μPa p-p for a typical seismic survey occurring in the closest Block (12/22b) (see Table 8.1), and a lower level of approximately 156dB re 1μPa p-p in the vicinity of areas where dolphins are most frequently recorded (e.g. mouth of Cromarty Firth). These levels are considerably lower than the injury criteria proposed by Southall *et al.* (2007) in cetaceans for both pulsed and non-pulsed sounds, and also below those proposed for the onset of TTS (postulated as significant behavioural disturbance) for pulsed sounds.

Seismic survey occurring in the 4 Blocks applied for is likely to be audible to dolphins within a large area of the Moray Firth. The available evidence suggests that significant effects at a population level are unlikely. Noise levels suggested to cause auditory damage in small odontocetes are rapidly attenuated with distance from source, and would therefore not occur within the SAC. Furthermore, the distances over which hearing damage may occur are well within the effective range of the mitigation measures which would be employed to minimise the risk of injury to marine mammals. Additionally, any future seismic survey plans would be subject to an extensive source- and site-specific assessment of the potential for adverse effects, including AA where necessary. Such assessments would be informed by the results of the DECC funded marine mammal research in the inner-central Moray Firth.

Small odontocetes have been shown to exhibit some avoidance behaviour to seismic survey (Stone & Tasker 2006), therefore there is potential for acoustic disturbance to disrupt foraging activities. However, this is likely to be short-term and infrequent with population

[4] SNH response to 24th Round Appropriate Assessment, Block 17/3, March 2008

level effects unlikely. The Offshore Energy SEA concluded that it was improbable (given the spatial ranges discussed above) that injurious or strong behavioural levels of effect from simultaneous surveys (or other activities) will coincide. However, it was recommended that within the key areas of marine mammal sensitivity, operational criteria are established to limit the cumulative pulse noise "dose" (resulting from seismic survey and offshore pile-driving) to which these areas are subjected.

Noise levels suggested to cause injury to fish (the primary prey species of dolphins) 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 have significant effects on relevant qualifying species at a population level.

Noise levels associated with other activities potentially resulting from the 25th Licensing Round such as a drilling, vessel movements, pipe-laying operations, are of a considerably lower magnitude than those resulting from seismic survey, and are not expected to have significant effects on relevant qualifying species at a population level.

Dornoch Firth and Morrich More SAC

(Primary Annex II species: common seal *Phoca vitulina*, otter *Lutra lutra*)

The Dornoch Firth supports a significant proportion of the inner Moray Firth population of the harbour seal and also supports a good population of otters. The condition of the otters at the site has been assessed as favourable (maintained).

SNH[5] note that the common seal population as a feature of the Dornoch Firth and Morrich More SAC was unfavourable (recovering) in the first reporting cycle. In the first cycle, counts of common seals were undertaken during the moulting season in three separate years. Counts varied from 405 seals in 2000, 220 seals in 2002 and 290 seals in 2003, although the survey in 2002 is considered to be an undercount. The decline in the number of common seals within the SAC led to the development of the Moray Firth Seal Management Plan, which effectively restricts shooting and other methods of predator control to tightly defined management zones around the main salmon rivers within the Moray Firth and has been underpinned by a series of Conservation Orders under the *Conservation of Seals Act 1970*. Within a wider survey area described as the 'Inner Moray Firth', counts of common seals at haul-out sites indicate a slow decline over the period 1992-2006, with numbers falling from a peak count of 1,141 in 1997 to 752 in 2006 (Lonergan *et al*. 2007). A limited number of counts from the wider Moray Firth area contain little evidence of any change over this period, although the statistical power of the data is limited.

Within the SAC, seals utilise sand-bars and shores at the mouth of the estuary as haul-out and breeding sites. The seals forage outside of the SAC throughout the Moray Firth, with areas of particular importance identified east and north of the Dornoch Firth (Sharples *et al*. 2005, 2008). As indicated in Table 8.1, estimated received noise levels at the SAC boundary from a typical seismic survey in any of the four Blocks applied for are considerably lower than the injury and TTS onset criteria proposed by Southall *et al.* (2007). The semi-enclosed nature of the firth will further limit the propagation of noise into the SAC. While seismic survey occurring in the 4 Blocks applied for may be audible to seals over a larger area of the outer Moray Firth (including known foraging grounds), available evidence suggests that significant effects at a population level are unlikely. Noise levels suggested to cause auditory damage in phocids are rapidly attenuated with distance from source, and

[5] SNH response to 24th Round Appropriate Assessment, Block 17/3, March 2008

would therefore not propagate into the SAC. Distances over which hearing damage may occur are well within the effective range of the mitigation measures which would be employed to minimise disturbance to marine mammals. Additionally, any future seismic survey plans would be subject to an extensive source- and site-specific assessment of the potential for adverse effects, including AA.

Evidence suggests that the extent and magnitude of any such disturbance of prey species of qualifying features of the SAC will be localised and small, and therefore highly unlikely to have significant effects on relevant qualifying species at a population level.

Riverine SACs

The potential for acoustic disturbance effects was identified for the following riverine SACs due to their proximity to the outer Moray Firth Blocks and the presence of Atlantic salmon as a qualifying feature: Berriedale and Langwell Waters SAC, River Oykel SAC, River Moriston SAC, River Spey SAC.

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. Following 1-3 years at sea, adult salmon return to their home rivers primarily during summer months. Due to their low densities in the outer Moray Firth and the highly localized 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 principally to, the designated rivers. The potential for impact can be mitigated through timing of seismic survey to avoid the period of peak salmon entry into the rivers and consequently significant effects on this qualifying feature can be avoided.

East Caithness Cliffs SPA.

The Article 4.2 species for which the site is designated are breeding guillemot, kittiwake, razorbill, herring gull and shag; and the breeding assemblage of seabirds (the status of the majority of species are favourable maintained although some are unfavourable declining - see Appendix C). For the species for which any evidence is available indicates that significant effects are unlikely. However, the mandatory Habitats Regulations Assessment procedures will allow further consideration of the nature, timing and location of any planned activities and mitigation measures deemed necessary to be defined (including conditions attached to consents/permits or potentially consent/permit refusal).

8.4 Regulation and mitigation

Both planning and operational controls cover acoustic disturbance resulting from activities on the UKCS, specifically including geophysical surveying and pile-driving. Application for consent to conduct seismic and other geophysical surveys is made using *Petroleum Operations Notice No 14* (PON14) supported by an Environmental Narrative to enable an accurate assessment of the environmental effects of the survey. Consultations with Government Departments and other interested parties are conducted prior to issuing consent, and JNCC may request additional risk assessment, specify timing or other constraints, or advise against consent. Any proposed activity with a potentially significant acoustic impact within a designated SAC or SPA would also be subject to the requirement for Appropriate Assessment.

The major operational control and mitigation over seismic surveys in the UK are through JNCC's *Guidelines for minimising the risk of disturbance and injury to marine mammals from seismic surveys* (June 2009 revision to reflect the *Offshore Marine Conservation (Natural*

Habitats, &c.) Regulations 2007 as amended). 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.

The guidelines require visual monitoring of the area by a dedicated Marine Mammal Observer (MMO) prior to seismic testing 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 (2009) advise that operators adopt mitigation measures which are appropriate to minimise the risk of an injury or disturbance offence[6] and stipulate, whenever possible, the implementation of several best practice measure, including:

- only commence seismic activities during the hours of daylight when visual mitigation by MMOs is possible.
- only commence seismic activities during the hours of darkness, or low visibility (including unsuitable sea state for visual mitigation), if an effective PAM system is used. In areas of particular importance for marine mammals, a PAM system should be used during day, night and other poor visibility seismic shooting.
- plan surveys so that the timing will reduce the likelihood of encounters with marine mammals.
- 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 airguns (along with other acoustic energy sources).

Due to the importance of the Moray Firth to marine mammals, DECC will expect that passive acoustic monitoring (PAM) will be routinely used as a mitigation tool.

8.5 Conclusions

As all blocks under consideration are at least several kilometres from the boundaries of SPAs, direct significant effects on SPAs were not considered possible. Indirect mechanisms of effect, for example through disturbance of prey species, were also considered with the conclusion that these will not have an adverse effect on integrity (i.e. on population viability of qualifying bird species).

Significant effects arising from acoustic disturbance were only considered possible for SACs with marine mammals and fish as a primary or secondary feature. Although seismic survey, drilling and other oilfield 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. This would require 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

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

displacement from foraging grounds). In the localised areas of Natura 2000 sites designated for marine mammals, acoustic disturbance from seismic 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.

Modelling of seismic noise propagation for licensed blocks in the outer Moray Firth has generally concluded that effects in the Moray Firth and Dornoch Firth and Morrich More SACs will not be significant. In the case of the blocks under consideration here, minimum direct linear range to the SAC boundaries is approximately 47km, giving a propagation loss (assuming 15logR) of around 70dB, or a received level at the SAC boundaries of 160dB re 1μPa p-p for a typical seismic survey.

Taking into account the information presented above and in the Appendices, it is concluded that activities which could arise from the proposed licensing of Blocks 12/16a, 12/17c, 12/22b and 12/23b will not cause an adverse effect on the integrity of the European Sites:

- It is considered reasonable to conclude that no effects will result with significant influence on the integrity of qualifying species within the SACs
- The utilisation of areas outside the designated SAC boundaries is not well understood, but the known extensive range of bottlenose dolphins and common seals, and available population monitoring indicates that neither previous activities, nor those associated with proposed licensing will have significant influence on the integrity of qualifying species.

9 IN-COMBINATION EFFECTS

Seismic survey and other noise producing activities that might follow the proposed licensing are anticipated to be widely separated in space and time. Therefore, any acoustic disturbance to marine mammals causing 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." As noted in Section 7, the number of seismic surveys is substantially less than historic peaks and as a result significant in-combination effects with oil and gas activities in existing licensed blocks are not foreseen.

Other noise producing activities which are likely to occur within the outer Moray Firth and adjacent areas include those associated with the development of marine renewable energy. Following the Offshore Energy SEA, The Crown Estate have entered a Round 3 zonal development agreement for the generation of up to 1.3 GW of offshore wind energy from a large area in the outer Moray Firth beyond 12nm of the coast; however, the consenting of developments in this area will be subject to detailed project-specific EIA and Habitats Regulations Assessments. The Crown Estate have also recently awarded exclusivity agreements to various consortia of wind energy developers for several areas within Scottish territorial waters, including a 121.3km^2 area off the northeast Moray Firth coast adjacent to the Round 3 development zone. Consenting of any development within this area will also be subject to the conclusions of an SEA, project-specific EIA and Habitats Regulations Assessments.

The Pentland Firth and waters surrounding Orkney are of considerable interest for the development of wave and tidal energy devices. The Crown Estate have identified Scottish territorial waters along the north coast of mainland Scotland and around Orkney as a potential area for wave and tidal energy development and announced plans to hold a leasing competition in the Pentland Firth strategic area in September 2008. The award of leases in this area is imminent. Consenting of any such developments will be subject to the conclusions of project-specific EIA and Habitats Regulations Assessments.

While the operation, maintenance and decommissioning of marine renewable energy developments will introduce noise into the marine environment, these are typically of low intensity. The greatest noise levels arise during the construction phase, and it is these which have the greatest potential for acoustic disturbance effects (see Faber Maunsell & Metoc 2007, DECC 2009). Pile-driving of mono-pile foundations is the principal source of construction noise, which will be qualitatively similar to pile-driving noise resulting from harbour works, bridge construction and oil and gas platform installation. While considerable uncertainty exists over the likely nature and installation method of foundations for future wave and tidal devices, a precautionary approach to assessment dictates the assumption that some level of pile-driving will occur, at least for tidal energy developments. Mono-pile foundations are the most commonly used for offshore windfarm developments at present, and are likely to be widely utilised in Round 3 and initial Scottish territorial water developments.

In relation to offshore pile-driving, standard conditions on consents for Round 2 offshore wind farms include various protocols to minimise the potential for acoustic disturbance of marine life, including the use of soft start, MMOs and PAM. For future developments, additional measures are likely to be required in areas where EIA suggests that high cetacean densities or site fidelity may occur; these may include technical measures such as pile sleeves (see Nehls *et al*. 2007). The "Statutory nature conservation agency protocol for

minimising the risk of disturbance and injury to marine mammals from piling noise" (JNCC 2009) outlines a protocol for the mitigation of potential underwater noise impacts arising from pile driving during offshore wind farm construction. SNH may in the future produce similar guidance in respect of Scottish territorial waters.

In addition to those activities which may follow licensing of the outer Moray Firth Blocks and future marine renewable energy development, there are a variety of other existing (e.g. oil and gas production, wind turbine deployments, 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 or synergistic effects that, when taken in-combination with the activities discussed above, would adversely affect the integrity of the relevant European 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 are due to come into force later this year. In respect of oil and gas activities and other developments with the potential to affect Natura 2000 sites, these mechanisms also include project specific Habitats Regulations Assessments.

However, the Offshore Energy SEA (DECC 2009) recommended that operational criteria should be established to limit the cumulative pulse noise "dose" (resulting from seismic survey and offshore pile-driving) within specified areas, which included: north and east of Orkney (grey and harbour seals); and, the Moray Firth and coastal waters south to the Forth (bottlenose dolphin) including Smith Bank (grey and harbour seals), inner Firths (harbour seal), St Andrews Bay and outer Forth (grey seals).

Potential incremental, cumulative, synergistic and secondary effects from a range of operations, discharges, emissions (including noise), and accidents were considered in the Offshore Energy SEA (DECC 2009; see also OSPAR 2000). Available evidence for the Moray Firth indicates that past oil and gas activity and discharges has not lead to adverse impacts on the integrity of European sites in the area. The current controls on terrestrial and marine industrial activities, including oil and gas operations that could follow licensing, can be expected to prevent significant in-combination effects affecting relevant European sites.

It is concluded that the in-combination effects from activities arising from the licensing of Blocks 12/16a, 12/17c, 12/22b and 12/23b with those from existing and planned activities in the Moray Firth area will not cause an adverse effect on the integrity of the relevant European Sites. The competent authorities will assess the potential for in-combination effects during Habitats Regulations Assessments of project specific consent applications; this process will ensure that mitigation measures are put in place to ensure that the project (if consented) will not result in adverse effects on integrity of European/Ramsar sites.

10 OVERALL CONCLUSION

Taking account of all the matters discussed, the Secretary of State is able to grant consent to the plan/programme (as defined) under the Habitats Directive and award the licences covering Blocks 12/16a, 12/17c, 12/22b and 12/23b. This is because there is certainty, within the meaning of the ECJ Judgment in the ***Waddenzee*** case, that the plan will not adversely affect the integrity of relevant European Sites, taking account of the mitigation measures that can be imposed through existing permitting mechanisms on the planning and conduct of activities.

These mitigation measures are incorporated in respect of habitat, diadromous fish, bird and marine mammal interest features through the range of legislation and guidance (see https://www.og.decc.gov.uk/environment/environ_leg_index.htm and https://www.og.decc.gov.uk/regulation/pons/index.htm) which apply to developer activities which could follow plan adoption. These mitigation measures include, where necessary, project-specific Appropriate Assessments based on detailed project proposals which would be undertaken by the competent authority before the granting of a permit/consent. The competent authority needs to be satisfied that the proposed activity will not result in adverse effects on integrity of European/Ramsar sites.

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

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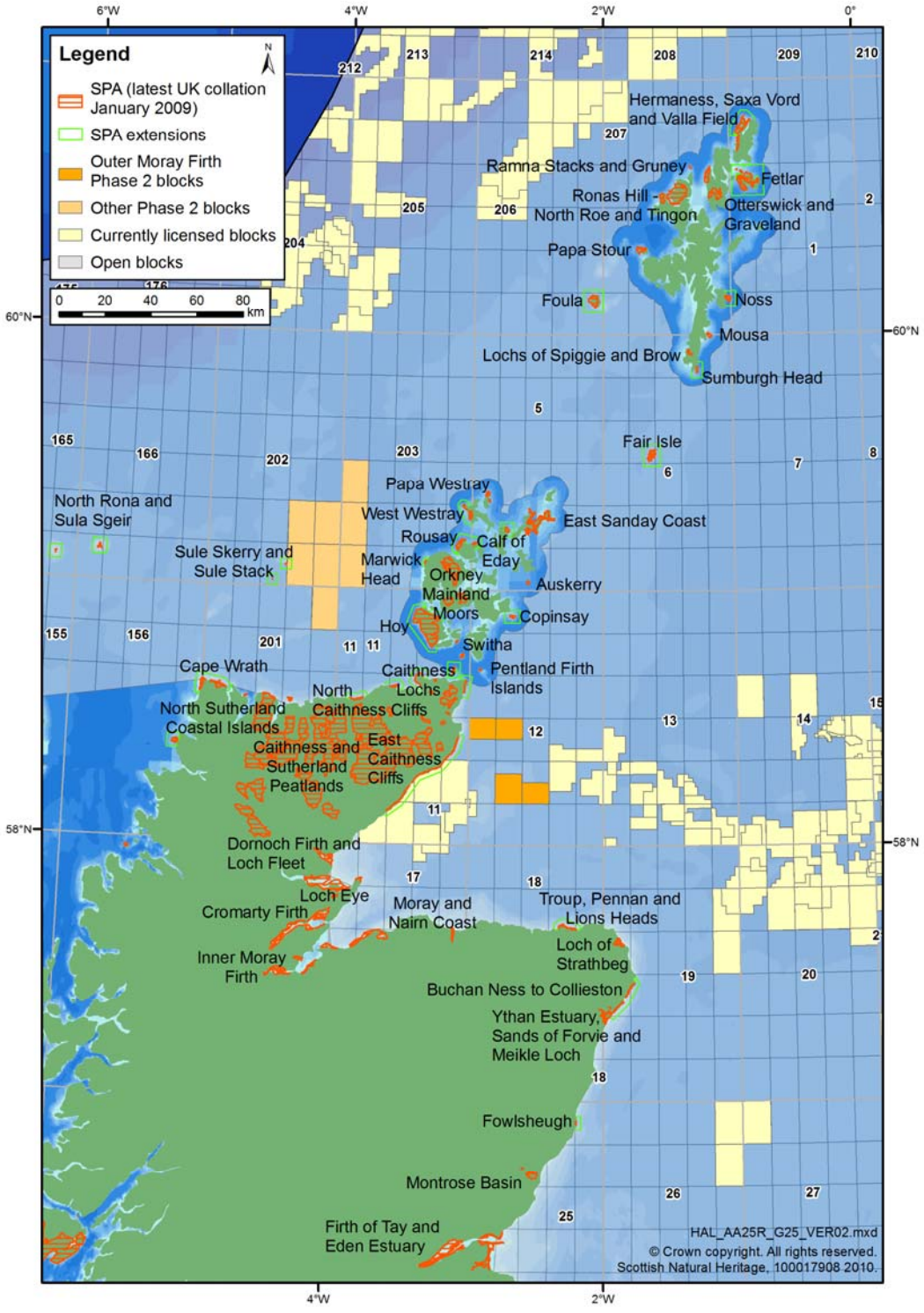
APPENDIX A – THE SITES

A1 Coastal and Marine Special Protection Areas

Map A.1 - Location of SPAs



NB: Proposed SPA marine extensions are also indicated

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*

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[7]
SHETLAND				
Sumburgh Head SPA	39.04 + 2km extension	Breeding: Arctic tern	N/A	Breeding: Seabirds
Lochs of Spiggie and Brow SPA	141.48	Over winter: Whooper swan	N/A	N/A
Foula SPA	1323.31 + 2km extension	Breeding: Arctic tern Leach's storm petrel Red-throated diver	Breeding: Great skua Guillemot Puffin Shag	Breeding: Seabirds
Papa Stour SPA	569.03	Breeding: Arctic tern	Breeding: Ringed plover	N/A
Ronas Hill-North Roe and Tingon SPA	5470.2	Breeding: Merlin Red-throated diver	Breeding: Great skua	N/A
Ramna Stacks and Gruney SPA	11.59	Breeding: Leach's storm petrel	N/A	N/A
Otterswick and Graveland SPA	2241.41	Breeding: Red-throated diver	N/A	N/A
Hermaness, Saxa Vord and Valla Field SPA	1037.3 + 2km extension	Breeding: Red-throated diver	Breeding: Gannet Great skua Puffin	Breeding: Seabirds
Fetlar SPA	2594.91 + 2km extension	Breeding: Arctic tern Red-necked phalarope	Breeding: Dunlin Great skua Whimbrel	Breeding: Seabirds
Noss SPA	343.82 + 2km extension	N/A	Breeding: Gannet Great skua Guillemot	Breeding: Seabirds
Mousa SPA	197.98	Breeding: Arctic tern Storm petrel	N/A	N/A
Fair Isle SPA	561.27 + 2km extension	Breeding: Arctic tern Fair Isle wren	Breeding: Guillemot	Breeding: Seabird
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	4444.35	Breeding: Hen harrier Red-throated diver Short-eared owl Over winter: Hen harrier	N/A	N/A
Hoy SPA	9499.7 + 2km extension	Breeding: Peregrine Red-throated diver	Breeding: Great skua	Breeding: Seabirds

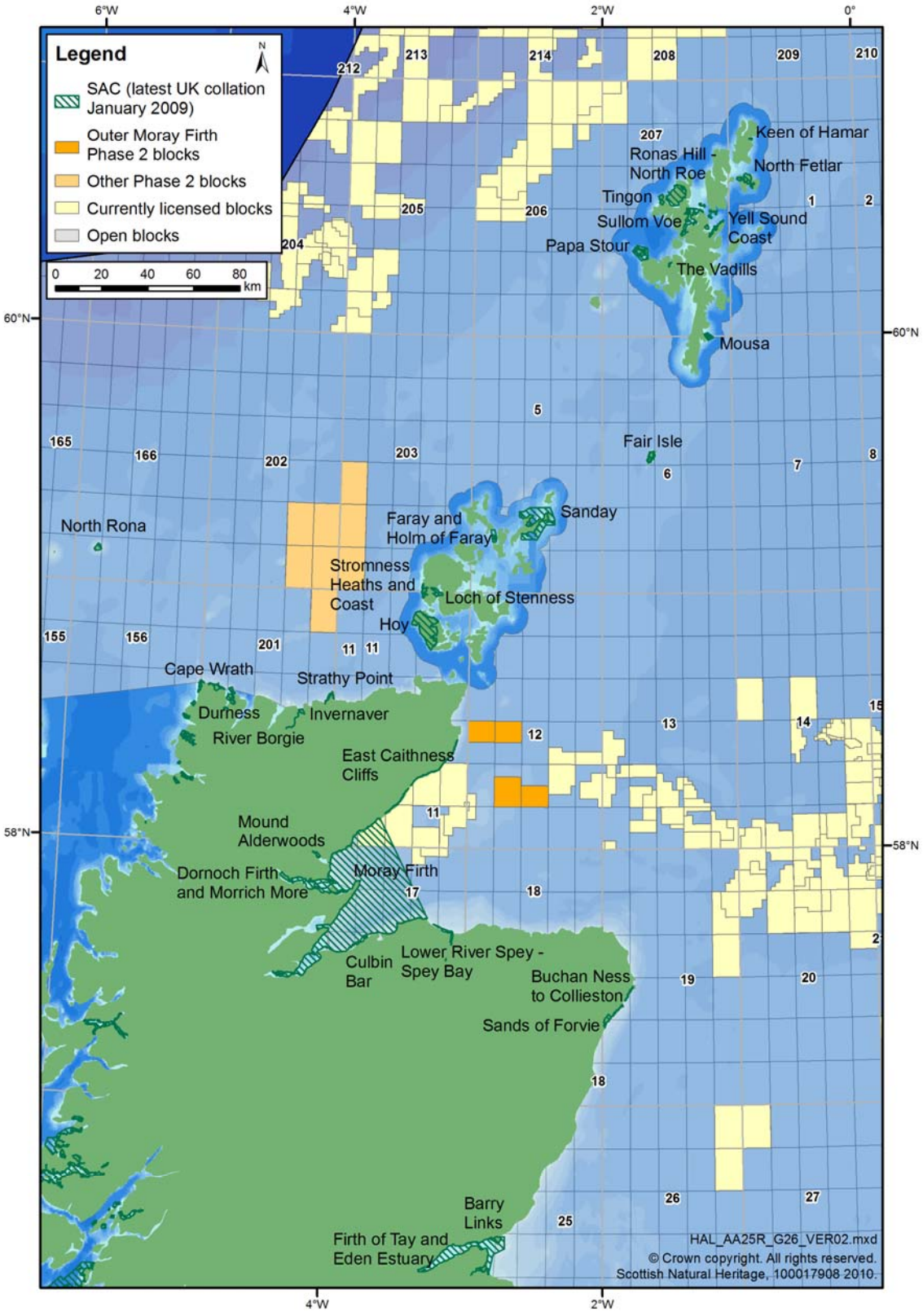
[7] A seabird assemblage of international importance: the area regularly supports at least 20,000 seabirds. Or, a wetland of international importance: the area regularly supports at least 20,000 waterfowl.

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[7]
Marwick Head SPA	8.7 + 1km extension	N/A	Breeding: Guillemot	Breeding: Seabirds
Rousay SPA	633.41 + 2km extension	Breeding: Arctic tern	N/A	Breeding: Seabirds
West Westray SPA	350.62 + 2km extension	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	238.03 + 2km extension	N/A	N/A	Breeding: Seabirds
East Sanday Coast SPA	1515.23	Over winter: Bar-tailed godwit	Over winter: Purple sandpiper Turnstone	N/A
Auskerry SPA	101.97	Breeding: Arctic tern Storm petrel	N/A	N/A
Copinsay SPA	125.42 + 2km extension	N/A	N/A	Breeding: Seabirds
Sule Skerry and Sule Stack SPA	18.9 + 2km extension	Breeding: Leach's storm petrel Storm petrel	Breeding: Gannet Puffin	Breeding: Seabird
NORTH COAST OF SCOTLAND				
North Rona and Sula Sgeir SPA	138.79 + 2km extension	Breeding: Leach's storm petrel	Breeding: Gannet Guillemot	Breeding: Seabird
Cape Wrath SPA	1019.18 + 2km extension	N/A	N/A	Breeding: Seabirds
North Sutherland Coastal Islands SPA	221.11	Over winter: Barnacle goose	N/A	N/A
North Caithness Cliffs SPA	557.73 + 2km extension	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
Caithness and Sutherland Peatlands SPA	145516.75	Breeding: Black-throated diver Golden eagle Golden plover Hen harrier Merlin Red-throated diver Short-eared owl Wood sandpiper	Breeding: Common scoter Dunlin Greenshank Wigeon	N/A
MORAY FIRTH AND ABERDEENSHIRE				
East Caithness Cliffs SPA	442.62 + 2km extension	Breeding: Peregrine	Breeding: Guillemot Kittiwake Razorbill Herring gull Shag	Breeding: Seabirds
Dornoch Firth and Loch Fleet SPA	7836.33	Breeding: Osprey Over winter: Bar-tailed godwit	Over winter: Greylag goose Wigeon	Over winter: Waterfowl

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[7]
Loch Eye SPA	205.14	Over winter: Whooper swan	Over winter: Greylag goose	N/A
Cromarty Firth SPA	3766.24	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 Osprey Over winter: Bar-tailed godwit	Over winter: Greylag goose Red-breasted merganser Redshank Scaup	Over winter: Waterfowl
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	174.22 + 2km extension	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	Over winter: Waterfowl
Buchan Ness to Collieston Coast SPA	208.62 + 2km extension	N/A	N/A	Breeding: Seabirds
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	10.15 + 2km extension	N/A	Breeding: Guillemot Kittiwake	Breeding: Seabirds
SOUTH OF ABERDEENSHIRE				
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

A2 Coastal and Marine Special Areas of Conservation

Map A.2 - Location of coastal and marine SACs


Legend
SAC (latest UK collation January 2009)
Outer Moray Firth Phase 2 blocks
Other Phase 2 blocks
Currently licensed blocks
Open blocks
0 20 40 60 80 km
6°W
4°W
2°W
0°
60°N
58°N
Keen of Hamar
Ronas Hill - North Roe
North Fetlar
Tingon
Sullom Voe
Yell Sound Coast
Papa Stour
The Vadills
Mousa
Fair Isle
North Rona
Faray and Holm of Faray
Sanday
Stromness Heaths and Coast
Loch of Stenness
Hoy
Cape Wrath
Strathy Point
Durness
Invernaver
River Borgie
East Caithness Cliffs
Mound Alderwoods
Dornoch Firth and Morrich More
Moray Firth
Culbin Bar
Lower River Spey - Spey Bay
Buchan Ness to Collieston
Sands of Forvie
Barry Links
Firth of Tay and Eden Estuary
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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 Degraded raised bogs still capable of natural regeneration Depressions on peat substrates of the *Rhynchosporion* Transition mires and quaking bogs
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	Estuaries
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
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
Heaths	Alpine and Boreal heaths European dry heaths Northern Atlantic wet heaths with *Erica tetralix*

Annex I Habitat (abbreviated)	**Annex I Habitat(s) (full description)**
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. 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

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					
The Vadills SAC	62.43	Coastal lagoons	N/A	N/A	N/A
Papa Stour SAC	2076.69	Reefs Sea caves	N/A	N/A	N/A
Tingon SAC	569.3	Bogs	Standing freshwater	N/A	N/A
Ronas Hill-North Roe SAC	4900.9	Standing freshwater Heath Bogs	Heath Scree	N/A	N/A
Sullom Voe SAC	2698.55	Inlets and bays	Coastal lagoons Reefs	N/A	N/A
Yell Sound Coast SAC	1540.55	N/A	N/A	Otter *Lutra lutra* Common seal *Phoca vitulina*	N/A
Keen of Hamar SAC	38.52	Grasslands Scree	Heath	N/A	N/A
North Fetlar SAC	1581.93	Heath Fens	N/A	N/A	N/A
Mousa SAC	530.6	N/A	Reefs Sea caves	Common seal *Phoca vitulina*	N/A
Fair Isle SAC	561.27	Sea cliffs	Heaths	N/A	N/A
ORKNEY					
Hoy SAC	9499.7	Sea cliffs Standing freshwater Heath Bog	Heath Fens Rocky slopes	N/A	N/A
Loch of Stenness SAC	791.87	Coastal lagoons	N/A	N/A	N/A
Stromness Heaths and Coasts SAC	635.78	Sea cliffs Heath	Fens	N/A	N/A
Faray and Holm of Faray SAC	785.68	N/A	N/A	Grey seal *Halichoerus grypus*	N/A
Sanday SAC	10971.65	Reefs	Sandbanks Mudflats and sandflats	Common seal *Phoca vitulina*	N/A
NORTH COAST OF SCOTLAND					
North Rona SAC	628.53	N/A	Reefs Sea cliffs Sea caves	Grey seal *Halichoerus grypus*	N/A
Cape Wrath SAC	1018.18	Sea cliffs	N/A	N/A	N/A

Site Name	Area (ha)	Annex 1 Habitat Primary	Annex 1 Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
Durness SAC	1212.74	Coastal dunes Standing freshwater Grasslands Limestone pavements	Coastal dunes Heath Grasslands Fens	N/A	Otter *Lutra lutra*
Invernaver SAC	294.54	Coastal dunes Heath Grasslands	Coastal dunes Fens	N/A	N/A
River Borgie SAC	32.72	N/A	N/A	Freshwater pearl mussel *Margaritifera margaritifera*	Atlantic salmon *Salmo salar* Otter *Lutra lutra*
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	151341.67	N/A	Sandbanks	Bottlenose dolphin *Tursiops truncatus*	N/A
Dornoch Firth and Morrich More SAC	8700.53	Estuaries Mudflats and sandflats Saltmarsh and saltmeadows Salt meadows Coastal dunes	Sandbanks Reefs	Otter *Lutra lutra* Common seal *Phoca vitulina*	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 cSAC	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	Common seal *Phoca vitulina*	N/A

A3 Offshore Special Areas of Conservation

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

A4 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]
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
River Tay	-	SL, RL, AS

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

APPENDIX B – SCREENING TABLES FOR IDENTIFICATION OF POTENTIAL EFFECTS ON THE SITES

B1 Coastal and marine Special Protection Areas

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
SHETLAND								
Sumburgh Head	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Lochs of Spiggie and Brow	-	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Foula	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Papa Stour	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Ronas Hill-North Roe and Tingon	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Ramna Stacks and Gruney	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Otterswick and Graveland	✓	-		-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Hermaness, Saxa Vord and Valla Field	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Fetlar	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Noss	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
Mousa	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Fair Isle	✓	-	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present (breeding seabirds), although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
ORKNEY								
Pentland Firth Islands	✓	-	-	✓	-	-	✓	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude or fuel oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (Arctic tern) will not be affected by foreseeable in-combination effects.
Switha	-	✓	-	-	-	-	-	Due to nature of feature present (barnacle goose), site integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
Orkney Mainland Moors	✓	✓	-	✓	-	-	-	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (red-throated diver) will not be affected by foreseeable in-combination effects.
Hoy	✓	-	-	✓	-	-	-	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.
Marwick Head	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Rousay	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
West Westray	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Papa Westray (North Hill and Holm)	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
Calf of Eday	✓	-	-	✓	-	-	✓	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.
East Sanday Coast	-	✓	-	✓	-	-	✓	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (over-wintering birds) will not be affected by foreseeable in-combination effects.
Auskerry	✓	-	-	✓	-	-	✓	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
Copinsay	✓	-	-	✓	-	-	✓	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.
Sule Skerry and Sule Stack	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
NORTH COAST OF SCOTLAND								
North Rona and Sula Sgeir	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Cape Wrath	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
North Sutherland Coastal Islands	-	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
North Caithness Cliffs	✓	-	-	✓	-	-	✓	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude or fuel oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.
Caithness and Sutherland Peatlands	✓	-	-	✓	-	-	✓	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude or fuel oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the Pentland Firth marine energy strategic area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.
Caithness lochs	-	✓	-	-	-	-	-	Due to nature of features present (over-wintering geese), site integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
MORAY FIRTH AND ABERDEENSHIRE								
East Caithness Cliffs	✓	-	-	✓	-	✓	✓	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude or fuel oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable (offshore wind) energy developments in the outer Moray Firth area; however, population integrity of the qualifying species (breeding seabirds) will not be affected by foreseeable in-combination effects.
Dornoch Firth and Loch Fleet	✓	✓	-	✓	-	-	✓	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Loch Eye	-	✓	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the qualifying features (over-wintering waterfowl) when foraging in adjacent firths beyond the site boundaries. However, mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
Cromarty Firth	✓	✓	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Inner Moray Firth	✓	✓	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Moray and Nairn Coast	✓	✓	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Troup, Pennan and Lion's Heads	✓	-	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the features present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
Loch of Strathberg	✓	✓	-	✓	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the feature present (sandwich tern), although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Buchan Ness to Collieston Coast	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Ythan Estuary, Sands of Forvie and Meikle Loch	✓	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Fowlsheugh	✓	-	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
SOUTH OF ABERDEENSHIRE								
Montrose Basin	-	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Firth of Tay and Eden Estuary	✓	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

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

B2 Coastal and marine Special Areas of Conservation

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
SHETLAND							
The Vadills	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Papa Stour	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Tingon	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Ronas Hill - North Roe	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Sullom Voe	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Yell Sound Coast	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Keen of Hamar	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
North Fetlar	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Mousa	✓	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Fair Isle	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
ORKNEY							
Hoy	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Loch of Stenness	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Stromness Heaths and Coasts	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Faray and Holm of Faray	-	✓	✓	-	✓	✓	Site is remote from blocks and integrity would not be affected by emissions or discharges from routine operations. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species feature (grey seal), although effects on site integrity are unlikely. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the feature present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the outer Moray Firth (offshore wind) and Pentland Firth areas; however, population integrity of the qualifying species (grey seal) will not be affected by foreseeable in-combination effects.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
Sanday	✓	✓	✓	-	✓	✓	Site is remote from blocks and integrity would not be affected by emissions or discharges from routine operations. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species feature (common seal), although effects on site integrity are unlikely. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect some of the features present (intertidal sand and mudflats, common seal), although mitigation would be possible. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the feature present, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the outer Moray Firth (offshore wind) and Pentland Firth areas; however, population integrity of the qualifying species (common seal) will not be affected by foreseeable in-combination effects.
NORTH COAST OF SCOTLAND							
North Rona	✓	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Cape Wrath	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Durness	✓	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Invernaver	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
River Borgie	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Strathy Point	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
MORAY FIRTH AND ABERDEENSHIRE							
East Caithness Cliffs	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Mound Alderwoods	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Moray Firth	✓	✓	✓	-	✓	✓	Site integrity would not be affected by emissions or discharges from routine operations. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species feature (bottlenose dolphin), although effects on site integrity are unlikely. In the unlikely event of a major crude oil spill, weathered spilled oil could theoretically affect the species feature (bottlenose dolphin), although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the outer Moray Firth (offshore wind) area; however, population integrity of the qualifying species (bottlenose dolphin) will not be affected by foreseeable in-combination effects.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
Dornoch Firth and Morrich More	✓	✓	✓	-	✓	✓	Site integrity would not be affected by emissions or discharges from routine operations. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species features (common seal and otter), although effects on site integrity are unlikely. In the unlikely event of a major crude or fuel oil spill, weathered spilled oil could theoretically affect several habitat and species features, although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known. It is noted that this site could potentially be influenced by renewable energy developments in the outer Moray Firth (offshore wind) area; however, population integrity of the qualifying species (common seal) will not be affected by foreseeable in-combination effects.
Culbin Bar	✓	-	✓	-	-	-	Site integrity would not be affected by emissions or discharges from routine operations. In the unlikely event of a major crude or fuel oil spill, weathered spilled oil could theoretically affect the features present (salt meadows), although mitigation would be possible. Such mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Lower River Spey - Spey Bay	✓	-	-	-	-	-	Due to nature of feature(s) present, site integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Buchan Ness to Collieston	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Sands of Forvie	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Garron Point	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
SOUTH OF ABERDEENSHIRE							
Barry Links	✓	-	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Firth of Tay and Eden Estuary	✓	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

B3 Riverine Special Areas of Conservation

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
River Naver	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
River Thurso	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
Berriedale and Langwell Waters	-	✓	-	-	✓	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species feature (Atlantic salmon) outside of the site boundaries, although effects on site integrity are unlikely.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
River Evelix	-	✓	-	-	-	-	Site is remote from blocks and the integrity of its interest feature (freshwater pearl mussel) integrity would not be affected by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to migratory salmonids (the gills of which provide an essential mode of dispersal for mussel larvae) outside of the site boundaries. However, such indirect effects are highly unlikely to compromise site integrity.
River Oykel	-	✓	-	-	✓	-	Site is remote from blocks and the integrity of its interest feature (freshwater pearl mussel) integrity would not be affected by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species feature (Atlantic salmon) outside of the site boundaries, although effects on site integrity are unlikely. The gills of migratory salmonids provide an essential mode of dispersal for the larvae of the species feature (freshwater pearl mussel); despite the potential for temporary acoustic disturbance of such salmonids outside of the site boundaries, effects on site integrity are highly unlikely.
River Moriston	-	✓	-	-	✓	-	Site is remote from blocks and the integrity of its interest feature (freshwater pearl mussel) integrity would not be affected by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species feature (Atlantic salmon) outside of the site boundaries, although effects on site integrity are unlikely. The gills of migratory salmonids provide an essential mode of dispersal for the larvae of the species feature (freshwater pearl mussel); despite the potential for temporary acoustic disturbance of such salmonids outside of the site boundaries, effects on site integrity are highly unlikely.

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
River Spey	-	✓	-	-	✓	-	Site is remote from blocks and the integrity of its interest feature (freshwater pearl mussel) integrity would not be affected by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic survey) may cause temporary acoustic disturbance to the species features (Atlantic salmon, sea lamprey) outside of the site boundaries, although effects on site integrity are unlikely. The gills of migratory salmonids provide an essential mode of dispersal for the larvae of the species feature (freshwater pearl mussel); despite the potential for temporary acoustic disturbance of such salmonids outside of the site boundaries, effects on site integrity are highly unlikely.
River Dee	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
River South Esk	-	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.
River Tay	✓	✓	-	-	-	-	Site is remote from blocks and its integrity would not be affected by emissions or discharges from routine operations or accidental spills.

APPENDIX C – DETAILED INFORMATION ON SITES WHERE THE POTENTIAL FOR EFFECTS HAVE BEEN IDENTIFIED

C1 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 59º32'15"N Longitude 01º37'00"W
Area (ha)	561.27 + 2km offshore extension
Summary	Fair Isle is located in the North Sea, halfway between the Shetland mainland and the Orkney Islands in northern Scotland. It is partly composed of Old Red Sandstone that has weathered to produce a greatly indented coastline with many geos, stacks and crags. The island is of major importance as a breeding area for seabirds, including skuas, terns, gulls and auks. It is also notable for its endemic race of wren *Troglodytes troglodytes fridariensis.* The seabirds nest both on the cliffs and crags around the island as well as on moorland and maritime grassland areas, and feed in the waters around the island, outside the SPA. The SPA includes the entire coastline of the island together with an extensive area of moorland and grassland in the north of the island.

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

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

During the breeding season:
Arctic tern *Sterna paradisaea*, 1,120 pairs representing at least 2.5% of the breeding population in Great Britain (5 year mean, 1993-1997) [favourable maintained]

Fair Isle wren *Troglodytes troglodytes fridariensis*, 37 individuals representing 100.0% of the breeding population in Great Britain (Count, as at 1997) [favourable maintained]

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

During the breeding season:
Guillemot *Uria aalge*, 25,165 pairs representing at least 1.1% of the breeding East Atlantic population (Count as at 1994) [favourable maintained]

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

During the breeding season, the area regularly supports 180,000 individual seabirds including: puffin *Fratercula arctica*, razorbill *Alca torda*, kittiwake *Rissa tridactyla*, great skua *Catharacta skua*, Arctic skua *Stercorarius parasiticus*, shag *Phalacrocorax aristotelis*, gannet *Morus bassanus*, fulmar *Fulmarus glacialis*, guillemot *Uria aalge*, Arctic tern *Sterna paradisaea* [all favourable maintained, except shag: unfavourable recovering]

Conservation objectives:

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

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

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	

Site Name: Orkney Mainland Moors SPA	
Location	Grid Ref: HY351223 (central point) Latitude 59º05'00"N Longitude 03º08'00"W
Area (ha)	4444.35
Summary	Orkney Mainland Moors SPA comprises four areas of moorland on the mainland of Orkney. The predominant habitats include extensive areas of blanket bog, acid grassland, wet and dry heath, raised-mire and calcareous valley mire. The presence of extensive moorland provides nesting opportunities for an assemblage of moorland breeding birds, including hen harrier and short-eared owl. Sheltered river valleys and dales support willow *Salix* spp. scrub, tall-herb and flush vegetation, and there are several scattered oligotrophic lochans present on part of the SPA, which provide important breeding areas for red-throated diver.
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:** Hen harrier *Circus cyaneus*, 30 pairs representing at least 6.0% of the breeding population in Great Britain (as of 1998) [favourable maintained] Red-throated diver *Gavia stellata*, 15 pairs representing at least 1.6% of the breeding population in Great Britain (1994-1996) [favourable maintained] Short-eared owl *Asio flammeus*, 20 pairs representing at least 2.0% of the breeding population in Great Britain (RSPB mid 1990s est) [favourable maintained] **Overwinter:** Hen harrier *Circus cyaneus*, 13 individuals representing at least 1.7% of the wintering population in Great Britain (Count mean (1994-98)) [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	

Site Name: Hoy SPA	
Location	Grid Ref: ND238974 (central point) Latitude 58º51'30"N Longitude 03º19'10"W
Area (ha)	9499.7 + 2km offshore extension
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*, 56 pairs 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 and kittiwake: 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	

Site Name: Calf of Eday SPA	
Location	Grid Ref: HY584394 (central point) Latitude 59º14'24"N Longitude 02º43'48"W
Area (ha)	238.03 + 2km offshore extension
Summary	The Calf of Eday is a small, uninhabited island located to the north of the island of Eday in the Orkney archipelago. The island has a rocky coastline with cliffs on the north and east coasts. The dominant vegetation on the island is dry dwarf-shrub heath dominated by heather, with smaller areas of wet heath, semi-improved grassland and coastal grassland. The site is of importance as a nesting area for breeding seabirds, which feed in surrounding waters outside the SPA. Gulls and cormorant nest in the dry heath and grassland areas, whilst fulmar, kittiwake and auks nest on the cliffs.
Qualifying features for which the site is designated [condition]:	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Guillemot *Uria aalge*, 24,388 pairs representing up to 1.1% of the breeding East Atlantic population (as of 1991) [unfavourable declining] ***Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds Assemblage qualification: A seabird assemblage of international importance.*** During the breeding season, the area regularly supports 30,000 individual seabirds (as of 1997) including: guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, great black-backed gull *Larus marinus*, cormorant *Phalacrocorax carbo*, fulmar *Fulmarus glacialis* [unfavourable declining, except great black-backed gull and fulmar: favourable maintained]	
Conservation objectives:	
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within site • Distribution and extent of habitats supporting the species • Structure, function and supporting processes of habitats supporting the species • No significant disturbance of the species	

Site Name: East Sanday Coast SPA	
Location	Grid Ref: HY676423 (central point) Latitude 59º16'00"N Longitude 02º34'00"W
Area (ha)	1515.23
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	

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	

Site Name: Copinsay SPA	
Location	Grid Ref: HY611015 (central point) Latitude 58º54'00"N Longitude 02º40'30"W
Area (ha)	125.42 + 2km offshore extension
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	

Site Name: North Caithness Cliffs SPA	
Location	Grid Ref: ND182743 (central point) Latitude 58º39'00"N Longitude 03º24'30"W
Area (ha)	557.73 + 2km offshore extension
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	

Site Name: Caithness and Sutherland Peatlands SPA	
Location	Grid Ref: NC866402 (central point) Latitude 58º20'10"N Longitude 03º56'15"W
Area (ha)	145,516.75
Summary	The Caithness & Sutherland Peatlands are located across the northernmost parts of mainland Scotland. The SPA contains a large proportion of these peatlands, which form one of the largest and most intact areas of blanket bog in the world. The peatlands include an exceptionally wide range of vegetation and surface pattern types (pool systems), some of which are unknown elsewhere. This range of structurally diverse peatland and freshwater habitats supports a wide variety of breeding birds including internationally important populations of raptors, wildfowl and 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:

During the breeding season:
Black-throated diver *Gavia arctica*, 26 pairs representing at least 16.3% of the breeding population in Great Britain (11 year mean, 1986-1996) [favourable maintained]

Golden eagle *Aquila chrysaetos*, 5 pairs representing at least 1.3% of the breeding population in Great Britain (Count, as at 1992) [favourable maintained]

Golden plover *Pluvialis apricaria*, 1,064 pairs representing at least 4.7% of the breeding population in Great Britain (Count, as at mid-1990s) [favourable maintained]

Hen harrier *Circus cyaneus*, 14 pairs representing at least 2.8% of the breeding population in Great Britain (5 year mean, 1993-1997) [favourable maintained]

Merlin *Falco columbarius*, 54 pairs representing at least 4.2% of the breeding population in Great Britain (Count, as at early 1990s) [favourable maintained]

Red-throated diver *Gavia stellata*, 89 pairs representing at least 9.5% of the breeding population in Great Britain (Two year mean, 1993-1994)

Short-eared owl *Asio flammeus*, 30 pairs representing at least 3.0% of the breeding population in Great Britain (Count, as at mid-1990s)

Wood sandpiper *Tringa glareola*, 5 pairs representing up to 50.0% of the breeding population in Great Britain (Two year mean, 1994-1995) [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:
Common scoter *Melanitta nigra*, 27 pairs representing <0.1% of the breeding Western Siberia/Western & Northern Europe/Northwestern Africa population (1996) [favourable maintained]

Dunlin *Calidris alpina schinzii*, 1,860 pairs representing at least 16.9% of the breeding Baltic/UK/Ireland population (Count, as at 1994) [favourable maintained]

Greenshank *Tringa nebularia*, 256 pairs representing at least 0.4% of the breeding Europe/Western Africa population (1994/95) [favourable maintained]

Wigeon *Anas penelope*, 43 pairs representing <0.1% of the breeding Western Siberia/Northwestern/Northeastern Europe population (1994)

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

Site Name: Caithness and Sutherland Peatlands SPA
• 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

Site Name: East Caithness Cliffs SPA	
Location	Grid Ref: ND214331 (central point) Latitude 58º16'49"N Longitude 03º20'21"W
Area (ha)	442.62 + 2km offshore extension
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) ***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*, 71,509 pairs representing at least 3.2% of the breeding East Atlantic population (Count as at 1986) [favourable maintained] Herring Gull *Larus argentatus*, 9,370 pairs representing at least 1.0% of the breeding Northwestern Europe (breeding) and Iceland/Western Europe - breeding population (Count, as at 1986) [unfavourable declining] Kittiwake *Rissa tridactyla*, 31,930 pairs representing at least 1.0% of the breeding Eastern Atlantic - Breeding population (Count, as at 1986) [favourable maintained] Razorbill *Alca torda*, 9,259 pairs representing at least 1.6% of the breeding population (1986) [favourable maintained] Shag *Phalacrocorax aristotelis*, 2,345 pairs representing at least 1.9% of the breeding Northern Europe population (Count as at 1986) [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	

Site Name: Dornoch Firth and Loch Fleet SPA	
Location	Grid Ref: NH788862 (central point) Latitude 57º51'00"N Longitude 04º02'30"W
Area (ha)	7836.33
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*, 15,304 individuals representing at least 1.2% of the wintering Western Siberia/Northwestern/Northeastern Europe population (5 year peak mean 1989/90-1993/4) [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 34,837 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

Site Name: Cromarty Firth SPA	
Location	Grid Ref: NH688680 (central point) Latitude 57º41'00"N Longitude 04º12'00"W
Area (ha)	3766.24
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 pairs representing at least 1.0% of the breeding population in Great Britain (Early 1990s) [favourable maintained] **Over winter:** Bar-tailed Godwit *Limosa lapponica*, 1,420 individuals representing at least 2.7% of the wintering population in Great Britain (winter peak mean) [favourable maintained] Whooper Swan *Cygnus cygnus,* 55 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,* 1,777 individuals representing at least 1.8% of the wintering Iceland/UK/Ireland population (winter peak mean) [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 34,847 individual waterfowl (5 year peak mean 1991/2 - 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	

Site Name: Inner Moray Firth SPA	
Location	Grid Ref: NN564745 (central point) Latitude 56º50'25"N Longitude 04º21'15"W
Area (ha)	2339.23
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*, 4 pairs representing at least 4.0% of the breeding population in Great Britain (Early 1990s) [favourable maintained] **Over winter:** Bar-tailed godwit *Limosa lapponica*, 1,155 individuals representing at least 2.2% of the wintering population in Great Britain (winter peak mean) [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,* 1,731 individuals representing at least 1.7% of the wintering Iceland/UK/Ireland population (winter peak mean) [favourable maintained] Red-breasted merganser *Mergus serrator*, 1,731 individuals representing at least 1.4% of the wintering Northwestern/Central Europe population (winter peak mean) [unfavourable no change] Redshank *Tringa totanus*, 1,811 individuals representing at least 1.2% of the wintering Eastern Atlantic - wintering population (winter peak mean) [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:	

Site Name: Inner Moray Firth SPA
• 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

Site Name: Loch Eye SPA	
Location	Grid Ref: NH831797 (central point) Latitude 57º47'30"N Longitude 03º58'00"W
Area (ha)	205.14
Summary	Loch Eye is located between the Cromarty and Dornoch Firths in the Highland region of Scotland. It is a relatively large, shallow, nutrient-rich inland water body, and is the best example of a eutrophic lowland loch north of the Highland boundary fault. The loch and surrounding area supports a diverse range of plant communities. In winter, the loch is an important roosting site for internationally important numbers of waterbirds, especially whooper swan and Icelandic greylag goose. The waterbirds using Loch Eye move on a regular basis between the loch and the nearby Dornoch and Cromarty Firths where there are abundant feeding opportunities, although the geese feed in surrounding areas of agricultural land outside the SPA. The loch is thus an integral component of the wider Moray Basin ecosystem.
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:** Whooper swan *Cygnus cygnus,* 213 individuals representing at least 3.9% of the wintering population in Great Britain (WeBS 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,* 11,321 individuals representing at least 11.3% of the wintering Iceland/UK/Ireland population (5 year peak mean 1991/2 - 1995/6) [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	

Site Name: Moray and Nairn Coast SPA	
Location	Grid Ref: NH967633 (central point) Latitude 57º38'54"N Longitude 03º43'48"W
Area (ha)	2410.25
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*, 1,690 individuals representing at least 1.1% of the wintering Eastern Atlantic - wintering population (WeBS 1989-1993 and additional surveys) [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 20,250 individual waterfowl including: 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	

Site Name: Troup, Pennan and Lion's Head SPA	
Location	Grid Ref: NH782677 (central point) Latitude 57º41'00"N Longitude 02º15'05"W
Area (ha)	174.22 + 2km offshore extension
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: **Over winter:** Guillemot *Uria aalge*, 29,902 pairs representing at least 1.3% of the breeding East Atlantic population (Count as at 1995) [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.*** 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* [favourable maintained, except herring gull 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	

Site Name: Loch of Strathbeg SPA	
Location	Grid Ref: NK070592 (central point) Latitude 57º 37' 24" N Longitude 01º 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 declining]

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 49,452 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* [favourable maintained, except greylag goose: 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

C2 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 1 Habitat Primary feature: None Secondary features: None **Annex 2 Species** Primary features: Grey seal *Halichoerus grypus* [favourable maintained] Secondary features: None	
Conservation objectives:	
For Annex I Habitats N/A	
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	

Site Name: Sanday SAC	
Location	Grid Ref: HY715442 (central point) Latitude 59º17'00"N Longitude 02º30'00"W
Area (ha)	10971.65
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 common 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 1 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 2 Species
Primary features: Common seal *Phoca vitulina* [favourable maintained]
Secondary features: None

Conservation objectives:

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

To ensure for the qualifying habitats that the following are maintained in the long term:
- Extent of the habitats on site
- Distribution of the habitats within site
- Structure and function of the habitats
- Processes supporting the habitats
- Distribution of typical species of the habitats
- Viability of typical species as components of the habitats
- No significant disturbance of typical species of the habitats

For Annex II Species
To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interest. To ensure for the qualifying species that the following are established then maintained in the long term:
- Population of the species as a viable component of the site
- Distribution of the species within the site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

Site Name: Moray Firth SAC	
Location	Grid Ref: NH976821 (central point) Latitude 57º49'00"N Longitude 03º43'36"W
Area (ha)	151341.67
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 1 Habitat Primary feature: None Secondary features: Sandbanks which are slightly covered by sea water all the time [favourable maintained] **Annex 2 Species** Primary features: Bottlenose dolphin *Tursiops truncatus* [unfavourable recovering] 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	

Site Name: Dornoch Firth and Morrich More SAC	
Location	Grid Ref: NH788863 (central point) Latitude 57º51'00"N Longitude 04º02'30"W
Area (ha)	8700.53
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 common seal. Their numbers represent almost 2% of the UK population.

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

Annex 1 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

Annex 2 Species
Primary features: Otter *Lutra lutra* [favourable maintained], common 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

Site Name: Culbin Bar SAC	
Location	Grid Ref: NH940613 (central point) Latitude 57º37'45"N Longitude 03º46'30"W
Area (ha)	612.88
Summary	Culbin Bar is one of the two largest shingle sites in Scotland. It is 7km long and 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, crowberry and juniper.
Qualifying features for which the site is designated [condition]:	
Annex 1 Habitat Primary feature: Perennial vegetation of stony banks [favourable maintained] Secondary features: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [unfavourable declining], embryonic shifting dunes [favourable maintained] **Annex 2 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	
For Annex II Species N/A	