DEPARTMENT OF ENERGY & CLIMATE CHANGE

Offshore Oil & Gas Licensing

26th Seaward Round

Central English Channel

Blocks 97/14, 97/15, 98/06b, 98/07b, 98/08, 98/11, 98/12, 98/13 and 98/14

Appropriate Assessment

URN 11D/901: November 2011

CONTENTS

1 Introduction

1.1 Background and purpose

On 27th January 2010, the Secretary of State for the Department of Energy and Climate Change (DECC) invited applications for licences in the 26th Seaward Licensing Round.

To comply with obligations under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended) (OPAR 2001), in summer 2010, 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 2010).

In so doing, the amplification of the Habitats Directive test provided by the European Court of Justice in the Waddenzee case (Case C-127/02) was used, 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 99 whole or part 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 Appropriate Assessments (AA) in respect of each potential licence award, are contained in seven regional reports as follows:

- Southern North Sea
- Outer Moray Firth
- Central North Sea
- Fair Isle Channel
- Northern Ireland
- Eastern Irish Sea
- Central English Channel

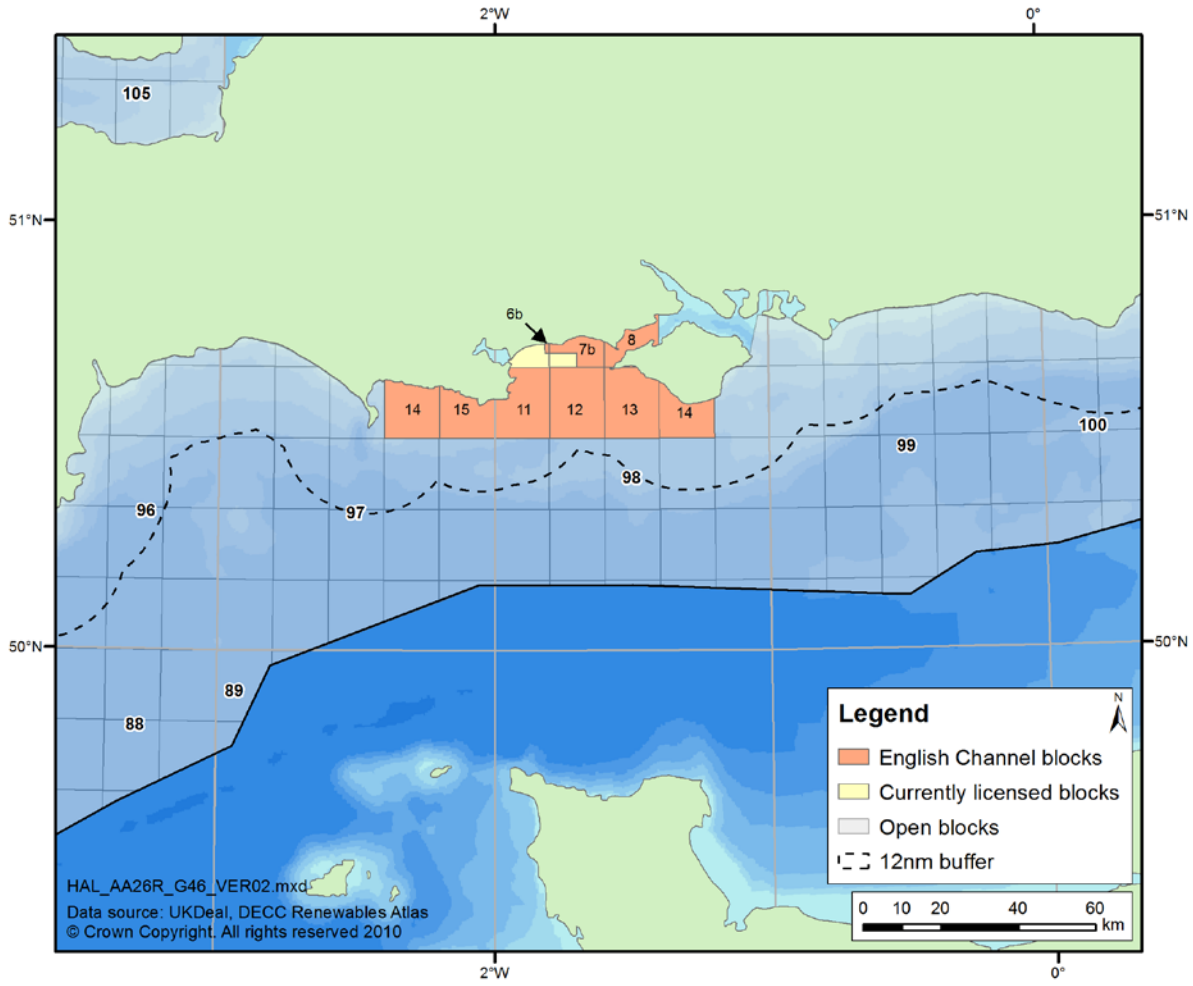
This report documents the further assessment in relation to 9 Blocks in the central English Channel (see Section 1.2).

1.2 Central English Channel Blocks

The central English Channel Blocks applied for in the 26th Round considered in this document are listed below and shown in dark orange in Figure 1.1.

97/14	97/15	98/06b	98/07b	98/08
98/11	98/12	98/13	98/14	

Figure 1.1: Location of central English Channel Blocks



2 Licensing and activity

2.1 Licensing

The exclusive rights to search and bore for and get petroleum in Great Britain, the territorial sea adjacent to the United Kingdom and on the UK Continental Shelf (UKCS) are vested in the Crown and the *Petroleum Act 1998* (as amended) gives the Secretary of State the power to grant licences to explore for and exploit these resources. The main type of offshore Licence is the Seaward Production Licence. Offshore licensing for oil and gas exploration and production commenced in 1964 and has progressed through a series of Seaward Licensing Rounds. A Seaward Production Licence may cover the whole or part of a specified Block or a group of Blocks. A Licence grants exclusive rights to the holders "to search and bore for, and get, petroleum" in the area covered by the Licence. A Licence does not confer any exemption from other legal/regulatory/fiscal requirements.

There are three types of Seaward Production Licences:

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

- Frontier Production Licences are a variation of the Traditional Production Licence with longer terms. A Frontier Production Licence has a longer Initial Term (six years as opposed to four) with the objective of allowing companies to screen larger areas. After 3 years, the licensee must relinquish 75% of the licensed acreage. At the end of the Initial Term, the exploration Work Programme must have been completed and the licensee must relinquish 50% of what is left (i.e. leaving one eighth of the original licensed area).

- In the 21st Round (2002) the Department introduced Promote Licences. The general concept of the Promote Licence is that the licensee is given two years after award to attract the technical, environmental and financial capacity to complete an agreed Work Programme. In effect, 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 model clauses and terms and conditions which are attached to Licences are contained in Regulations.

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

2.2 Activity

As part of the licence application process, applicant companies provide DECC with details of work programmes they propose in the first term to further the understanding or exploration of the Blocks(s) in question. These work programmes are considered with a range of other factors in DECC's decision on whether to license the Blocks and to whom. There are 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 a conditional commitment 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 result in a 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 proposed work programmes for the first four-year period (six years in the case of Frontier licences) are detailed in the licence applications. For some activities, such as seismic survey noise and oil spills, the impacts can occur some distance from the licensed Blocks and the degree of activity is not necessarily proportional to the size or number of Blocks in an area. For the case of direct physical disturbance, the licence Blocks being applied for are relevant, although there may still be pipelines that cross unlicensed Blocks should any significant development ensue after the initial four-year exploratory period.

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 Blocks comprising individual licences and estimates of work commitments for the Blocks derived by DECC from the range of applications received are as follows:

- Up to 3 Drill or Drop wells have been proposed as a combined total number for the central English Channel Blocks applied for. On account of the range of

environmental sensitivities present, the applicants propose exploration wells would be drilled from land, although subsequent activities could involve offshore drilling. In addition, around 70km of 2D marine seismic survey has been proposed in the Quadrant 98 Blocks. The hydrocarbon resources being targeted are conventional oil and gas in normally pressured reservoirs although in Quadrant 97 and Block 98/11, there may also be the potential for shale gas.

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, 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 and would be subject to further, project level assessment (incorporating Habitats Regulations Assessment (HRA) where appropriate) assessment prior to any consent being issued.

DECC has issued guidance on Block specific issues and concerns and Licensees should expect these concerns to affect DECC's decision whether or not to approve particular activities. The guidance indicates seasonal concerns for the majority of the Blocks considered in this assessment (see Table 2.1 and Section 7.1).

Table 2.1: Seasonal and other concerns related to Blocks considered in this Appropriate Assessment

Block	Period of concern for seismic surveys	Period of concern for drilling	Spawning sites*	Special Conditions
97/14	March - May	-	-	✓[1]
97/15	March - May	-	-	✓[1]
98/06b	-		-	✓[1]
98/07b	-		-	✓[1]
98/08	-		-	✓[1]
98/11	-	-	-	✓[1]
98/12	-	-	-	✓[2]
98/13	-	-	-	✓[2]
98/14	-	-	-	✓[2]

Note: [1] Extensive naval or air operations in these blocks. Any production license granted for these blocks will specify that no surface drilling or infrastructure development may occur within the block, which means that the subsurface will only be accessible from adjacent areas. [2]Activity is of concern to the MoD because the Block lies within training ranges. For further information see: Other regulatory issues (DECC 26th Seaward licensing Round website).

3 Relevant Natura 2000 Sites

The Natura 2000 sites to be considered in this assessment were identified based on their location in relation to the 9 Blocks (see Section 1.2 above) which are the subject of licence applications and in terms of the foreseeable possibility of interactions. Sites considered include designated Natura 2000 sites (also referred to as 'European Sites') and potential sites for which there is adequate information on which to base an assessment.

The sites considered are listed and mapped in Appendix A, and Appendix B presents the results of a screening exercise of these sites to identify the potential effects of activities that could follow the licensing of the Blocks in question. In accordance with Government policy (as set out in Planning Policy Statement 9 (ODPM 2005a[1])), the relevant sites considered include classified and potential SPAs, designated and candidate SACs and Sites of Community Importance[2] (SCIs). Guidance in relation to sites which have not yet been submitted to the European Commission is given by Circular 06/2005 (ODPM 2005b) which states that: "*Prior to its submission to the European Commission as a cSAC, a proposed SAC (pSAC) is subject to wide consultation. At that stage it is not a European site and the Habitats Regulations do not apply as a matter of law or as a matter of policy. Nevertheless, planning authorities should take note of this potential designation in their consideration of any planning applications that may affect the site.*" This can be augmented by the amended Scottish Government Circular 6/1995, "*...potential SPAs and potential SACs should be treated in the same way as classified SPAs...*" (i.e. that pSACs attract the same legal protection as designated sites).

The relevant sites are detailed in Appendix A and include:

- Coastal and marine Natura 2000 sites along the south coast of England from the Lyme Bay region in Devon to Pagham Harbour in Sussex
- Offshore Natura 2000 sites in the central English Channel
- Riverine SACs within the area for migratory fish.

In French offshore waters, several SACs and SPAs have been identified and are sufficiently progressed in the designation process to be considered as relevant sites in the context of AA.

Information gathering is in progress to inform the potential designation of further Natura 2000 sites, for instance the work of Kober *et al.* (2010) and survey work being undertaken on the south coast with a view to the identification of SPAs for the Balearic Shearwater (*Puffinus mauretanicus*). Should further sites be established in the future, these would be considered as necessary in subsequent project specific assessments.

Summaries of sites, together with their features of interest, and location maps are given in Appendix A (Maps A.1 to A.3 and Tables A.1 to A.7). This information is summarised in Figures 3.1-3.2 and Tables 3.1-3.3 and, below.

[1] Which states that "Listed Ramsar sites, also as a matter of policy, should receive the same protection as designated SPAs and SACs". UK coastal Ramsar sites are typically coincident with SACs and/or SPAs.

[2] Sites of Community Importance (SCIs) are more advanced in designation than cSACs in that they have been adopted by the European Commission but not yet formally designated by the government of the relevant country.

Figure 3.1: SPAs Relevant to this Appropriate Assessment

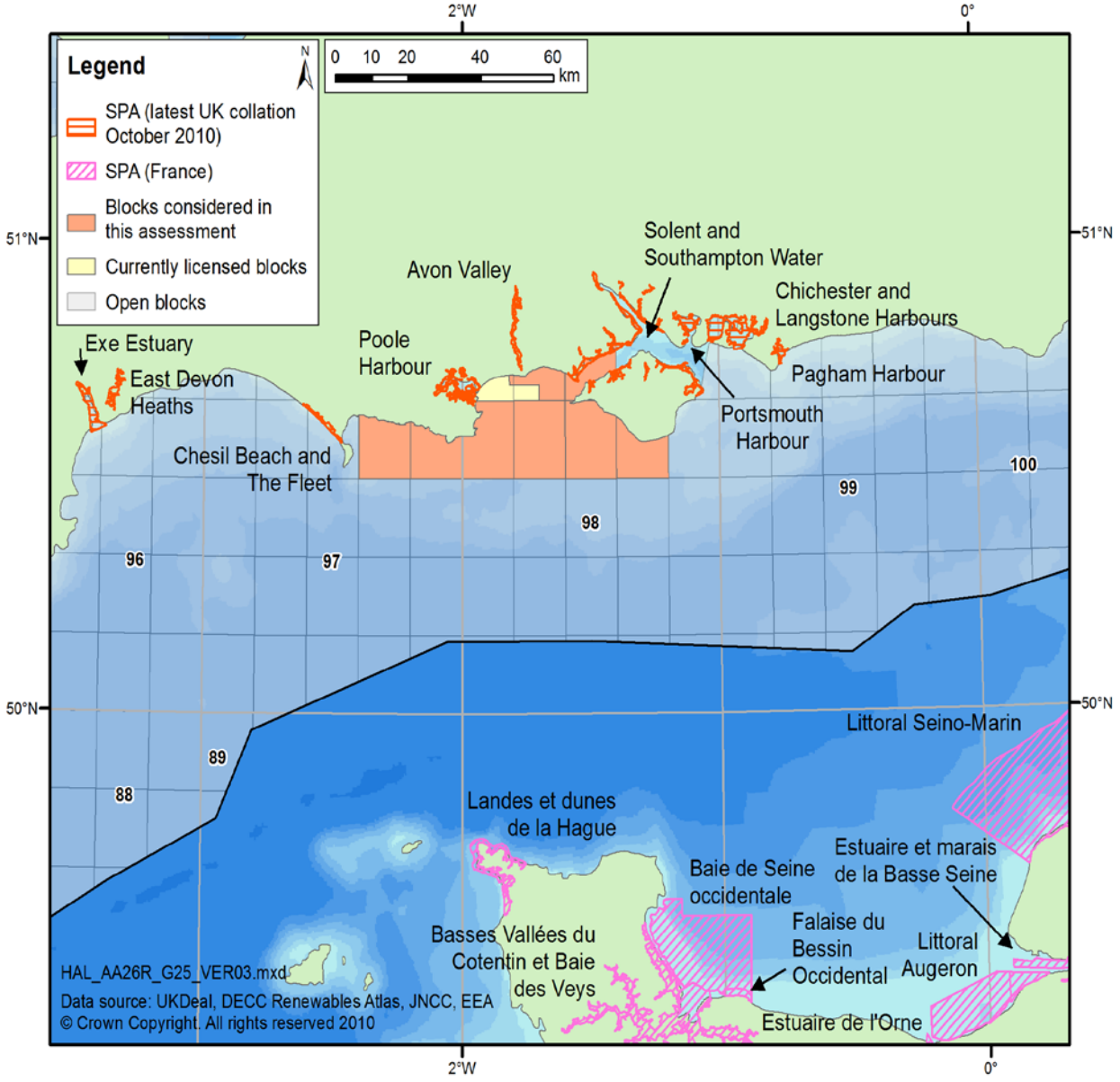


Figure 3.2: SACs Relevant to this Appropriate Assessment

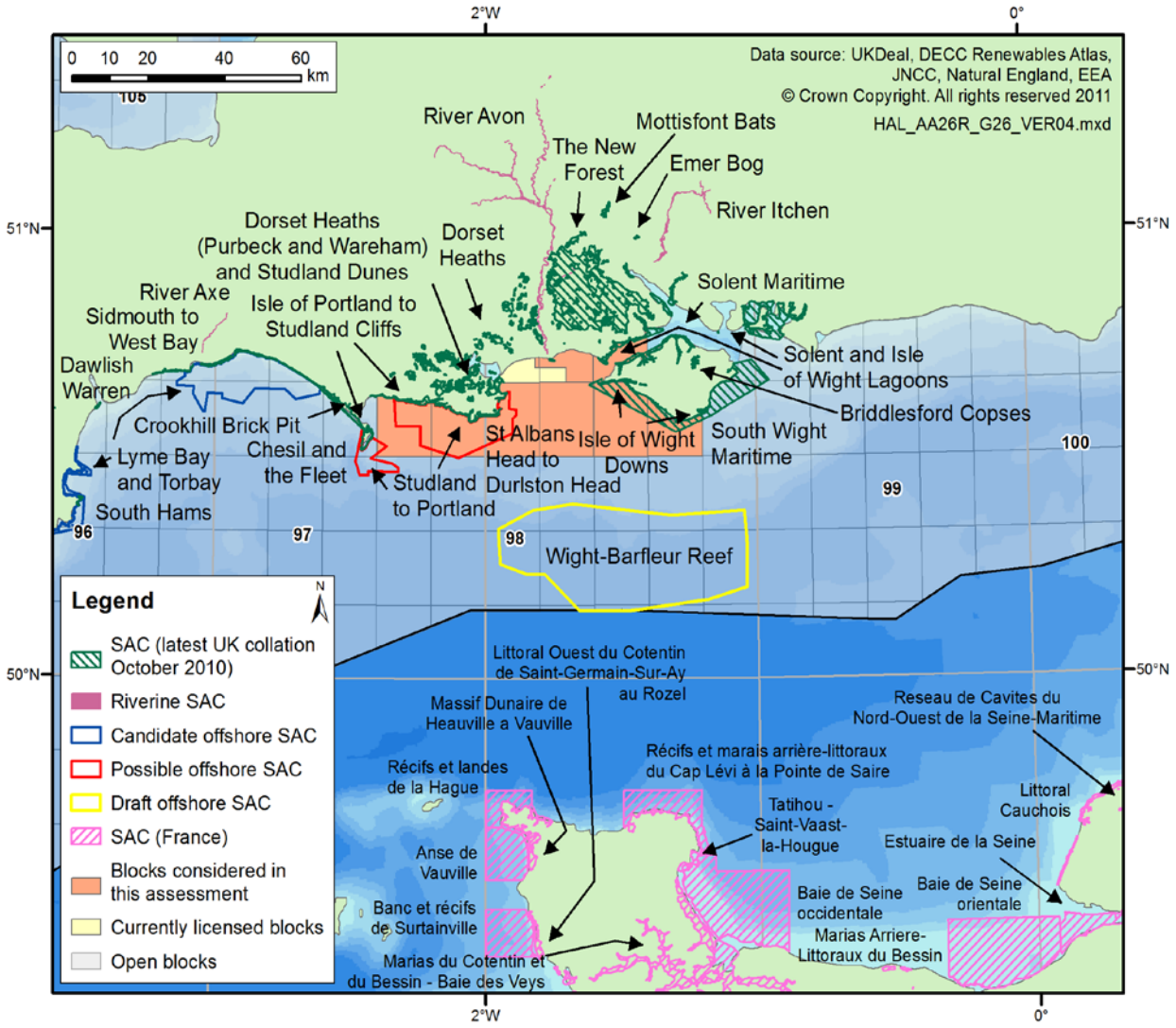


Table 3.1: SPA sites and qualifying features under Article 4.1 and 4.2, relevant to the English Channel AA

	Chesil Beach and The Fleet	Dorset Heathlands	Poole Harbour	The New Forest	Solent and Southampton Water	Avon Valley	Exe Estuary	East Devon Heaths	Chichester and Langstone Harbours	Portsmouth Harbour	Pagham Harbour
Redshank									W		
Little tern	B				B				B		B
Dark bellied Brent goose	W				W				W	W	
Dartford warbler		B		B				B			
Nightjar		B		B				B			
Woodlark		B		B							
Hen harrier		W		W							
Merlin		W									
Common Tern			B		B				B		
Mediterranean gull			B		B						
Avocet			W				W				
Little egrit			W						W		
Aquatic warbler			P								
Black-tailed godwit			W		W				W		
Shelduck			W								
Honey buzzard				B							
Roseate tern					B						
Sandwich tern					B				B		
Ringed plover					W				W		
Teal					W						
Bewick's swan						B					
Gadwall						W					
Slavonian grebe							W				
Bar tailed godwit									B		
Dunlin									W		
Grey plover									W		

	Chesil Beach and The Fleet	Dorset Heathlands	Poole Harbour	The New Forest	Solent and Southampton Water	Avon Valley	Exe Estuary	East Devon Heaths	Chichester and Langstone Harbours	Portsmouth Harbour	Pagham Harbour
Ruff											W
Pintail											W
Assemblage			W		W		W		W		

Note: B = Breeding, W = Over Wintering, P = On Passage, see Appendix C for more details.

Table 3.2: SAC sites and qualifying features under Annex 1 and Annex 2, relevant to this Appropriate Assessment

Annex 1 Habitats	The New Forest	Isle of Wight Downs	Solent & Isle of Wight Lagoons	Chesil & the Fleet	Dorset Heaths	Isle of Portland to Studland Cliffs	St Albans Head to Durlston Head	Dorset Heaths (Purbeck and Wareham and Studland)	Solent Maritime	South Wight Maritime	Ermer Bog	South Hams	Sidmouth to West Bay	Dawlish Warren	Lyme Bay and Torbay	Studland to Portland pSAC	Wight-Barfleur Reef dSAC
Bogs	P,Q				P			P									
Coastal dunes								P	Q					P,Q			
Coastal lagoons			P	P					Q								
Estuaries									P								
Fens	Q				Q			Q									
Mires											P						
Forest					Q			Q				Q	P				
Grasslands	P	P			Q	P	P	Q				P					
Heaths	P	P			P			P				P					
Mudflats and sandflats									Q								
Reefs										P					P	P	P
Salt marshes and salt meadows				P,Q					P,Q								
Sandbanks									Q								
Sea caves										P		Q			P		
Sea cliffs		P				P	P			P		Q	P				
Standing freshwater	P							P									
Vegetation of drift lines				P		Q			Q				Q				
Vegetation of stony banks				P					Q								

Annex 2 Species	The New Forest	Isle of Wight Downs	Dorset Heaths	Isle of Portland to Studland Cliffs	St Albans Head to Durlston Head	Dorset Heaths (Purbeck and Wareham and Studland Dunes)	Solent Maritime	Crookhill Brick Pit	South Hams	Dawlish Warren	Wight-Barfleur Reef dSAC	River Axe	River Avon	River Itchen
Harbour porpoise											NQ			
Bottlenose dolphin											NQ			
Sea lamprey												Q	P	
Brook lamprey												Q	P	Q
Atlantic salmon													P	Q
Otter														Q

Note: P = Primary feature, Q = Qualifying feature, NQ = Non-qualifying feature; see Appendix C for more details – note that primary and qualifying (secondary) features are treated equally within this assessment. Annex 1 habitats follow nomenclature shown in Box A.2 (AppendixA2).

4 Assessment of the effects of the plan on site integrity

4.1 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 has:

- Considered, on the basis of the precautionary principle, whether it could be concluded that the integrity of relevant European Sites would not be affected. This impact prediction involved a consideration of the cumulative and in-combination effects.
- Examined, in relation to elements of the plan where it was not possible to conclude that the integrity of relevant sites would not be affected, whether appropriate mitigation measures could be designed which cancelled or minimised any potential adverse effects identified.
- Considered the comments received from statutory advisers and others on the draft AA
- Completed the AA, including DECC's conclusion on whether or not it is possible to go ahead with the plan.

In considering the above, DECC used the clarification of the tests set out in the Habitats Directive in line with the ruling of the ECJ in the *Waddenzee* case (Case C-127/02), 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 (i.e. cause deterioration to a qualifying habitat or habitat of qualifying species, and/or undermine the conservation objectives of any given site). That is the case where no reasonable scientific doubt remains as to the absence of such effects.

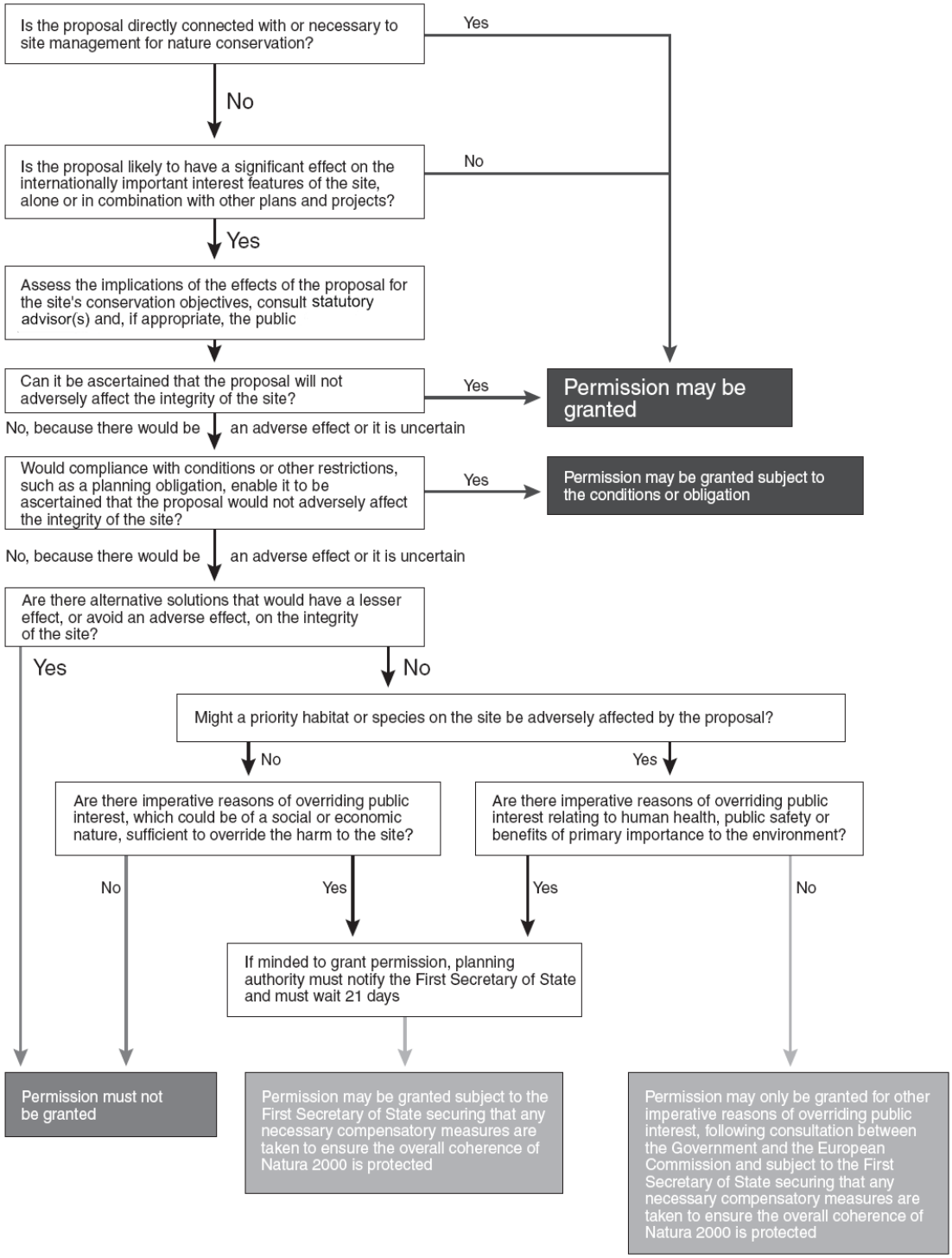
A flowchart summarising the process is shown in Figure 4.1.

4.2 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 a site-by-site consideration in Appendix C.

Figure 4.1: 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).

4.3 Assessment

The approach to ascertaining the absence or otherwise of adverse effects on the integrity of a European Site is set out in Section 4.1 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), the English Nature Research Reports, No 704 (Hoskin & Tyldesley 2006) and the Scottish Natural Heritage Habitats Regulations Appraisal of Plans, No 1739 (Tyldesley & Associates 2010).

Appendix A lists 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 the 9 Blocks in question. Where potential effects are identified, more detailed information on the relevant sites is provided in Appendix C.

Detailed assessments are made in Sections 5-9 of the implications for the integrity of the relevant European Sites and their qualifying features and species, were a licence for any of the nine central English Channel 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. Advice given under Regulation 33 (now Regulation 35 of the 2010 Regulations) 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 a requirement that these options would be evaluated in the environmental assessments required as part of activity consenting.

The conservation objectives identified for SAC and SPA features for sites where the potential for effects have been identified are listed in Appendix C and referred to where relevant throughout the document. These objectives, in relation to the specific qualifying features of each site, and the conservation status of these features, have been considered during this Appropriate Assessment. The basis and primary concern of the conservation objectives are to maintain or achieve favourable conservation status. Table 4.1 provides definition of conservation status based on Articles 1(e) and (i) of the Habitats Directive.

Table 4.1: Definition of favourable conservation status for sites defined in the Habitats Directive

For habitats	Conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as 'favourable' when: • its natural range and areas it covers within that range are stable or increasing • the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future • the conservation status of its typical species is favourable (see below)
For species	Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The *conservation status* will be taken as 'favourable' when: • population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and • the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and • there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis

A set of high level mitigation measures have been identified with regards to each of the broad sources of effect listed above (see Table 4.2). These mitigation measures, which are discussed in more detail in sections 5-8, should *inter alia* help to avoid the deterioration of any qualifying habitats, and habitats supporting species, and seek to prevent undermining any of the conservation objectives for a given site in relation to the features for which it is designated. These high-level mitigation measures can be partly interpreted as "...conditions or other restrictions such as a planning obligation, [compliance with which would] enable it to be ascertained that the proposal would not adversely affect the integrity of the site" (see Figure 4.1, above), though also represent other non-statutory guidance etc. with regards to the avoidance of significant effects on sites. Where it is considered that no effect can arise from any of the given sources of effect for a particular species or habitat (e.g. due to animal behaviour and/or the location/characteristics of a particular habitat), certain sites may be screened out of the assessment, and these are listed in the relevant section (5-8) where this is the case (also see Appendix B).

Table 4.2: High level mitigation measures identified for potential sources of effect

	High level Mitigation
Physical disturbance	All blocks under consideration are at least several kilometres offshore and remote from Natura 2000 sites. 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 – such mitigation would be defined at the project level, and be subject to project specific EIA and HRA.
Marine Discharges	Discharges from offshore oil and gas facilities have been subject to increasingly stringent regulatory controls over recent decades, and oil and other contaminant concentrations in the major streams (drilling wastes and produced water) have been substantially reduced or eliminated. Discharges would be considered in detail in project-specific Environmental Statements, AAs (where necessary) and chemical risk assessments under existing permitting procedures.

High level Mitigation	
Other effects	The IMO International Convention for the Control of Ballast Water and Sediment, serves to mitigate against the possible introduction of invasive alien species through shipping ballast, which may degrade sensitive local habitats and communities. Measures include the mid-ocean exchange of ballast water (with ultra-violet irradiation of ballast a proposed alternative). The potential for collision of birds with offshore infrastructure, increased by attraction of birds to lights, may be mitigated by controlling well test and routine flaring during production and by avoiding or limiting activities during months when large numbers of birds aggregate in the area.
Underwater noise	Application for consent to conduct seismic and other geophysical surveys – PON14 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). 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, *Guidelines for minimising the risk of disturbance and injury to marine mammals from seismic surveys,* are followed. European Protected Species (EPS) disturbance licences can also be issued under the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007*. DECC will expect that passive acoustic monitoring (PAM) will be routinely used as a mitigation tool. Potential disturbance of certain species may be avoided by the seasonal timing of noisy activities. Potential disturbance of certain species may be avoided by the seasonal timing of noisy activities, and periods of seasonal concern for individual Blocks on offer have been highlighted (See Section 2.2) for which licensees should expect to affect DECC's decision whether or not to approve particular activities.
Oil Spills	Oil Pollution Emergency Plans (OPEPs): regulatory requirements on operators to prepare spill prevention and containment measures, risk assessment and contingency planning – these are reviewed by DECC, MCA, JNCC, MMO, and relevant SNCB. Additional conditions imposed by DECC, through block-specific licence conditions (i.e. "Essential Elements"), and seasonal periods of concern for drilling, within which there is a presumption for drilling activity to be refused unless appropriate mitigation measures can be agreed (defined at the project level). Project level mitigation through permitting/HRA of specific activities (including conditions attached to consents/permits or potentially consent/permit refusal). MCA is responsible for a National Contingency Plan and maintains aerial spraying and surveillance aircraft based at Coventry and Inverness and counter-pollution equipment (booms, adsorbents etc.). The MCA presently has

High level Mitigation	
	four Emergency Towing Vessels stationed around the UK which remain on standby at sea[3].
In-combination effects	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 subsequent to licensing, specific projects (if consented) will not result in adverse effects on integrity of European sites.

[3] The future of these vessels is presently subject to debate as a new funding stream is required for their maintenance, with the present contract to be terminated in 2011. The role of these vessels may be filled by a commercial alternative (see: http://www.parliament.uk/business/committees/committees-a-z/commons-select/transport-committee/inquiries/coastguard/).

5 Consideration of potential effects from oil spills on relevant sites

5.1 Overview of spill effects and context

Oil spills can have potentially adverse environmental effects, and are accordingly controlled by a legal framework aimed at minimising their occurrence, providing for contingency planning, response and clean up, and which enables prosecutions. It is however, not credible to conclude that in spite of the regulatory controls and other preventative measures, an oil spill will never occur as a result of 26th Round licensing.

In April 2010, a major incident occurred in the US Gulf of Mexico. During drilling of an exploratory well in deep water approximately 50 miles offshore Louisiana, there was an explosion and fire on the semi-submersible drilling rig Deepwater Horizon. The rig was drilling in a water depth of 5000ft with the oil reservoir at 18000ft. UK regulators have been in contact with their counterparts in the United States (the Bureau of Ocean Energy Management, Regulation, and Enforcement - BOEMRE) to understand the cause of the incident and whether there are implications for safety at offshore operations on the UK continental shelf.

The Health and Safety Executive (HSE) is responsible for regulating the risks to health and safety arising from work in the offshore industry on the UKCS. Inspectors from HSE's Offshore Division undertake offshore inspections of well control/integrity arrangements and related safety issues, and also review well designs and procedures. In the UK a safety case regime exists with specific safeguards including:

- The Offshore Installations (Safety Case) Regulations 2005 require written safety cases and risk assessments to be prepared by the operator, and then approved by HSE, for all mobile offshore drilling rigs operating in the UK.
- A system of well notification, where the HSE reviews well design and procedures.
- A requirement for the design and construction of a well to be examined by an independent and competent specialist.
- A scheme of independent verification of offshore safety critical equipment such as blowout preventers to ensure they are fit for purpose.
- Checks that workers involved in well operations have received suitable information, instruction, training and supervision.
- Offshore inspections of well control and integrity arrangements, and related safety issues, by specialist inspectors from HSE's Offshore Division.
- Weekly drilling reports submitted to HSE by operators.

A review has been carried out by DECC which has found that the existing system is fit for purpose, but in light of the Deepwater Horizon spill the regime is being strengthened further:

1. DECC has increased the oversight of drilling operations through the recruitment of additional inspectors in its Aberdeen office. This will allow the Department to carry out double inspections (i.e. inspections carried out by 2 inspectors) for more

complex drilling operations and it will also allow annual inspections of all mobile and fixed oil and gas installations, once all of the new inspectors are recruited and have completed relevant training.

2. In light of the Gulf of Mexico incident, DECC has reviewed the indemnity and insurance requirements for operating in the UK Continental Shelf.
3. DECC has issued letters (dated: 23rd December 2010, 21st July 2011, 20th September 2011) to all UK operators specifying a number of requirements and expectations regarding oil pollution prevention, response, emergency plans and consenting.
4. Industry trade association Oil and Gas UK established a group comprised of regulators, industry and trade union representatives (the Oil Spill Prevention and Response Advisory Group - OSPRAG) to examine the UK's strengths and weaknesses in responding to a Gulf like incident. DECC participated in this group. OSPRAG's work is documented in their final report, *Strengthening UK Prevention and Response*, published September 2011 and the Secretary of State is examining its findings closely.

As a result of the Deepwater Horizon incident a UK Parliamentary Select Committee Inquiry into the safety and environmental regulations and spill prevention and response provisions of oil and gas operations on the UKCS was held which reported in January 2011 (Energy and Climate Change Committee 2011). The report includes a series of recommendations regarding regulatory oversight, spill prevention, response and understanding. However, the Committee report did not conclude that a moratorium on drilling, even in deep water, was justified in the UK.

In January 2011 the US Government National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling released an extensive report (National Commission 2011) into the disaster, citing systematic management failures by the main companies involved and shortcomings in the US government regulatory regime as the principal sources of blame. A series of general recommendations are included in the report regarding spill prevention, response and understanding.

DECC (along with other parts of government) have considered the implications of these various findings and implemented a series of actions in response.

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 26th Round, including the recent Offshore Energy SEA2. Previous SEAs have concluded that given the UK regulatory framework and available mitigation and response, in relation to objective risk criteria (such as existing exposure to risk as a result of shipping), the incremental risk associated with exploration and production (E&P) is moderate or low.

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 site 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) (see Table 5.1).

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 9 Blocks in the 26th 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.

5.2 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.

5.2.1 Historical spill scenarios and frequency

Oil spills on the UKCS have been subject to statutory reporting since 1974 under PON1 (formerly under CSON7); annual summaries of which were initially published in the "Brown Book" series, now superseded by on-line data available from the DECC website[4] (Figure 5.1). Discharges, spills and emissions data from offshore installations are also reported by OSPAR (e.g. OSPAR 2009).

DECC data indicate that the most frequent types of spill from mobile drilling rigs have been organic phase drilling fluids (and base oil), diesel and crude oil. Topsides couplings, valves and tank overflows; and infield flowlines and risers are the most frequent sources of spills from production operations, with most spills being <1 tonne. 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). Estimated spill risk from UKCS subsea facilities was equivalent to a risk of 0.003 spills/year for an individual facility, with almost all reported spills less than a tonne (<5bbl) in size.

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. A review of blowout frequencies cited in UKCS Environmental Statements as part of the OESEA2 gives occurrence values in the range 1/1,000-10,000 well-years.

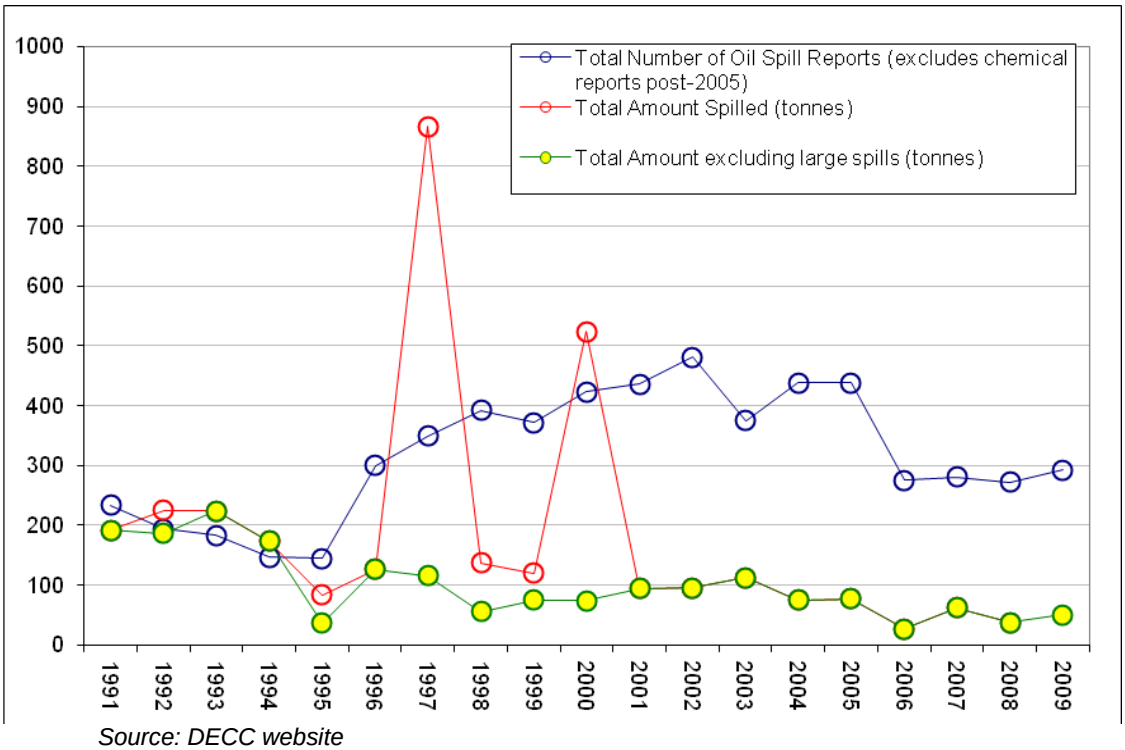
An annual review of reported oil and chemical spills in the UKCS – covering both vessels and offshore installations – is made on behalf of the Maritime and Coastguard Agency (MCA) by the Advisory Committee on Protection of the Sea (e.g. ACOPS 2008 as reported in Dixon 2009). This includes all spills reported by POLREP reports by the MCA and PON1 reports to DECC. The number of accidental discharges attributed to oil and gas installations during 2008 showed a reduction of 6.5% over the previous year's total. Of these discharges, 65% were fuel, lubrication or hydraulic oils; additionally, of the discharges with volume information, 95% were less than 455 litres.

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

[4] Oil and chemical discharge notifications (accessed October 2010) https://www.og.decc.gov.uk/information/bb_updates/chapters/Table_chart3_1.htm

discharged with produced water from the UKCS in 2009 totalled 2,900 tonnes (DECC website[5]).

Figure 5.1: Number and volume of reported oil spills from UKCS oil and gas installations over the period 1991-2009



Source: DECC website

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).

5.2.2 Trajectory and fate of spilled oil

The main oil weathering processes following a surface oil spill are spreading, evaporation, dispersion, emulsification, dissolution, oxidation, sedimentation and biodegradation. The anticipated reservoir hydrocarbon type in the central English Channel Blocks is crude 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 approximately 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. Generally, the slick front will be wind-driven on a vector equivalent to current velocity plus approximately 3% of wind velocity. Although strong winds can come from any direction and in any season, the predominant winds in the area are from the southwest, with a northeast component in spring, which, for

[5] Oil discharged with produced water 2005 – 2009
https://www.og.decc.gov.uk/information/bb_updates/chapters/Table3_2.htm

the central English Channel Blocks, would most likely push spilled oil north and east towards the southern coast of England and the Isle of Wight, which is in very close proximity to the Blocks. The likely trajectory of any spill would therefore take oil into an area which is naturally physically constrained (e.g. Solent area) and as a result dispersion would potentially occur at a slower rate than in the open ocean. To support environmental assessments of individual drilling or development projects, modelling is carried out for a major crude oil release, corresponding to a blowout (i.e. a worst case scenario based on expected well flow rates and nature of the crude oil, however unlikely that scenario might be), and for smaller diesel or fuel oil releases, which are expected to be less persistent. Also in response to the Deepwater Horizon spill, operators are required to consider and provide evidence of planning for the eventuality that a relief well may need to be drilled (e.g. time to acquire a suitable rig, time to drill the well etc.) Representative modelling cases from various parts of the UKCS have been reviewed by successive SEAs.

5.2.3 Potential ecological effects

The most vulnerable components of the ecosystem to oil spills in offshore and coastal environments are seabirds and marine mammals, due to their close association with the sea surface. Seabirds are affected by oil pollution in several ways, including oiling of plumage resulting in the loss of insulating properties and the ingestion of oil during preening. Pollution of the sea by oil, predominantly from merchant shipping, can be a major cause of seabird mortality. 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 (see Table 5.1, below) 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, skuas 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.

Table 5.1: Monthly seabird vulnerability to surface pollution in 26th Round Blocks

Block	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall
97/14	3	3	4	4	4	4	4	4	4	4	3	3	4
97/15	3	3	4	4	4	4	4	4	4	4	3	3	4
98/06	3	3	4	4	4	4	4	4	4	4	3	3	4
98/07	3	3	4	4	4	4	4	4	4	4	3	3	4
98/08	2	3	4	4	4	4	4	3	4	4	3	3	4
98/11	3	3	4	4	4	4	4	4	4	4	3	3	4
98/12	3	3	4	4	4	4	4	4	4	4	3	3	4
98/13	3	3	4	4	4	4	4	4	4	4	3	3	4
98/14	3	4	4	4	4	4	4	4	4	4	3	4	4

Note: 1 = very high, 2 = high, 3 = moderate, 4 = low.
Source: JNCC (1999).

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).

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 harbour seals) and particularly the pupping season (October-December in grey seals and June-July in harbour seals). Animals most at risk from oil coming ashore on seal haulout sites and breeding colonies are neonatal pups, which rely on their prenatal fur and metabolic activity to achieve thermal balance during their first few weeks of life, and are therefore more susceptible than adults to external oil contamination.

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

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 long periods in such environments.

5.3 Implications for relevant European Sites

As the principal hydrocarbon in the area is crude oil, spills of which can travel significant distances, the predominant wind and current directions in the region need to be taken into account when considering the potential extent of any spill. The dominant current flow direction in the central English Channel is ENE, with anticlockwise gyral flows within the bays on the south coast of England and mean speeds of 1.0-2.5m/s. For most of the year the dominant wind direction is SW, with a NE component in spring, which means that any spill would likely be pushed by tide and wind to the north and east. As a result all Natura 2000 sites in the area have been screened (Appendix B) and those sites where the potential for effects from oil spills have been identified (either sites which are within or abut Blocks or are within ca. 50km in a north or east direction from any of the edges of the Blocks) are listed in detail in Appendix C. The identification of potential effects from oil spills on specific European Sites considers the following factors:

- Oil spill probability and severity (taking into account distance from blocks under offer, and probable hydrocarbon type)
- The ecological sensitivity of the qualifying feature(s) to oil spills
- Connected with the above, in what way an oil spill would have an immediate effect on the conservation objectives of SACs and SPAs as listed in Appendix C, and any long-term implications of a spill on these objectives

It should be noted that at a project level, DECC requirements for the preparation of OPEPs and ES submissions include, amongst other mitigation and response criteria, the modelling of a worst case blowout scenario considering a specific release location, crude oil type and historic metocean conditions as well an unlikely 30 knot onshore wind, over a release time of 10 days. Detailed potential effects of an unmitigated release on Natura 2000 sites beyond a generic consideration can be considered at this stage.

5.3.1 Special Areas of Conservation

The ecological sensitivity of the qualifying features of relevant sites to oil spills varies. For several Annex I habitats and Annex II species, it is considered that any potential source of effect is unlikely to degrade the qualifying habitat or habitat of species, or undermine the conservation objectives of related sites. 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) – it is not expected that the extent, distribution or functioning of these habitats would be significantly affected, and therefore similarly, those of any species associated with, or relying on the functioning of these habitats, such that conservation objectives would be undermined.
- **Lagoons, dunes** – sites above Mean High Water Springs not generally vulnerable to surface oil pollution, except possibly to wind-blown oil or evaporated hydrocarbons. Lagoons typically have periodic connections to the sea; such connections can be protected from the ingress of surface pollutants.
- **Sea cliffs, sea caves** – generally not considered sensitive due to wave reflection and rapid recovery (e.g. Gundlach & Hayes 1978) – it is not expected that the extent, distribution or functioning of these habitats would be significantly affected, and therefore similarly, those of any species associated with, or relying on the functioning of these habitats such that conservation status would be detrimentally affected..
- **Terrestrial and freshwater aquatic species** – the potential for significant effects on the conservation objectives of these species and their supporting habitats is essentially negated by their distribution, as these features do not utilise marine or estuarine environments. Includes: narrow-mouthed whorl snail (*Vertigo angustior*), freshwater pearl mussel (*Margaritifera margaritifera*), and non-coastal otter populations (*Lutra lutra*). It should be noted that salmonids play a critical role in the life cycle of the freshwater pearl mussel, and potential indirect effects of this association are considered in the assessment below.

Table 5.2 provides information on those categories of Annex I habitats and Annex II species which may have their conservation objectives undermined in the event of being impacted by an oil spill – those sites for which such potential effects from fuel and/or crude oil spills has been identified (see Appendix B) are listed. Note: several sites are represented in more than one risk category.

Table 5.2: 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:** Solent Maritime 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:** Solent Maritime SAC

Contd. overleaf

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:** Chesil & The Fleet SAC, Solent Maritime 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
Harbour porpoise
Sites comprise a variety of marine habitats utilised by harbour porpoise (*Phocoena phocoena*) 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:** Wight-Barfleur Reef dSAC
Bottlenose Dolphin
Sites comprise a variety of marine habitats utilised by bottlenose dolphin (*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:** Wight-Barfleur Reef dSAC
Atlantic salmon
Though not generally vulnerable to surface oil pollution due to the absence or paucity of time spent at the water's surface, available evidence suggests that smolts utilise shallow water depths (1-6m) and that adults show varying behaviour, swimming generally close to the surface (0- 40m depth), with occasional deeper dives – e.g. Holm *et al.* (2005) noted dive depths of between 85 and 280m (Malcolm *et al.* 2010). **Sites potentially at risk:** River Avon SAC, River Itchen SAC

5.3.1.1 Consideration

The conservation features of the sites listed in Table 5.2 are potentially vulnerable to a large oil spill due to the proximity of the blocks to the coastline, which could result in significant deterioration of habitats and disturbance to species. Additionally, such a spill could result in damage to supporting habitats including intertidal areas utilised by a variety of foraging animals including fish, birds and marine mammals.

- 2 SACs (Solent Maritime SAC, Wight-Barfleur Reef dSAC) are considered at risk with potential for impacts from significant spills of crude oil, diesel or lube oil.
- Chesil & The Fleet SAC is also considered at risk but at a lower level since it is not within or adjacent to any Blocks but is within 50km.
- Other sites are considered to be at low risk with the potential for impacts from significant spills of crude oil, diesel or lube oil due to being close to or adjacent to a Block but in an upstream direction of any potential spill or having a habitat or species that are considered not very vulnerable

The likelihood of a large oil spill is extremely low (blowout occurrence frequency in the range of 1/1000-10,000 well years, see Section 5.2). The proposed work programmes indicate up to 3 drill or drop wells (the applicants propose exploration wells would be drilled from land, although subsequent activities could involve offshore drilling). Following examination of

existing seismic information a decision will be made by the prospective licensee to drill a well or relinquish the block. As the location and design of the proposed drill or drop wells are not known, a detailed assessment of the potential for effects cannot be made at this time.

Following licensing, specific activities require permitting (see Section 5.4) and those 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 required of operators and monitored by the regulator for offshore exploration and production.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities which may include the drilling of a well will not have an adverse affect which could undermine the conservation objectives of the qualifying features of relevant SACs.

5.3.2 Migratory fish

(Annex II qualifying species: Atlantic salmon *Salmo salar*, sea lamprey *Petromyzon marinus*)

Both the River Itchen and River Avon SACs have species that migrate out to sea (sea lamprey and Atlantic salmon) into Block 98/7b in the case of the River Avon and into the area adjacent to Block 98/8 in the case of the River Itchen. There is therefore the theoretical possibility of oil spill impact on these species, although this is considered very remote.

The proposed work programmes indicate up to 3 drill or drop wells (the applicants propose exploration wells would be drilled from land, although subsequent activities could involve offshore drilling). Following examination of existing seismic information a decision will be made by the prospective licensee to drill a well or relinquish the block. As the location and design of the proposed drill or drop wells are not known, a detailed assessment of the potential for effects cannot be made at this time.

Following licensing, specific activities require permitting (see Section 5.4) and those considered to present a risk to European Sites and species 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 addition to those mitigation measures which are mandatory – in all cases, rigorous spill prevention, response and other mitigation measures are required of operators and monitored by the regulator for offshore exploration and production.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities will not have an adverse affect which could undermine the conservation objectives of relevant Annex II migratory fish.

5.3.3 Special Protection Areas

Table 5.3 provides information on those SPA types which are potentially vulnerable to oil spills. Those sites where the potential for effects from oil spills has been identified (see Appendix B) are listed. Due to the close proximity to each other of the central English Channel Blocks under consideration, site vulnerability is considered relevant for all nine Blocks. Note: several sites are represented in more than one risk category.

Table 5.3: 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. **Sites potentially at risk:** None
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. **Sites potentially at risk:** Poole Harbour SPA, Solent and Southampton Water SPA, Chichester and Langstone Harbour SPA, Pagham Harbour 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:** None
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:** None
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:** Chesil Beach and The Fleet SPA, Solent and Southampton Water SPA, Chichester and Langstone Harbour SPA, Pagham Harbour SPA, Portsmouth Harbour SPA, Avon Valley SPA

5.3.3.1 Consideration

Pevensey Levels is the only Ramsar site considered in this Appropriate Assessment which is not also an SPA or SAC. This site is 100km from the edge of the nearest Block under consideration, and although it is downstream in relation to predominant wind and current directions, it is unlikely to be significantly affected by any spill.

- 2 SPAs (Poole Harbour SPA, Solent & Southampton Water SPA) are considered at risk with potential for impacts from significant spills of crude oil, diesel or lube oil.
- 4 SPAs (Chesil Beach & The Fleet SPA, Chichester & Langstone Harbour SPA, Portsmouth Harbour SPA, Avon Valley SPA) are also considered at risk but at a lower level since they are not within or adjacent to any Blocks but are within 50km and, other than Chesil Beach & The Fleet SPA, are in a likely downstream direction of any spill and in a spatially constrained location where any spill would potentially be contained within the marine topography, increasing its impact.
- Other sites are considered to be at low risk with the potential for impacts from significant spills of crude oil, diesel or lube oil due to being close to or adjacent to a Block but in an upstream direction of any potential spill or having a habitat or species that are considered not very vulnerable

The proposed work programmes indicate up to 3 drill or drop wells (the applicants propose exploration wells would be drilled from land, although subsequent activities could involve offshore drilling). Following examination of existing seismic information a decision will be made by the prospective licensee to drill a well or relinquish the block. As the location and design of the proposed drill or drop wells are not known, a detailed assessment of the potential for effects cannot be made at this time.

Following licensing, specific activities require permitting (see Section 5.4) and those considered to present a risk to European Sites and species would be evaluated by DECC under mandatory contingency planning and HRA procedures which will allow mitigation measures to be defined (including conditions attached to consents/permits or potentially consent/permit refusal), in addition to those mitigation measures which are mandatory – in all cases, rigorous spill prevention, response and other mitigation measures are required of operators and monitored by the regulator for offshore exploration and production.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities will not have an adverse affect which could undermine the conservation objectives of the qualifying features of any of the SPAs listed in Table 5.2.

5.4 Regulation and mitigation

Spill prevention and mitigation measures are implemented for offshore exploration and production inter alia through the *Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation) Regulations 1998* and the *Offshore Installations (Emergency Pollution Control) Regulations 2002*. The required measures include spill prevention and containment measures, risk assessment and contingency planning. Under the Regulations, all operators of an offshore installation or oil handling facility must have an Oil Pollution Emergency Plan, OPEP) in place. The plans are reviewed by DECC, MCA and relevant environmental consultees, such as the Marine Management Organisation or relevant Devolved Authority, the Joint Nature Conservation Committee and the relevant inshore statutory nature conservation body, e.g. Natural England, before approval by DECC. OPEPs set out the arrangements for responding to incidents with the potential to cause marine pollution by oil, with a view to preventing such pollution or reducing or minimising its effect. Additional conditions can be imposed by DECC, through block-specific licence conditions (i.e. “Essential Elements”).

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 currently maintains four Emergency Towing Vessels stationed around the UK, which remain on standby at sea (see footnote 3 on page 18). The MCA maintains a contractual arrangement for provision of aerial spraying and surveillance, with aircraft based at Coventry and Inverness. Within two days, aircraft can deliver sufficient dispersant to treat a 16,000 tonne spill within 50 miles of the coast anywhere around the UK. MCA holds 1,400 tonnes of dispersant stockpiled in 14 locations around the UK, in addition to counter-pollution equipment (booms, adsorbents etc.) which can be mobilised within 2-12 hours depending on incident location. DECC is a partner in undertaking regular aerial surveillance operations of offshore installations, as a deterrent measure.

For activities in proximity to sensitive shorelines, the Department’s guidance (DECC 2009a) requires that the risk of shoreline contamination be determined through an appropriate risk assessment, and operators with oil spill scenarios that could impact the shoreline must have access to appropriate oil spill response resources suitable for shoreline clean-up operations. Additional resources are required for installations operating in any Block wholly or partly

within 25 miles of the coastline dependent on the hydrocarbon inventory and the oil pollution incident scenarios identified, including:

- The presence near the facility at all times of a vessel:
  - with the capability of spraying dispersant within 30 minutes of an oil pollution incident notification
  - has a stock of dispersant sufficient to deal with an oil pollution incident of 25 tonnes, and if required, have the capability (equipment and capacity) of recovering any oil likely to be lost from the installation under a Tier 1[6] scenario
- In the event of a Tier 2 incident, Tier 2 resources must be available on scene within half the time taken for the oil to reach shore in 30 knot wind conditions
- Details of resources to deal with a Tier 3 incident (i.e. an oil pollution incident that cannot be controlled by Tier 1 or 2 resources), including sources transport and delivery system
- A Shoreline Protection Strategy Plan

UK oil spill contingency planning and response capabilities have been reviewed and revised following the Deepwater Horizon spill (see Section 5.1). Oil & Gas UK established the Oil Spill Prevention and Response Advisory Group (OSPRAG) to provide a focal point for the sector's review of the industry's practices in the UK, in advance of the conclusion of investigations into the Gulf of Mexico incident. The Group had four specialist review groups whose remit was to focus on:

- technical issues including first response for protection of personnel;
- oil spill response capability and remediation including national emergency response measures;
- indemnity and insurance requirements;
- pan-North Sea regulations and response mechanisms.

The Oil Spill Response Group (OSRG) of OSPRAG was established to review the UK's oil spill response capability and industry co-ordination with the national response mechanism. Its areas of focus were spill scenarios and modelling, review of physical response capability, sensitivity and protection mapping in relation to clean up and restoration, Oil Pollution Emergency Plans (OPEPs) and exercising OPEPs. An early action of the OSRG was to facilitate planning for an early exercise of the NCP (see above).

OSPRAG's technical review group has completed its review of the UK offshore oil and gas industry's practices in the following areas: well examination verification and primary well control, blow-out preventers (BOPs) and competency, behaviours and human factors. This work concluded that there is a high degree of confidence in the UK regulatory regime and that it drives the right safety and environmental behaviours. The Well Life Cycle Practices Forum (WLCPF) will advance recommendations made by OSPRAG and facilitate the dissemination of lessons from Macondo and other similar events, with a specific focus (among others) on BOP issues, including liaison with the HSE on the recommendation made

[6] Oil pollution incidents are classified according to the response levels they are most likely to require and not the volume of oil pollution, unless this is supported by a location specific risk assessment. For example, if a pollution incident requires the use of resources from a regional centre, this would be used to classify the necessary response level, irrespective of its size.
For consistency with the National Contingency Plan, the following Tier definitions apply:
- Tier 1 Local (within the capability of the operator on site);
- Tier 2 Regional (beyond the in-house capability of the operator);
- Tier 3 National (requiring national resources).

by the House of Commons Select Committee that it examines the case for prescribing the equipment of BOPs on the UKCS with two blind shear rams.

5.5 Conclusions

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

- Those sites considered to be at potential risk, with the possibility of impacts in the event of a significant spill of crude oil, bunker or lube oil (i.e. where site conservation objectives are at risk of being undermined/where present conservation status may be negatively affected).
- Many sites are considered not to be at risk from oil spills associated with activities in the Blocks, due to their distance from the Blocks and relative sensitivity of the features.

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

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 activities which may follow licensing; however, as oil spills are not intended activities, a risk-based assessment is appropriate.

Following licensing, specific activities require permitting (see section above) and those 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 required of operators and monitored by the regulator for offshore exploration and production.

Given the availability of prevention and mitigation measures which are applied prior to consenting any activity including project specific safety, oil spill risk assessment, response, inspection and other monitoring, and the requirement for project specific Habitats Regulations Assessment, DECC considers that the granting of a Seaward Production Licence (or Licences) for Blocks 97/14, 97/15, 98/11, 98/12, 98/13, 98/14, 98/6b, 98/7b and 98/8 would not adversely affect the integrity of European Sites such that the conservation objectives of qualifying features would be undermined.

6 Consideration of sites and potential physical and other effects

6.1 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. Although all the Blocks applied for in the central English Channel have plans for land based drilling and therefore would have reduced impacts in terms of physical damage to the seabed, this method is not guaranteed and as such, effects from marine rig based drilling need to be considered. 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.

6.1.1 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 depending on the 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 is 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 Blocks applied for and the expected 'drill from shore' method, it is expected that new field developments will require additional onshore and offshore 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. The current extended reach well at the BP Wytch Farm facility in Poole Bay (adjacent to Block 98/6b) is drilled from shore and holds the world record for the longest horizontal displacement distance (10,728m) for a drilled well. This requires a significant length of pipeline which, if similar methods were used for the proposed Blocks, would have a potential physical impact on the seabed in the area.

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 bottom 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 broad distribution of large scale biotopes of conservation importance is relatively well understood in the central English Channel (e.g. see McBreen *et al.* 2011). Within the boundaries of designated and potential SACs the occurrence of habitats of interest is usually known with greater precision. Annex I habitats potentially affected by offshore infrastructure construction are reefs, sandbanks and mudflats and sandflats. SACs with the potential for impact are Studland to Portland pSAC and South Wight Maritime SAC, which both overlap Blocks under consideration. However, 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, where relevant, AA. Provisions under the Marine and Coastal Access Act (2009) include certain activities previously covered by the Food and Environment Protection Act; guidance on these is pending. 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.

6.1.2 Onshore physical damage

As the work plans for all of the Blocks applied for indicate potential drilling from shore there is the potential for physical damage to onshore environments associated with infrastructure. Blocks 97/14, 97/15, 98/06b, 98/07b, 98/08, 98/11, 98/13 and 98/14 are all adjacent to a coastline with an SAC or SPA. Therefore the Annex I habitats potentially affected by the construction of onshore infrastructure are sea cliffs, heathland, grassland, coastal lagoons, coastal dunes, bogs and sea caves. However, any impact is likely to be localised and temporary, with a condition that the area is returned to its natural habitat after decommissioning. The exact locations of any onshore infrastructure are currently unknown and will be assessed in detail by the terrestrial planning system as part of any project approval.

6.1.3 Marine discharges

As described in previous DECC 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). Although these are predominantly platform-derived discharges which would not potentially apply to the drill from shore methods proposed for the Blocks, a range of discharges are also 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. Amendments to the Offshore Chemical Regulations (2002) in 2011 mean that additional activities are now captured within a permit. 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.

6.1.4 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 activities 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, together with any flared gas, will be visible at distance (some 10-12nm in good visibility). Although it is likely that any infrastructure associated with activity within the Blocks would be land based, due to proposed drilling methods and Block restrictions, several of the Blocks (98/11, 98/07b and 98/08) overlap with coastal SPAs (Poole Harbour SPA, Avon Valley SPA and Solent and Southampton Water SPA) and therefore, depending on exact location of onshore infrastructure, it can be concluded that light effects may affect site integrity in parts of these SPAs. This would however be further investigated, and potentially mitigated against, during specific site location and as part of the onshore planning process.

Physical disturbance of seaduck and other waterbird flocks by vessel and aircraft traffic associated with hydrocarbon exploration and production is possible, particularly in SPAs

established for shy species. Such disturbance can result in repeated disruption of bird feeding, loafing and roosting. As with light, it is considered this source of potential effect may result in significant effects at Poole Harbour SPA and Solent and Southampton Water SPA, because the location of the SPAs overlap Blocks 98/11 and 98/8 applied for. Available mitigation measures include strict use of existing shipping and aircraft routes, and timing controls on temporary activities to avoid sensitive periods and again potential impact is partially dependent on onshore infrastructure location. It is therefore concluded that adverse effects from physical disturbance could be expected in parts of the Poole Harbour SPA and Solent & Southampton Water SPA, in part depending on onshore infrastructure location, with limited/no disturbance expected at other SPAs in the region.

6.2 Implications for relevant European Sites

Physical disturbance e.g. from pipeline trenching, and placing facilities or deposits on the seabed and onshore (as part of a drill form shore work plan) were considered to have the potential to result in significant effects on SACs only if the Block was within or impinged on the site boundary. Therefore, as identified by the screening process (Appendix B), the potential for such effects exists with respect to the Solent Maritime SAC, South Wight Maritime SAC, Solent & Isle of Wight SAC, Isle of Wight and Downs SAC, Dorset Heath (Purbeck & Wareham) & Studland Dunes SAC, Studland to Portland pSAC and Isle of Portland to Studland Cliffs dSAC and parts of Blocks 97/14, 97/15, 98/07b, 98/08, 98/11, 98/12, 98/13 and 98/14.

Any potentially damaging activities that could following licensing of the 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.

6.3 Conclusions

All Blocks, bar one (98/06b) under consideration in the central English Channel abut an SAC or have one within or intersecting part of the Block. Similarly blocks 98/11 and 98/8 overlap with two SPAs. Any adverse effects that could occur from consequent activities will therefore potentially influence site integrity, although 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. Whilst any new onshore infrastructure and pipelines built as a result of developments following 26th Round Licensing could conceivably come ashore 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. If exploration/production wells are drilled from land (as some drilled to exploit parts of the Wytch Farm field extending under Poole Harbour and Poole Bay) within the Blocks applied for, then the potential for physical disturbance to relevant sites would be obviated.

Taking into account the information presented above and in the Appendices, it is concluded that activities arising from the licensing of Blocks 97/14, 97/15, 98/11, 98/12, 98/13, 98/14, 98/6b, 98/7b and 98/8 will not cause an adverse effect on site integrity and undermine the conservation objectives of associated qualifying features.

7 Consideration of sites and potential acoustic effects

7.1 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 lungs which are sensitive to rapid pressure changes. Most concern in relation to seismic noise disturbance has been related to cetacean species. In the central English Channel only 1 SAC, Wight-Barfleur Reef dSAC, has cetacean species associated with it, although multiple French designated sites on its northern coastline (see Table A.6) have both cetaceans and pinnipeds which may be affected by activities within the Blocks.

DEFRA identified periods of concern for seismic from March to May for Blocks 97/14 and 97/15 (see Table 2.1), and it is envisaged that consent would not be granted for seismic survey during this period. 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). 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. Whilst Atlantic salmon and sea lamprey are the only qualifying fish species of relevant European Sites (River Avon SAC, River Itchen SAC and River Axe SAC) in the central English Channel area, numerous fish species present in the region provide important components of the diet of qualifying species of other relevant European Sites, such as harbour porpoise *Phocoena phocoena*, bottlenose dolphin *Tursiops truncatus* (Wight-Barfleur dSAC) and several seabird species.

There are currently no UK Natura 2000 sites with mobile marine invertebrates as qualifying features. However, as with fish, invertebrates such as crabs and squid may form an important component of the diet of qualifying species of relevant European Site. 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). Impact on prey species (e.g. fish) could undermine conservation objectives for sites, for instance this may represent an indirect disturbance to qualifying species, or a temporary deterioration of the functioning of the habitats which support qualifying species, though mitigation measures are available (see Section 7.4) the implementation of which will also be assessed in detail once project plans are available.

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 and land based drilling would not involve flights to the site. In specific cases of concern, mitigation through routeing restrictions could be implemented.

7.2 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. Some of the proposed work plans for the Blocks in the central English Channel include limited 2D seismic survey although source sizes and areas are not yet defined.

7.2.1 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.

7.2.2 Other activities

Pile-driving of foundations may generate high source levels and has been widely recognised as a potential concern, in particular for large offshore wind developments where many piles may be installed sequentially over long time scales (as reviewed in DECC 2011). Brandt *et al.* (2011) reporting on piling operations at the Horns Rev II site off the Danish west coast, indicated that during 1 pile driving event, the peak noise level reached 196 dB re 1 µPa, the sound exposure level (SEL) reached a maximum of 176 dB re 1 μPa^2 s and the M-weighted SEL (see below) reached 170 dB re 1 μPa^2 s at 720m distance. At a distance of 2,300m, peak levels reached 184 dB re 1 µPa, SEL 164 dB re 1 μPa^2 s and M-weighted SEL reached 157 dB re 1 μPa^2 s. Pile-driving also occurs in connection with oil and gas facilities, although the pile diameters are smaller than wind turbine monopiles and typically result in lower source levels and durations.

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). As the drilling method proposed for all of the Blocks applied for is from land, then limited marine noise from drilling infrastructure can be expected. However, as future marine drilling cannot be discounted, noise generated from jack-up rigs and other offshore infrastructure is included. 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 10-2000Hz (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 undertaken (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, however, 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, although these would not occur for drilling from land. There is relatively little quantitative information on the transmission of helicopter airborne noise to the marine environment (Richardson *et al*. 1995). Measurements of an airsea 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.

7.2.3 Effects thresholds

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.

There is now a reasonable body of evidence to quantify noise levels associated with both seismic survey and pile-driving, and to understand the likely propagation of such noise within the marine environment. There is less clarity about the potential effects on marine mammals (and other receptors including fish), particularly in relation to distinguishing a significant behavioural response from an insignificant, momentary alteration in behaviour. Consequently, recent expert assessments have recommended that onset of significant behavioural disturbance resulting from a single pulse is taken to occur at the lowest level of noise exposure that has a measurable transient effect on hearing. A similar approach can be taken to multi-pulsed sounds although the evidence base is small and contradictory.

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

Brandt *et al.* (2011) reported on the spatial and temporal scale of behavioural responses of harbour porpoises to construction noise at the Horns Rev II offshore wind farm site. Porpoise acoustic activity (measured by passive acoustic monitoring devices (T-PODs)) was reduced by 100% during 1h after pile driving and stayed below normal levels for 24 to 72 h at a distance of 2.6km from the construction site. This period gradually decreased with increasing distance. A negative effect was detectable out to a mean distance of 17.8km. At 22km it was no longer apparent, instead, porpoise activity temporarily increased. This might indicate that porpoises at this distance showed no behavioural reaction to pile driving. Animals moving away from the construction site might have caused porpoise abundance and thus porpoise acoustic activity to temporarily increase as animals aggregated there. Out to a distance of 4.7km, the recovery time was longer than most pauses between pile driving events. Consequently, porpoise activity and possibly abundance were reduced over the entire 5 month construction period.

7.2.4 Injury and behavioural criteria

The Offshore Energy SEAs (DECC 2009b, 2011) reviewed recent data and recommendations for injury and behavioural criteria for noise assessment in marine mammals, although with emphasis on pulse noise from high-energy deep seismic survey and pile-driving. The OESEA utilised injury criteria proposed by Southall *et al*. (2007) 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.

Southall *et al*. (2007) concluded that developing behavioural criteria was challenging, in part due to the difficulty in distinguishing a significant behavioural response from an insignificant, momentary alteration in behaviour. Consequently, they recommended that onset of significant behavioural disturbance resulting from a single pulse is taken to occur at the lowest level of noise exposure that has a measurable transient effect on hearing (i.e. TTS-onset). These criteria for single pulses are an unweighted 224dB re 1µPa p-p and an M-weighted sound exposure level of 183dB re 1 $\mu Pa^2 \cdot s$ for three functional hearing categories of cetaceans, and 212dB re 1µPa (p-p) and 171dB re 1 $\mu Pa^2 \cdot s$ (M-weighted) for pinnipeds.

For multiple pulse and non-pulse (i.e. continuous) sources, Southall *et al*. (2007) were unable to derive explicit and broadly applicable numerical threshold values for delineating behavioural disturbance, and suggested that a context-based approach to deriving noise exposure criteria for behavioural responses will be necessary.

Based on the criteria developed by Southall *et al*. (2007), and the data reported by Lucke *et al*. (2009), indicative spatial ranges of injury and disturbance for cetaceans and pinnipeds

may be calculated as indicated in Table 7.1 below. Calculated ranges for the Southall *et al*. (2007) criteria suggest that there is negligible risk of auditory damage to cetaceans, and a low to moderate risk of seals being within the required range (63m assuming modified cylindrical spreading) of seismic operations. Modified cylindrical spreading is usually considered to occur in water depths <1.5x range, i.e. spherical spreading (20logR) will occur to a range of 60m in a water depth of 40m.

Table 7.1: Indicative spatial ranges of various injury and disturbance indicators for cetaceans and pinnipeds

	Cetaceans seismic	**Pinnipeds** seismic
Nominal vertical source level (dB p-p)	260	260
Horizontal array correction	-15	-15
Effective horizontal source level	245	245
Injury sound pressure level (multiple pulses; dB p-p)	230	218
Required propagation loss	15	27
Deep water (20logR) distance (m)	**5.6**	**22.4**
Shallow water (15logR) distance (m)	**10.0**	**63.1**
Behavioural response sound pressure level (single pulse; dB p-p)	224	212
Required propagation loss	21	33
Deep water (20logR) distance (m)	**11.2**	**44.7**
Shallow water (15logR) distance (m)	**25.1**	**158.5**
MTTS (4kHz) response sound pressure level in porpoise (single pulse; dB p-p)	200	
Required propagation loss	45.3	
Deep water (20logR) distance (m)	**184**	
Shallow water (15logR) distance (km)	**1.05**	

Source: Southall et al. (2007), Lucke et al. (2009)

The ranges affected by potential auditory injury resulting from modelled seismic survey, in or adjacent to those Blocks where new seismic may be shot represent a small proportion of the marine areas used by seals and cetaceans (bottlenose dolphins) associated with European Sites in the region. Larger proportions of the overall ranges may be affected by noise levels possibly associated with behavioural modification, although the ecological significance of such postulated effects have not been demonstrated. It is acknowledged here that injury and disturbance do not necessarily lead to an adverse impact on the integrity of a European site under the Habitats Directive, and indeed disturbance licences can be granted for certain levels of activity, without site integrity being compromised. Therefore, disturbance effects both within and 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 non-shooting, 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

7.3 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. It is noted that effects on fish which are also prey species (e.g. for marine mammals and birds), and may therefore result in the undermining of conservation objectives of qualifying species, are unlikely from noise sources associated with oil and gas activities, with noise levels suggested to cause injury to fish not extending beyond a few tens of metres around the noise source. Mandatory Habitats Regulations Assessment procedures will allow further consideration of the nature, timing and location of any planned activities and mitigation measures (see Section 7.4) deemed necessary to be defined (including conditions attached to consents/permits or potentially consent/permit refusal). The screening process (Appendix B) identified the potential for acoustic disturbance in the following sites:

7.3.1 Wight-Barfleur dSAC

(Annex I habitat: Bedrock and stony reefs. Non-qualifying Annex II species: harbour porpoise *Phocoena phocoena*; bottlenose dolphin *Tursiops truncatus*)

The Wight-Barfleur reef is an area of bedrock and stony reef located in the central English Channel, between St Catherine's Point on the Isle of Wight and Barfleur Point on the Cotentin Peninsula in northern France.

Harbour porpoise (*Phocoena phocoena*) are still very rare in the English Channel, and it represents one of the areas with the lowest occurrence of the species (Reid *et al.* 2003). Although small numbers of porpoise have been seen in the English Channel, no sightings have been recorded within the boundary of the dSAC (Evans *et al.* 2003; Reid *et al.* 2003). However, due to the highly mobile nature of the species and the large size of the proposed SAC, it is likely that harbour porpoise may sometimes occur within the boundaries and are therefore considered to be a non significant presence.

Although there are few reports of bottlenose dolphin *Tursiops truncatus* from within the proposed SAC boundary, small groups appear to be resident or near-resident in waters off

Cornwall and Dorset which range further east along the south coast (Williams *et al* 1996; Wood 1998; Evans *et al* 2003; Reid *et al* 2003). Therefore *Tursiops truncatus* is considered to be a non significant presence.

7.3.1.1 Consideration

Simple calculations of sound propagation can be made to estimate the likely maximum received sound levels at the boundaries of Wight-Barfleur Reef dSAC should a typical seismic survey occur in any one of the Blocks applied for; the results of these are presented in Table 7.2. 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.

In the case of the Wight-Barfleur Reef dSAC, the minimum direct linear range from the SAC boundary to the nearest Block (98/12) is approximately 12km, giving a propagation loss (assuming 15logR) of around 61dB, or a received sound level of 169dB re 1μPa p-p for a typical seismic survey. This level is significantly 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.

Table 7.2: Estimated received sound levels in relevant European Sites associated with a typical seismic survey

Block	Wight-Barfleur Reef dSAC	
	Minimum distance (km)	Received sound level (dB re 1μPa peak-to-peak)
97/14	25	164
97/15	18	166
98/11	13	168
98/12	12	169
98/13	14	168
98/14	16	167
98/6b	36	162
98/7b	31	163
98/8	32	162

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.

Table 7.2 suggests that seismic surveys occurring in the proposed licence Blocks will be audible to cetaceans over a large area of the central English Channel, characterised by small / moderate marine usage by foraging harbour porpoise and bottlenose dolphins

associated with communities on the Dorset, Cornwall and north French coasts. The low numbers of these species recorded in the SAC and surrounding waters and distance from areas of residency, however means that although the exact effects of seismic surveys occurring within the Blocks is unknown, available evidence (see Section 7.2) suggests that significant effects at a population or individual level are very unlikely. 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 (see Section 7.4). 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.

DECC recently undertook an Appropriate Assessment in respect of a 2D seismic survey (comprising two airguns with a total capacity of 470 cubic inch and a precautionary noise source level of 243 dB re1. µPa @ 1m) across four separate locations within the Moray Firth: the Braemore, Forse, Berriedale and Helmsdale Prospects, covering a total area of 308.5km^2 (DECC 2010). Noise modelling studies undertaken as part of the AA indicated that permanent impact on hearing would be extremely unlikely and temporary impacts would only occur if a bottlenose dolphin was within 55 metres or less of the airgun. The range at which bottlenose dolphins may exhibit potential behavioural avoidance was between 1.8km and 11km. It was concluded that any disturbance or displacement would not affect the long-term distribution and abundance of the bottlenose dolphin population nor would it affect the integrity of the site. There would be no significant disturbance of the species and there was a sufficiently large habitat to maintain the population (DECC 2010).

Noise levels suggested to cause injury to fish (the primary prey species of cetaceans) 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 or non-qualifying species.

Noise levels associated with other activities potentially resulting from the 26th 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, especially given the drill from shore proposals.

7.4 Riverine SACs

The potential for acoustic disturbance effects was identified for the River Itchen SAC, River Avon SAC and River Axe SAC due to presence of migratory sea lamprey species (River Axe and River Avon) and Atlantic salmon (River Avon and River Itchen) as qualifying features, which occupy adjacent coastal and offshore marine areas for part of their life cycle. Noise associated with activities following licensing of the central English Channel Blocks will not propagate into the 3 riverine SACs and for associated qualifying species occurring beyond the SAC boundaries significant effects on qualifying fish species are unlikely. Furthermore, the potential for impact can be mitigated through timing of seismic survey to avoid the period of lamprey and salmon entry into the rivers and consequently significant effects on these qualifying features can be avoided.

7.5 Adjacent waters SACs

The potential for acoustic disturbance was identified for several French SACs due to the presence of multiple qualifying Annex II pinniped and cetacean species (see Appendix A8).

Distances from the closest Blocks applied for and calculated received sound levels for a given source level are given below.

Table 7.3: Estimated received sound levels in European Sites in adjacent waters associated with a typical seismic survey

SAC	Closest Block	Minimum distance (km)	Received sound level (dB re 1μPa peak-to-peak)
Anse de Vauville	97/15, 98/11	92	156
Baie de Seine Occidentale	98/14	102	155
Baie de Seine Orientale	98/14	118	154
Banc et Récifs de Surtainville	97/15, 98/11	99	155
Estuaire de la Seine	98/14	131	153
Littoral Cauchois	98/14	120	154
Marais du Cotentin et du Bessin – Baie de Veys	98/14	103	155
Récifs et Landes de la Hague	97/15, 98/11	82	157
Récifs et Marais Arrière-littoraux du Cap Lévi à la Pointe de Saire	98/13, 98/14	82	157

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.

Simple noise propagation calculations suggest maximum received sound levels at the site boundaries of between 153 and 157 dB re 1μPa p-p for a typical seismic survey occurring in the closest Block (see Table 7.3). 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; therefore effects on the integrity of these sites is not predicted.

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

7.6 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 on 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. European Protected Species (EPS) disturbance licences can also be issued under the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007*.

The guidelines require visual monitoring of the area by a 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 (2010) advise that operators adopt mitigation measures which are appropriate to minimise the risk of an injury or disturbance offence[7] and stipulate, whenever possible, the implementation of several best practice measure, including:

- If marine mammals are likely to be in the area, only commence seismic activities during the hours of daylight when visual mitigation using Marine Mammal Observers (MMOs) is possible.
- Only commence seismic activities during the hours of darkness, or low visibility, or during periods when the sea state is not conducive to visual mitigation, if a Passive Acoustic Monitoring (PAM) system is in use to detect marine mammals likely to be in the area, noting the limitations of available PAM technology (seismic surveys that commence during periods of darkness, or low visibility, or during periods when the observation conditions are not conducive to visual mitigation, could pose a risk of committing an injury offence).
- Plan surveys so that the timing will reduce the likelihood of encounters with marine mammals. For example, this might be an important consideration in certain areas/times, e.g. during seal pupping periods near Special Areas of Conservation for harbour seals or grey seals.
- Provide trained MMOs to implement the JNCC guidelines.
- Use the lowest practicable power levels to achieve the geophysical objectives of the survey.
- Seek methods to reduce and/or baffle unnecessary high frequency noise produced by the airguns (this would also be relevant for other acoustic energy sources).

DECC will expect that passive acoustic monitoring (PAM) will be routinely used as a mitigation tool. Additionally, periods of concern for seismic survey have been identified for a number of Blocks considered in this AA (see Table 2.1) within which there would be a presumption against such activities taking place.

In addition to marine mammal sensitivities, disturbance to populations of Atlantic salmon and other qualifying anadromous species can be mitigated through timing of seismic survey to avoid migratory periods and consequently significant disturbance can be avoided. In particular JNCC[8] highlight the sensitive post-smolt migration period for Atlantic salmon

[7] Defined under Regulation 39 1(a) and 1(b) (respectively) of the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended) or Regulation 40 of *The Conservation of Habitats and Species Regulations 2010* in territorial waters.
[8] JNCC's response to the 26th Seaward licensing Round.

between April and May, and that mitigation, including a presumption against seismic survey at this time, is considered.

In addition to marine mammal sensitivities, disturbance to populations of qualifying anadromous species can be mitigated through timing of seismic survey to avoid migratory periods and consequently significant disturbance can be avoided.

7.7 Conclusions

Significant effects arising from acoustic disturbance were only considered possible for SACs with marine mammals and fish as a qualifying feature. Although seismic survey, drilling and other oil industry noise is detectable by marine mammals, waterbirds and their prey, there is no evidence that such noise presents a risk to the viability of populations in UK waters and specifically not within designated Natura 2000 sites. 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 displacement from foraging grounds). In the localised areas of Natura 2000 sites designated for marine mammals, acoustic disturbance from seismic survey activity resulting from proposed licensing would be intermittent and there is no evidence that cumulative effects of previous survey effort have been adverse. Despite considerable scientific effort, no causal link, or reasonable concern in relation to population viability has been found.

Modelling of seismic noise propagation for licensed Blocks in the central English Channel has generally concluded that effects on the Wight-Barfleur Reef dSAC and Natura 2000 sites on the northern French coast will not be significant. In the case of the Blocks under consideration here, calculations considering the direct linear range to the SAC boundaries and the source level of a typical seismic survey suggest that received noise levels within all SACs will fall below relevant effects criteria as defined by Southall *et al*. (2007).

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

Should a seismic survey be proposed (as indicated by the work programme), further Habitats Regulations Assessment would be required to assess the potential for significant effects on site integrity once the area of survey, source size, timing and proposed mitigation measures are known and can form the basis for a definitive assessment.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities which may include seismic survey will not have an adverse affect on the site integrity of European Sites.

8 In-combination effects

8.1 Underwater Noise

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 7.2, the number of seismic surveys is substantially less than historic peaks and as a result significant in-combination effects with oil activities in existing licensed blocks are not foreseen. There is the potential for cumulative noise impacts where concurrent and sequential activities result in long-term exposure to elevated noise levels within the wider area. However, the likelihood of this is low (because of technical interference) and subject to mitigation in the near future by measures introduced to achieve Good Environmental Status under the Marine Strategy Framework Directive.

Other noise producing activities which are likely to occur within the central English Channel include those associated with the development of marine renewable energy. Offshore wind energy is expected to undergo large-scale development in UK waters over the next decade. A Round 3 offshore wind zone, West of Isle of Wight, intersects Blocks 98/11, 98/12 and 98/13 and overlaps the Weight-Barfleur Reef dSAC. The windfarm zone is 723km^2 with an expected 900MW capacity to be operational by 2018. The consenting of developments in this area will be subject to detailed project-specific EIA and Habitats Regulations Assessments.

There is currently only one infrastructure project proposed in the region associated with the extraction of wave and tidal energy (Wooton Bridge, north side of the Isle of Wight), and no further ones are envisaged in the immediate future.

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 2009b, 2011). 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. Mono-pile foundations are the most commonly used for offshore windfarm developments at present. 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.

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.

In addition to those activities which may follow licensing of the central English Channel Blocks under consideration and future marine renewable energy development, there are a variety of other existing (e.g. oil production, fishing, commercial and recreational shipping,

military exercise areas, dredging) and planned 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, especially given the proposed drilling method, would adversely affect the integrity of the relevant European Sites. This is due to the presence of effective regulatory mechanisms in place to ensure that operators, DECC and other relevant consenting authorities take such considerations into account during activity permitting. 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 SEAs (DECC 2009b, 2011) 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.

The Marine Strategy Framework Directive (2008/56/EC) (MSFD) requires that the European Commission (by 15 July 2010) should lay down criteria and methodological standards to allow consistency in approach in evaluating the extent to which Good Environmental Status (GES) is being achieved. ICES and JRC were contracted to provide scientific support for the Commission in meeting this obligation. A total of 10 reports have been prepared relating to the descriptors of GES listed in Annex I of the Directive.

Task Group 11 reported on underwater noise and other forms of energy (Tasker *et al*. 2010). The Task Group developed three possible indicators of underwater sound. In no case was the Task Group able to define precisely (or even loosely) when Good Environmental Status occurs on the axes of these indicators. This is partly to do with insufficient evidence and recognised scientific challenges but also to no fully accepted definition of when, for example, a behavioural change in an organism is not good.

DECC is cognisant of the ongoing MSFD Task Group 11 work to determine criteria for an indicator relating to high amplitude, low and mid-frequency impulsive anthropogenic sounds including those from pile driving, seismic surveys and some sonar systems. DECC will review the findings of this Task Group closely with respect to consenting of relevant activities which may result from the draft plan/programme, as well as other activities which generate noise in the marine environment. The establishment of noise criteria and the consenting of activities will require a coordinated approach across different industries and activities, possibly through the future marine planning system.

8.2 Other Potential in-combination Effects

Potential incremental, cumulative, synergistic and secondary effects from a range of operations, discharges, emissions (including noise), and accidents were considered in the Offshore Energy SEAs (DECC 2009b, 2011; see also OSPAR 2000, 2010).

8.2.1 Physical damage/change to features and habitats

Potential sources of physical disturbance to the seabed, and damage to biotopes, associated with oil and gas activities were identified by the OESEA2 as anchoring of semi-submersible rigs; wellhead placement and recovery; production platform jacket installation and piling; subsea template and manifold installation and piling; pipeline, flowline and umbilical installation and trenching and decommissioning of infrastructure (DECC 2011).

In general, cumulative effects are likely to be dominated by trawling, with potential scour and physical damage from cable laying and other activities associated with potential offshore wind developments (e.g. Round 3 wind farm zones such as the West of Isle of Wight), which

are likely to be more important in the future. Given the forecast scale of activity within this oil and gas licensing Round, it is likely that there will be considerable spatial and temporal separation between disturbance "footprints" and a low probability of incremental overlap of affected areas. Recovery of affected seabed through sediment mobility, and faunal recovery and recolonisation is expected to be rapid (less than five years) where the source of effects is transient (e.g. anchoring).

8.2.2 Physical presence

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

The larger numbers of individual surface or submerged structures associated with offshore wind developments, the presence of rotating turbine blades and considerations of their location and spatial distribution (e.g. in relation to coastal breeding or wintering locations for waterbirds and important areas for marine mammals), indicate a higher potential for physical presence effects. Potential displacement and barrier effects will likely be an important consideration at the project level for the large offshore wind developments that are planned for the English Channel and will likely form an important part of associated Habitats Regulations Assessments.

8.2.3 Marine discharges

As described in Section 6.3, most studies of produced water toxicity and dispersion, in the UK and elsewhere have concluded that the necessary dilution to achieve a No Effect Concentration (NEC) would be reached at <10 to 100m and usually less than 500m from the discharge point. Given the general separation distances of existing oil and gas installations within southern North Sea, a presumption against the discharge to sea of produced water from new developments, and that production is largely isolated to gas hydrocarbons, there is unlikely to be a cumulative effect from multiple produced water discharges.

Previous discharges of WBM cuttings in the UKCS have been shown to disperse rapidly and to have minimal ecological effects (Section 6.3). Dispersion of further discharges of mud and cuttings could lead to localised accumulation in areas where reduced current allows the particles to settle on the seabed. However, in view of the scale of the region, the water depths and currents, and probability of reinjection of drill cuttings from any major field development, this is considered unlikely to be detectable and to have negligible cumulative ecological effect (DECC 2011).

8.3 Conclusions

Available evidence (see UKBenthos database and OSPAR 2000) for the central English Channel 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.

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 subsequent to licensing, specific

projects (if consented) will not result in adverse effects on integrity of European sites. Therefore, bearing this in mind, it is concluded that the in-combination of effects from activities arising from the licensing of Blocks 97/14, 97/15, 98/6b, 98/7b, 98/8, 98/11, 98/12, 98/13 and 98/14 with those from existing and planned activities in the central English Channel will not cause an adverse effect on the integrity of the relevant European Sites.

9 Overall conclusion

Taking account of all the matters discussed above, 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 97/14, 97/15, 98/6b, 98/7b, 98/8, 98/11, 98/12, 98/13 and 98/14. This is because there is certainty, within the meaning of the ECJ Judgment in the *Waddenzee* case, that implementation of the plan will not adversely affect the integrity of relevant European Sites, 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 sites.

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

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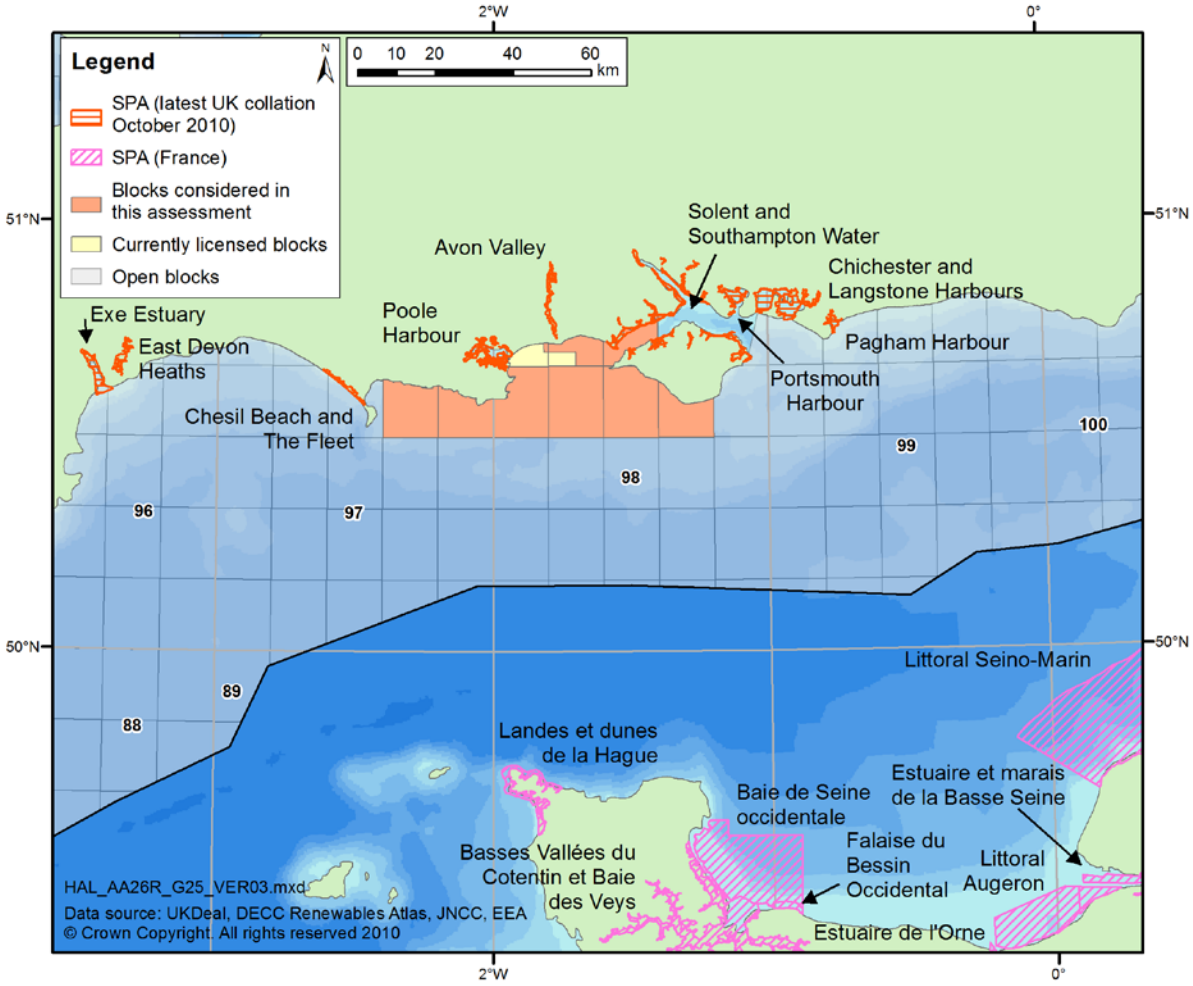
Appendix A - The sites

The migratory and/or Annex I bird species for which SPAs are selected in the UK are listed in Box A.1, and the SPAs from Devon to Sussex and their qualifying features are given in Table A.1 and their locations shown in the Map A.1.

A1 Coastal and Marine Special Protection Areas

Map A.1: Location of Special Protection Areas



Box A.1: Migratory and/or Annex I bird species for which SPAs are selected in 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*
Black guillemot *Cepphus grylle*
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*
Bittern *Botaurus stellaris*

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*
Little egret *Egretta garzetta*

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*
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: SPAs and their Qualifying Features in the English Channel

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages[9]
Chesil Beach and The Fleet SPA	748.11	Breeding: Little Tern	Over winter: Dark bellied brent goose	N/A
Dorset Heathlands SPA	8168.79	Breeding: Dartford warbler Nightjar Woodlark Over winter: Hen harrier Merlin	N/A	N/A
Poole Harbour SPA	2271.99	Breeding: Common tern Mediterranean gull Over winter: Avocet Little egret On Passage: Aquatic warbler Little egret	Over winter: Black tailed godwit Shelduck	Over winter: Waterfowl
The New Forest	28002.81	Breeding: Dartford warbler Honey buzzard Nightjar Woodlark Over winter: Hen harrier	N/A	N/A
Solent and Southampton Water SPA	5505.86	Breeding: Common tern Little tern Mediterranean gull Roseate tern Sandwich tern	Over winter: Black tailed godwit Dark bellied brent goose Ringed plover Teal	Over winter: Waterfowl
Avon Valley SPA	1385.08	Over winter: Bewick's swan	Over winter: Gadwall	N/A
Exe Estuary SPA	2345.71	Over winter: Avocet Slavonian grebe	N/A	Over winter: Waterfowl
East Devon Heaths SPA	1119.94	Breeding: Dartford warbler Nightjar	N/A	N/A

[9] - 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[9]
Chichester and Langstone Harbours SPA	5810.03	Breeding: Little tern Sandwich tern Common tern Over winter: Bar tailed godwit Little egret On passage: Little egret	Over winter: Dark bellied brent goose Black-tailed godwit Dunlin Ringed plover Grey plover Redshank	Over winter: Waterfowl
Portsmouth Harbour SPA	1248.77	N/A	Over winter: Dark bellied brent goose	N/A
Pagham Harbour SPA	636.68	Breeding: Little tern Over winter: Ruff	Over winter: Pintail	N/A

A2 SPAs in adjacent member states

See Map A.1 for details of site locations. All site details are taken from the standard data forms submitted to the European Commission Natura 2000 network (http://www.natura.org/).

Table A.2: SPAs and their Qualifying Features in France

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
Basses Vallées du Contenin et Baie des Veys	33,365	Breeding: Common kingfisher Short-eared owl Eurasian bittern Kentish plover Whiskered tern White stork Marsh harrier Montagu's harrier Corncrake Little egret Peregrine falcon Mediterranean gull Bluethroat Ruff Spotted crake Common tern Over winter: Common kingfisher Short-eared owl Eurasian bittern Kentish plover Great egret Little egret Peregrine falcon Bar-tailed godwit Ruff Golden plover	Breeding: Sedge warbler Shoveler Teal Garganey Snipe Black-headed gull Black-tailed godwit Curlew Shelduck Common redshank Lapwing Over winter: Pintail Gadwall Icelandic greylag goose Turnstone Dunlin Sanderling Ringer plover Horned lark Oystercatcher Common gull Curlew Snow bunting Grey plover Shelduck Spotted redshank	

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
		On passage / moulting: Aquatic warbler Common kingfisher Short-eared owl Eurasian bittern Kentish plover Whiskered tern Black tern White stork Corncrake Great egret Little egret Peregrine falcon Mediterranean gull Ruff Little tern Common tern Sandwich tern	Common redshank On passage / moulting: Pintail Sanderling Ringed plover Herring gull Common gull Black-headed gull Black-tailed godwit Eider	
Landes et dunes de la Hague	4950	Breeding: Nightjar Kentish plover Marsh harrier Peregrine falcon Dartford warbler Hen harrier Over winter: Kingfisher Short-eared owl Eurasian bittern Kentish plover Marsh harrier Peregrine falcon Mediterranean gull Hen harrier Black-throated diver Great-northern diver Red-throated diver On passage / moulting: Aquatic warbler Black tern Bar-tailed godwit Little tern Common tern	Breeding: Little grebe Shoveler Teal Garganey Ringed plover Curlew Pochard Tufted duck Eurasian hobby Shag Over winter: Teal	
Baie de Seine occidental	44,488	Breeding: Little egret Over winter: Mediterranean gull Little gull Horned grebe Great-northern diver Red-throated diver Black-throated diver On passage / moulting: Black tern Mediterranean gull	Breeding: Herring gull Great black-backed gull Eider Shelduck Shag Cormorant Over winter: Razorbill Turnstone Purple sandpiper Herring gull Great black-backed	

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
		Little gull Little tern Common tern Arctic tern Sandwich tern Red-throated diver	gull Common scoter Red-breasted merganser Eider Shelduck Shag Cormorant Great-crested grebe Common murre On passage / moulting: Purple sandpiper Fulmar Common scoter Red-breasted merganser Eider Shag Great-crested grebe Kittiwake Northern gannet Common murre	
Falaise du Bessin occidental	1200	Breeding: Dartford warbler Over winter: Short-eared owl Peregrine falcon Red-throated diver	Breeding: Fulmar Herring gull Kittiwake Lesser black-backed gull Over winter: Cormorant Common murre Razorbill Red-breasted merganser Shag	
Estuaire de l'Orne	1000	Over winter: Common kingfisher Hen harrier Whooper swan Little egret Eurasian spoonbill Avocet On passage / moulting: Common kingfisher Short-eared owl Black tern Marsh harrier Montagu's harrier Little egret Ruff Golden plover Little tern Common tern Arctic tern Sandwich tern Dartford warbler Purple heron	Over winter: Oystercatcher Cormorant	

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
		Barnacle goose Stone curlew Avocet Common crane Black-winger stilt Leach's storm-petrel Osprey European honey-buzzard Eurasian spoonbill Roseate tern Wood sandpiper Whooper swan		
Littoral Augeron	21,420	Resident: Sandwich tern Over winter: Red-throated diver Little gull Slavonian grebe On passage / moulting: Common tern Sandwich tern	Over winter: Razorbill Herring gull Common gull Common scoter Red-breasted merganser Eider Cormorant Great-crested grebe Northern gannet Common murre Scaup Black-headed gull White-winged scoter On passage / moulting: Manx shearwater Lesser black-backed gull Red-breasted merganser Arctic skua Northern gannet Pomarine skua	
Estuarie et marais de la Basse Seine	18,840	Resident: White stork Breeding: Common kingfisher Eurasian bittern Nightjar Kentish plover White stork Marsh harrier Corncrake Peregrine falcon Bluethroat Spotted crake Hen harrier European honey-buzzard Avocet Over winter: Common kingfisher Short-eared owl Eurasian bittern	Breeding: Sedge warbler Pintail Teal Garganey Dunlin Ringed plover Snipe Oystercatcher Black-tailed godwit Curlew Shelduck Common redshank Lapwing Marsh warbler Eurasian reed warbler Common sandpiper Long-eared owl Little owl Goldeneye Cetti's warbler Little ringed plover	

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
		Kentish plover Marsh harrier Little egret Peregrine falcon Bar-tailed godwit Hen harrier Merlin Avocet Red-backed shrike On passage / moulting: Aquatic warbler Common kingfisher Short-eared owl Eurasian bittern Nightjar Kentish plover White stork Black stork Marsh harrier Corncrake Little egret Peregrine falcon Bar-tailed godwit Little gull Ruff Common tern Sandwich tern Hen harrier Merlin Osprey Eurasian spoonbill Smew	Reed bunting Common kestrel Grasshopper warbler Bearded reedling Common redstart Whinchat Stonechat Over winter: Pintail Shoveler Teal Garganey Gadwall Icelandic greylag goose Dunlin Sanderling Knot Ringed plover Snipe Oystercatcher Black-tailed godwit Curlew Common scoter Grey plover Eider Shelduck Spotte redshank Common redshank Lapwing Pochard Tufted duck Cormorant Common murre Scaup White-winged scoter Common sandpiper Razorbill European widgeon Greater white-footed goose Grey heron Long-eared owl Goldeneye Eurasian siskin Green sandpiper On passage / moulting: Shoveler Icelandic greylag goose Turnstone Dunlin Sanderling Knot Snipe Red-breasted merganser Spotted redshank Common redshank Lapwing	

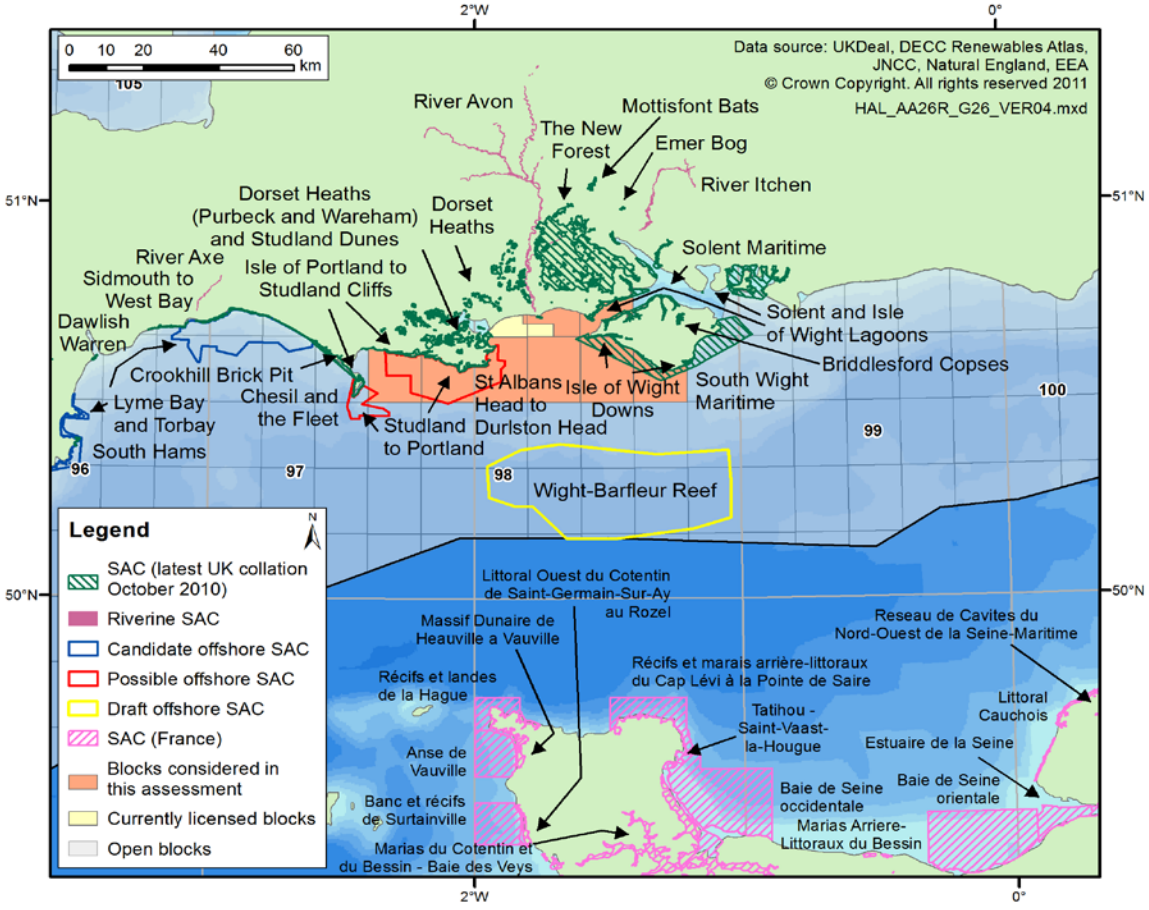
Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
			Pomarine skua Common sandpiper Eurasian widgeon Curlew sandpiper Little ringed plover Whimbrel Great skua Common greenshank Green sandpiper	
Littoral Seino-Marin	148,907	Breeding: Peregrine falcon Over winter: Black-throated diver Great northern diver Red-throated diver Mediterranean gull Little gull Slavonian grebe On passage / moulting: Short-eared owl Mediterranean gull Little gull Horned grebe Little tern Common tern Arctic tern Sandwich tern Black-throated diver Great northern diver Red-throated diver Leach's storm petrel Eurasian spoonbill Gull-billed tern European storm petrel Balearic shearwater	Breeding: Fulmar Herring gull Great black-backed gull Cormorant Kittiwake Over winter: Razorbill Purple sandpiper Fulmar Herring gull Cormorant Red necked grebe Great crested grebe Manx shearwater Kittiwake Northern gannet Common murre On passage / moulting: Sabine's gull Manx shearwater Fulmar Cormorant Great-crested grebe Kittiwake Northern gannet Common murre Red-necked grebe Common sandpiper Razorbill Greater white-fronted goose Great skua Arctic skua Pomarine skua	

A3 Coastal and Marine Special Areas of Conservation

This section includes coastal or nearshore marine (within 12nm boundary) Special Areas of Conservation (SAC) sites (Map A.2) which contain one or more of the Annex I coastal habitats listed in Box A.2 (below) or examples of Annex II qualifying marine species. Abbreviations for the Annex 1 habitats used in SAC site summaries are listed in Box A.2.

Relevant offshore (out with or crossing the 12nm boundary) SACs are included on the maps here and described in Section A4. Riverine/freshwater SACs which are designated for migratory fish are considered in Section A5.

Map A.2: Location of coastal, marine and offshore Special Areas of Conservation



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

Annex I Habitat (abbreviated)	Annex I Habitat(s) (full description)
Bogs	Active raised bogs * Priority feature Blanket bogs * Priority feature Bog Woodland * Priority feature Degraded raised bogs still capable of natural regeneration Depressions on peat substrates of the *Rhynchosporion* Transition mires and quaking bogs
Caves	Caves not open to the public
Coastal dunes	Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) Coastal dunes with *Juniperus* spp. Decalcified fixed dunes with *Empetrum nigrum* Dunes with *Hippophae rhamnoides* Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) Embryonic shifting dunes Fixed dunes with herbaceous vegetation (`grey dunes`) * Priority feature Humid dune slacks Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)
Coastal lagoons	Coastal lagoons *Priority feature
Estuaries	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 *Tilio-Acerion* forests of slopes, screes and ravines * Priority feature Killarney fern *Trichomanes speciosum* Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) *Asperulo-Fagetum* beech forests Old acidophilous oak woods with *Quercus robur* on sandy plains

Annex I Habitat (abbreviated)	Annex I Habitat(s) (full description)
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 Dry Atlantic coastal heaths with *Erica vagans* European dry heaths Northern Atlantic wet heaths with *Erica tetralix*
Inlets and bays	Large shallow inlets and bays
Limestone pavements	Limestone pavements * Priority feature
Machairs	Machairs
Mudflats and sandflats	Mudflats and sandflats not covered by seawater at low tide
Reefs	Reefs
Rocky slopes	Calcareous rocky slopes with chasmophytic vegetation
Running freshwater	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
Salt marshes and salt meadows	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) *Salicornia* and other annuals colonising mud and sand *Spartina* swards (*Spartinion maritimae*)
Sandbanks	Sandbanks which are slightly covered by sea water all the time
Scree	Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)
Scrub (mattoral)	*Juniperus communis* formations on heaths or calcareous grasslands
Sea caves	Submerged or partially submerged sea caves
Sea cliffs	Vegetated sea cliffs of the Atlantic and Baltic coasts
Standing freshwater	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

Annex I Habitat (abbreviated)	Annex I Habitat(s) (full description)
	Mediterranean temporary ponds Natural dystrophic lakes and ponds Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*
Vegetation of drift lines	Annual vegetation of drift lines
Vegetation of stony banks	Perennial vegetation of stony banks

Table A.3: Coastal SACs and their Qualifying Features in the English Channel

Site Name	Area (ha)	Annex I Habitat Primary	Annex I Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
The New Forest SAC	29262.36	Standing freshwater Heaths Grasslands Bogs	Bogs Fens	Southern damselfly *Coenagrion mercuriale* Stag beetle *Lucanus cervus*	Great crested newt *Triturus cristatus*
Isle of Wight Downs SAC	461.8	Sea cliffs Heaths Grassland	N/A	Early gentian *Gentianella anglica*	N/A
Solent and Isle of Wight Lagoons SAC	36.24	Coastal lagoons	N/A	N/A	N/A
Chesil and the Fleet SAC	1631.63	Coastal lagoons Vegetation of drift lines Vegetation of stony banks Salt marshes and salt meadows	Salt marshes and salt meadows	N/A	N/A
Dorset Heaths	5,730.73	Heaths Bogs	Grasslands Fens Forests	Southern damselfly *Coenagrion mercuriale*	Great crested newt *Triturus cristatus*
Isle of Portland to Studland Cliffs SAC	1447.5	Sea cliffs Grassland	Vegetation of drift lines	Early gentian *Gentianella anglica*	N/A
St Albans Head to Durlston Head SAC	287.22	Sea cliffs Grassland	N/A	Early gentian *Gentianella anglica*	Greater horseshoe bat *Rhinolophus ferrumiquinum*
Dorset Heaths (Purbeck and Wareham and Studland Dunes SAC	2221.94	Coastal dunes Standing freshwater Heath Bogs	Grassland Fens Forest	Southern damselfly *Coenagrion mercuriale*	Great crested newt *Triturus cristatus*

Site Name	Area (ha)	Annex 1 Habitat Primary	Annex 1 Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
Solent Maritime SAC	11325.09	Estuaries Salt marshes and salt meadows	Sandbanks Mudflats and sandflats Coastal lagoons Vegetation of drift lines Vegetation of stony banks Salt marshes and salt meadows Coastal dunes	N/A	Desmoulin's whorl snail *Vertigo moulinisiana*
South Wight Maritime SAC	19862.71	Reefs Sea cliffs Sea caves	N/A	N/A	N/A
Emer Bog	37.5	Mires	N/A	N/A	N/A
Briddlesford Copses	167.22	N/A	N/A	Bechstein`s bat *Myotis bechsteinii*	N/A
Mottisfont Bats	196.88	N/A	N/A	Barbastelle *Barbastella barbastellus*	N/A
Crookhill Brick Pit	4.71	N/A	N/A	Great crested newt *Triturus cristatus*	N/A
South Hams SAC	129.53	Heath Grassland	Sea cliffs Caves Forest	Greater horseshoe bat *Rhinolophus ferrumiquinum*	N/A
Sidmouth to West Bay SAC	897.3	Sea cliffs Forest	Vegetation of drift lines	N/A	N/A
Dawlish Warren SAC	58.84	Coastal dunes	Coastal dunes	Petalwort *Petalophyllum ralfsii*	N/A
Lyme Bay and Torbay SAC	31,248	Reefs Sea caves	N/A	N/A	N/A
Studland to Portland pSAC	33,177	Reefs	N/A	N/A	N/A

A4 Offshore Special Areas of Conservation

This section considers the relevant candidate, possible and draft SACs located in UK offshore waters – see Maps A.2 and Table A.4. Candidate SACs have been submitted to the European Commission for consideration, but not yet formally adopted, unlike possible SACs which have yet to be submitted to the EC and draft SACs which have yet to be formally approved by the UK government as sites for public consultation.

Table A.4: Offshore SACs and their Qualifying Features from the English Channel

Site Name	Area (ha)	Annex I Habitat	Annex II Species
Wight-Barfleur Reef dSAC	137,344	Bedrock and Stony Reefs	Harbour porpoise *Phocoena phocoena* (non-qualifying) Bottlenose dolphin *Tursiops truncatus* (non-qualifying)

A5 Riverine and Freshwater Special Areas of Conservation

The following riverine and freshwater SACs designated for migratory fish and/or the freshwater pearl mussel are also considered, see Map A.2.

Table A.5: Relevant riverine and freshwater SACs designated for migratory fish and/or the freshwater pearl mussel from the English Channel

Site Name	Freshwater pearl mussel *Margaritifera margaritifera*	Migratory fish[10]
River Axe	-	SL
River Avon	-	SL, AS
River Itchen	-	AS

A6 Sites in adjacent member states

See Map A.2 for details of site locations. All details are taken from the standard data forms submitted for each site to the European Commission Natura 2000 network (http://www.natura.org/).

Table A.6: SACs and their Qualifying Features in France

Site Name	Area (ha)	Annex I Habitat	Annex II Species
Anse de Vauville	13,073	Sandbanks Reefs	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal
Baie de Seine occidentale	45,566	Sandbanks Shallow inlets and bays Reefs	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal Allis shad Twaite shad River lamprey Sea lamprey Atlantic salmon

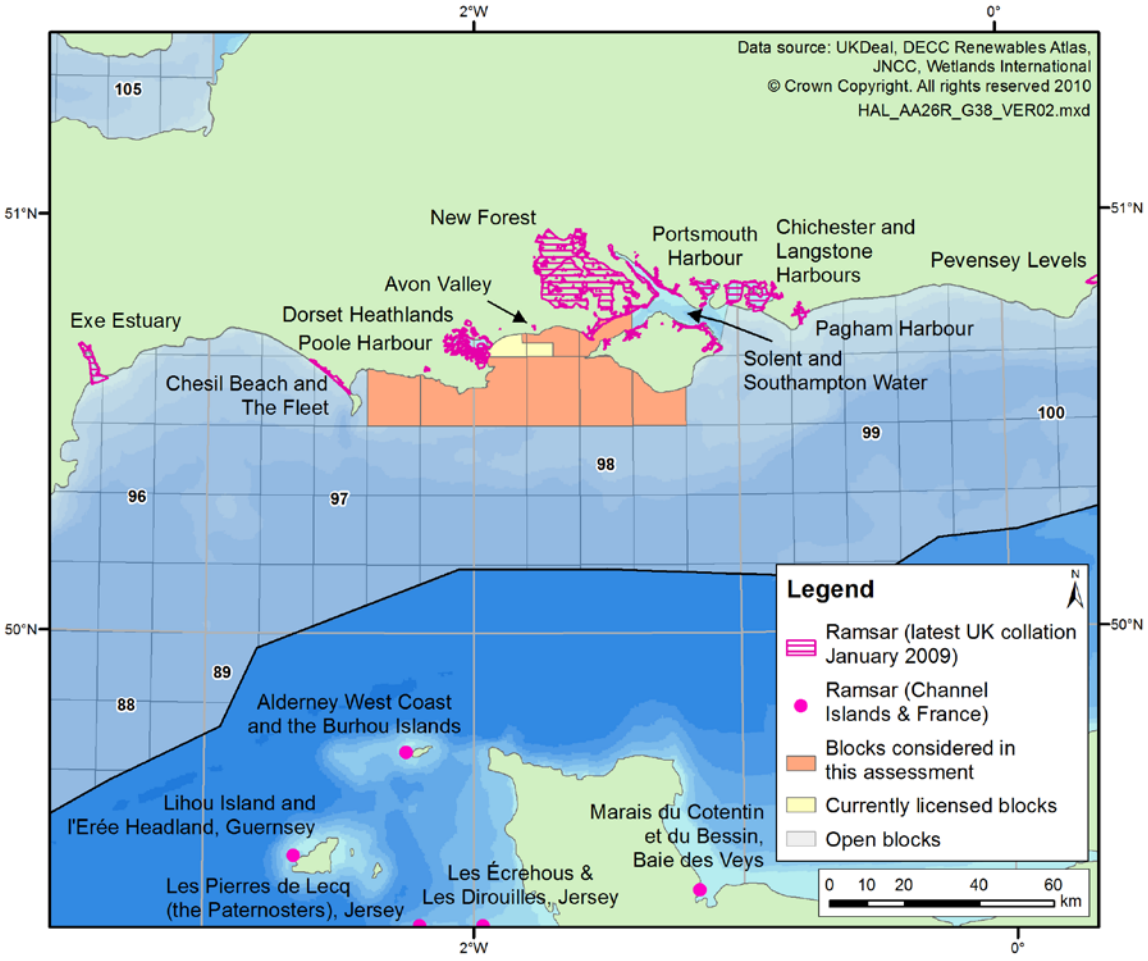
[10] *SL - Sea lamprey Petromyzon marinus, AS - Atlantic salmon Salmo salar*

Site Name	Area (ha)	Annex I Habitat	Annex II Species
Baie de Seine orientale	44,456	Sandbanks Shallow inlets and bays Reefs	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal Allis shad Twaite shad River lamprey Sea lamprey Atlantic salmon
Banc et récifs de Surtainville	14,070	Sandbanks Reefs	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal
Estuaire de la Seine	10,931	Sandbanks Estuaries Mudflats and sandflats not covered by seawater at low tide Reefs	Harbour porpoise Harbour seal Grey seal Bechstein's bat Greater horseshoe bat Lesser horseshoe bat Western Barbastelle bat Jersey tiger moth Great-crested newt Southern damselfly Marsh fritillary Stag beetle Allis shad Twait shad Bullhead River lamprey European brook lamprey Sea lamprey Atlantic salmon
Littoral Cauchois	4,574	Reefs Vegetated sea cliffs Tilio-Acerion forests Mudflats and sandflats Sandbanks	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal
Littoral Ouest du Cotentin de Saint-Germain-sur-Ay au Rozel	2,317	Coastal dunes Mudflats and sandflats Saltmeadows Shifting dunes	Jersey tiger moth Great-crested newt Yellow widelip orchid Creeping marshwort Shore dock
Marais Arriere-Littoraux du Bessin	359	Dunes	N/A
Marais du Cotentin et du Bessin - Baie des Veys	29,270	Mudflats and sandflats Molinia meadow	Harbour seal Greater horseshoe bat Greater mouse-eared bat Jersey tiger moth Great-crested newt Southern damselfly Marsh fritillary Stag beetle Yellow widelip orchid Floating water-plantain Allis shad Twait shad River lamprey Sea lamprey Atlantic salmon
Massif dunaire de Heauville a Vauville	707	Dunes Mudflats and sandflats	Great-crested newt

Site Name	Area (ha)	Annex I Habitat	Annex II Species
Récifs et Landes de la Hague	9,187	Reefs European dry heaths	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal Bechstein's bat Greater mouse-eared bat Greater horseshoe bat Jersey tiger moth Shore dock Killarney fern
Récifs et Marais Arrière-littoraux du Cap Lévi à la Pointe de Saire	15,403	Reefs Sandbanks	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal Greater horseshoe bat Great-crested newt
Reseau de Cavites du Nord-Ouest de la Seine-Maritime	27	Caves	Bechstein's bat Greater mouse-eared bat Greater horsshoe bat Lesser horseshoe bat Geoffoy's bat
Tatihou - Saint-vaast-la-Hougue	852	Mudflats and sandflats Reefs	N/A

A7 – Ramsar Sites

Map A.3: Location of coastal Ramsar sites in the Central English Channel



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

The Pevensey Levels Ramsar site is mainly terrestrial but includes some shingle and intertidal mud and sand.

Table A.7: Coastal Ramsar sites and corresponding Natura 2000 sites

Ramsar Name	SPA Name	SAC Name
Avon Valley	Avon Valley	River Avon
Chesil Beach and The Fleet	Chesil Beach and The Fleet	Chesil and the Fleet
Chichester and Langstone Harbours	Chichester and Langstone Harbours	Solent and Isle of Wight Lagoons
		Solent Maritime
Dorset Heathlands	Poole Harbour	Dorset Heaths (Purbeck and Wareham) and Studland Dunes
Exe Estuary	Exe Estuary	Dawlish Warren
Pagham Harbour	Pagham Harbour	
Pevensey Levels		
Poole Harbour	Poole Harbour	Dorset Heaths (Purbeck and Wareham) and Studland Dunes
Portsmouth Harbour	Portsmouth Harbour	
Solent and Southampton Water	Solent and Southampton Water	Solent and Isle of Wight Lagoons
		Solent Maritime
		South Wight Maritime

In addition there are 5 Ramsar sites in the wider region waters belonging to France, Jersey, Alderney and Guernsey (see Map A.3).

Appendix B – Screening tables for the identification of likely significant 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	
Chesil Beach & The Fleet	-	✓	-	✓	-	-	-	Site conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect the qualifying features (over-wintering geese) when foraging within the SPA and in adjacent areas beyond the site boundaries. However, mitigation would be possible. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Dorset Heathlands	✓	✓	-	-	-	-	-	Site is terrestrial and conservation objectives would not be undermined by emissions or discharges from routine operations.
Poole Harbour	✓	✓	✓	✓	✓	-	-	Block 98/11 abuts this coastal SAC. Certain disturbance of qualifying species (breeding common tern and gulls and over-wintering waders) could occur during the construction and operation phase of any activity, especially if a drill from land

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								method is utilised. In the unlikely event of a major crude oil spill from the Block, weathered spilled crude oil could theoretically affect the qualifying features when foraging within the SPA and in adjacent areas beyond the site boundaries. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
New Forest	✓	✓	-	-	-	-	-	Site is terrestrial and conservation objectives would not be undermined by emissions or discharges from routine operations.
Solent & Southampton Water	✓	✓	-	✓	✓	-	-	Block 98/08 abuts this coastal SAC. Certain disturbance of qualifying species (breeding terns and gulls and over-wintering waterfowl and waders) could occur during the construction and operation phase of any activity, especially if a drill from land method is utilised. In the unlikely event of a major crude oil, diesel or lube oil spill, weathered spilled crude oil could theoretically affect the qualifying features when foraging within the SPA and in adjacent areas beyond the site boundaries. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Avon Valley	-	✓	-	✓	✓	-	-	Block 98/07b abuts the southern end of this site, although the majority of it is terrestrial. Certain disturbance of qualifying species (over-wintering waterfowl) could occur during the construction and operation phase of any activity, especially if a drill from land method is utilised. In the unlikely event of a major crude oil, diesel or lube oil spill, weathered spilled crude oil could theoretically affect the qualifying features within the SPA. Although as the site

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								is predominantly terrestrial this is unlikely to be of significant impact. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Exe Estuary	-	✓	-	-	-	-	-	Site is remote from blocks. Site conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect the qualifying features (over-wintering waterfowl, avocet and Slavonian grebe) when foraging in adjacent areas beyond the site boundaries. However, mitigation would be possible. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
East Devon Heaths	✓	-	-	-	-	-	-	Site is terrestrial and is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills
Chichester & Langstone Harbours	✓	✓	✓	✓	-	-	-	Site conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect the qualifying features (breeding terns and over-wintering waterfowl and waders) when foraging within the SAC and in adjacent areas beyond the site boundaries. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific 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	
Portsmouth Harbour	-	✓	-	✓	-	-	-	Site conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect the qualifying features (over-wintering waterfowl and waders) when foraging within the SAC and in adjacent areas beyond the site boundaries. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Pagham Harbour	✓	✓	-	✓	-	-	-	Site conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from any of the Blocks, weathered spilled crude oil could theoretically affect the qualifying features (breeding terns and over-wintering waterfowl) when foraging within the SAC and in adjacent areas beyond the site boundaries. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Basses Vallées du Contenin et Baie des Veys	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Landes et dunes de la Hague	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Baie de Seine occidental	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined 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	
Falaise du Bessin occidental	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Estuaire de l'Orne	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Littoral Augeron	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Estuarie et marais de la Basse Seine	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Littoral Seino-Marin	✓	✓	✓	-	-	-	-	Site is remote from Blocks and its conservation objectives would not be undermined 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]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
The New Forest	✓	✓	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Isle of Wight Downs	✓	✓	-	✓	-	-	Block 98/13 is within or adjacent to the SAC. Certain activities in or related to these blocks could potentially undermine site conservation objectives through physical damage or loss from smothering by drilling discharges and the installation of pipelines and the construction of onshore infrastructure. Oil spills within the site would be unlikely to affect site conservation status as the features of interest are primarily above the high water mark (sea cliffs, heathlands and grasslands) – see Section 5.2. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Solent & Isle of Wight Lagoons	✓	-	-	✓	-	-	This site is partially within Block 98/8. Certain activities in, or related to, this block could potentially undermine site conservation objectives through physical damage or loss from smothering by drilling discharges and the installation of pipelines and the construction of onshore infrastructure. Oil spills within the site would be unlikely to affect site conservation status due to the presence of sea walls and limited entry of salt water to the site. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Chesil & The Fleet	✓	-	✓	-	-	-	Site conservation objectives would not be undermined by emissions,

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							discharges or physical damage from routine and installation operations. In the unlikely event of a major crude oil spill from the adjacent Blocks weathered crude oil could affect the salt marsh and salt meadow habitats, although mitigation would be possible. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Dorset Heaths	✓	✓	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Isle of Portland to Studland Cliffs	✓	✓	-	✓	-	-	Several Blocks (97/14, 97/15 and 98/11) abut this site, all with plans to drill from land. Any onshore wellsite or development would therefore potentially cause physical damage to the site although these would require planning permission and an associated Habitats Regulations Assessment. Site conservation objectives would not be undermined by emissions or discharges from routine marine operations or accidental spills due to the nature of the habitat (sea cliffs and grassland).

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
St Albans Head to Durlston Head	✓	✓	-	✓	✓	-	This site is adjacent to Blocks 97/15 and 98/11, both with plans to drill from land. Any onshore wellsite or development would therefore potentially cause physical damage to the site although these would require planning permission and an associated Habitats Regulations Assessment. Site conservation objectives would not be undermined by emissions or discharges from routine marine operations or accidental spills due to the nature of the habitat (sea cliffs and grassland). Noise generated during onshore construction and drilling may be an issue for the qualifying species (greater horseshoe bat) but mitigation would be possible (see Section 7.6 and summary in Table 4.2) and would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Dorset Heaths (Purbeck & Wareham) & Studland Dunes	✓	✓	-	✓	-	-	This site is adjacent to Block 98/11, with a plan to drill from land. Any onshore wellsite or development would therefore potentially cause physical damage to the site although these would require planning permission and an associated Habitats Regulations Assessment. Site conservation objectives would not be undermined by emissions or discharges from routine marine operations or accidental spills due to the nature of the habitat (coastal dunes, heath and bogs).
Solent Maritime	✓	✓	✓	✓	-	-	This site is adjacent to Block 98/8, with a plan to drill from land. Any onshore wellsite or development would therefore potentially cause physical damage to the site although these would require planning permission and an associated Habitats Regulations Assessment. In the unlikely event of a major crude oil spill from the adjacent Blocks weathered crude oil could affect the salt marsh, salt meadow, mudflats, sandflats and estuarine habitats, although mitigation would be possible. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							Regulations Assessment once project plans are known.
South Wight Maritime	✓	-	-	✓	-	-	Several blocks (98/7b, 98/8, 98/12, 98/13, 98/14) are within or adjacent to the site. Certain activities in, or related to, these blocks could potentially undermine site conservation objectives through physical damage or loss from smothering by drilling discharges and the installation of pipelines and the construction of onshore infrastructure. Oil spills within the site would be unlikely to affect site conservation status as the features of interest are sea cliffs, sea caves and reefs (see Section 5.2). High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Lyme Bay & Torbay	✓	-	-	-	-	-	Due to likely spill trajectory and qualifying habitats (reefs and sea caves) the conservation status of this site is unlikely to be affected by emissions or discharges from routine marine operations or accidental spills
Studland to Portland	✓	-	-	✓	-	-	Several blocks (97/14, 97/15, 98/11) are within the site. Certain activities in, or related to, these blocks could potentially undermine site conservation objectives through physical damage or loss from smothering by drilling discharges and the installation of pipelines and the construction of onshore infrastructure. Oil spills within the site would be unlikely to affect site conservation status as the features of interest are reefs (see Section 5.2). Mitigation is possible and measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.
Emer Bog	✓	-	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
Briddlesford Copses	✓	-	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Montisfont Bats	✓	-	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Crookhill Brick Pit	-	✓	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
South Hams	✓	✓	-	-	-	-	Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Sidmouth to West Bay	✓	✓	-	-	-	-	Site conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Dawlish Warren	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Anse de Vauville	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Baie de Seine occidentale	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							pinniped species) outside of the site boundaries, although mitigation would be possible.
Baie de Seine orientale	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Banc et récifs de Surtainville	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Estuaire de la Seine	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Littoral Cauchois	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Littoral Ouest du Cotentin de Saint-Germain-sur-Ay au	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
Rozel							accidental spills.
Marais Arriere-Littoraux du Bessin	✓	-	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Marais du Cotentin et du Bessin - Baie des Veys	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (pinniped species) outside of the site boundaries, although mitigation would be possible.
Massif dunaire de Heauville a Vauville	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.
Récifs et Landes de la Hague	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Récifs et Marais Arrière-littoraux du Cap Lévi à la Pointe de Saire	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species) outside of the site boundaries, although mitigation would be possible.
Reseau de Cavites du Nord-Ouest de la Seine-Maritime	✓	✓	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							accidental spills.
Tatihou - Saint-vaast-la-Hougue	✓	-	-	-	-	-	Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills.

Notes: [1] ✓denotes feature present; [2] ✓denotes vulnerability to effect; [3] including crude oil, diesel and/or lube oil

B3 Offshore Special Areas of Conservation

Site name	Features present[1]		Effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
Wight-Barfleur Reef	✓	✓	✓	-	✓	✓	This site is not adjacent to any blocks but certain activities (i.e. seismic survey, installation of wind farm infrastructure) may cause temporary acoustic disturbance to the species features (bottlenose dolphin and harbour porpoise – non-qualifying) within and outside of the site boundaries, although mitigation would be possible (see Section 7.6). Similarly any accidental spills may potentially affect the designated species although mitigation would be possible and the predominant current and wind direction would take oil away from the site. High level mitigation measures have been identified in Section 5.4 and are summarised in Table 4.2. Further, project specific mitigation measures would be defined by subsequent Habitats Regulations Assessment once project plans are known.

Notes: [1] ✓denotes feature present; [2] ✓denotes vulnerability to effect; [3] including crude oil, diesel and/or lube oil

B4 Riverine Special Areas of Conservation

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
River Itchen	-	✓	✓	-	✓	-	Site is predominantly terrestrial and does not meet the sea. However theoretically there is a possibility that its qualifying species (migrating Atlantic salmon), could be affected by emissions or discharges from routine operations or accidental spills outside the site boundaries, although mitigation would be possible. Certain activities (i.e. seismic survey) could also cause temporary acoustic disturbance to Atlantic salmon, again outside the site boundary. Mitigation measures (see Section 7.6) would however be defined by subsequent Habitats Regulations Assessment once project plans are known.
River Axe	-	✓	-	-	✓	-	Site is remote from Blocks and predominantly terrestrial. As a result its conservation objectives are unlikely to be undermined by discharges or from routine operations or accidental spills (see Section 5.2). Certain activities (i.e. seismic survey) however could cause temporary acoustic disturbance to Atlantic salmon, outside the site boundary. Mitigation measures (see Section 7.6) would be possible and be defined by subsequent Habitats Regulations Assessment once project plans are known.
River Avon	-	✓	✓	-	✓	-	Site is predominantly terrestrial. However theoretically there is a possibility that its qualifying species (migrating Atlantic salmon and sea lamprey), could be affected by emissions or discharges from routine operations or accidental spills outside the site boundaries, although mitigation would be possible. Certain activities (i.e. seismic survey) could also cause temporary acoustic disturbance to these species features, again outside the site boundary. Mitigation measures (see Section 7.6) would however be defined by subsequent Habitats Regulations Assessment once project plans are known.

Notes: [1] ✓denotes feature present; [2] ✓denotes vulnerability to effect; [3] including crude oil, diesel and/or lube oil

Appendix C – Detailed information on Natura 2000 sites where the potential for effects have been identified

C1 Coastal and marine Special Protection Areas

Site Name: Poole Harbour SPA	
Location	Latitude 50°40'52" N Longitude 02°01'34" W
Area (ha)	2271.99
Summary	Poole Harbour is a bar-built estuary of nearly 4,000 ha located on the coast of Dorset. The Harbour occupies a shallow depression towards the south-western extremity of the Hampshire Basin which has flooded over the last 5,000 years as a result of rising sea levels. The unusual micro-tidal regime means that a significant body of water is retained throughout the tidal cycle. The Harbour therefore exhibits many of the characteristics of a lagoon. There are extensive intertidal mud-flats and, away from the north shore that has become urbanised through the growth of the town of Poole, there are fringes of saltmarsh and reedbed. As a whole, the Harbour supports important numbers of waterbirds in winter and is also an important breeding site for terns and gulls, whilst significant numbers of little egret *Egretta garzetta* and aquatic warbler *Acrocephalus paludicola* occur on passage. Several river valleys converge on the Harbour, notably the Frome and the Piddle, and these support grazing marsh that contribute to the importance of the SPA for wintering waterbirds. Parts of the Harbour, especially along the western and southern shores, adjoin the Dorset Heathlands SPA. Where the two areas meet, there are unusual transitions from saltmarsh and reedbed to valley mire and heath habitats. The Harbour is separated from Poole Bay by the Studland Dunes (part of the Dorset Heaths [Purbeck and Wareham] and Studland Dunes SAC) and the SPA includes Littlesea, a large oligotrophic dune-slack lake of importance for wintering wildfowl.
Qualifying features for which the site is designated:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Common tern *Sterna hirundo*, 155 pairs representing at least 1.3% of the breeding population in Great Britain (5 year mean 1993-1997) Mediterranean gull *Larus melanocephalus*, 5 pairs representing at least 50.0% of the breeding population in Great Britain (5 year mean 1993-1997) **On passage:** Aquatic warbler *Acrocephalus paludicola*, 11 individuals representing at least 16.4% of the population in Great Britain (Count as at 1997) Little egret *Egretta garzetta*, 107 individuals representing at least 13.4% of the population in Great Britain (Count as at 1998) **Over winter:**	

Site Name: Poole Harbour SPA

Avocet *Recurvirostra avosetta*, 459 individuals representing at least 36.1% of the wintering population in Great Britain (5 year peak mean 1992/3-1996/7)

Little egret *Egretta garzetta*, 83 individuals representing at least 16.6% of the wintering population in Great Britain (Count as at 1998)

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter:
Black-tailed godwit *Limosa limosa islandica*, 1,576 individuals representing at least 2.3% of the wintering Iceland - breeding population (5 year peak mean 1992/3-1996/7)

Shelduck *Tadorna tadorna*, 3,569 individuals representing at least 1.2% of the wintering Northwestern Europe population (4 year peak mean 1993/4-1996/7)

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.

Over winter, the area regularly supports 28,426 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: redshank *Tringa totanus*, curlew *Numenius arquata*, dunlin *Calidris alpina alpina*, lapwing *Vanellus vanellus*, red-breasted Merganser *Mergus serrator*, goldeneye *Bucephala clangula*, pochard *Aythya ferina*, shoveler *Anas clypeata*, dark-bellied brent goose *Branta bernicla bernicla*, cormorant *Phalacrocorax carbo*, black-tailed godwit *Limosa limosa islandica*, shelduck *Tadorna tadorna*, avocet *Recurvirostra avosetta*, little egret *Egretta garzetta*.

Conservation objectives:

- Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of regularly occurring Annex 1 bird species, under the European Birds Directive, in particular:
- Shallow inshore waters
- Intertidal sediment communities
- Saltmarsh

- Subject to natural change, maintain in favourable condition the habitats for the Internationally important populations of regularly occurring migratory bird species, under the European Birds Directive, in particular:
- Shallow inshore waters
- Intertidal sediment communities
- Saltmarsh
- Reedbed

- Subject to natural change, maintain in favourable condition the habitats for the internationally important assemblage of waterfowl, under the European Birds Directive, in particular:
- Shallow inshore waters
- Intertidal sediment communities
- Saltmarsh
- Reedbed

- The SPA conservation objectives focus on habitat condition in recognition that bird populations may change as a reflection of national or international trends or events.

Site Name: Solent and Southampton SPA	
Location	Latitude 50°44'25" N Longitude 01°31'33" W
Area (ha)	5505.86
Summary	The Solent and Southampton Water are located on the south English coast. The area covered extends from Hurst Spit to Hill Head along the south coast of Hampshire, and from Yarmouth to Whitecliff Bay along the north coast of the Isle of Wight. The site comprises a series of estuaries and harbours with extensive mud-flats and saltmarshes together with adjacent coastal habitats including saline lagoons, shingle beaches, reedbeds, damp woodland and grazing marsh. The mud-flats support beds of *Enteromorpha* spp. and *Zostera* spp. and have a rich invertebrate fauna that forms the food resource for the estuarine birds. In summer, the site is of importance for breeding seabirds, including gulls and four species of terns. In winter, the SPA holds a large and diverse assemblage of waterbirds, including geese, ducks and waders. Dark-bellied brent goose *Branta b. bernicla* also feed in surrounding areas of agricultural land outside the SPA.

Qualifying features for which the site is designated:

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

During the breeding season:
Common tern *Sterna hirundo*, 267 pairs representing at least 2.2% of the breeding population in Great Britain (5 year peak mean, 1993-1997)

Little tern *Sterna albifrons*, 49 pairs representing at least 2.0% of the breeding population in Great Britain (5 year peak mean, 1993-1997)

Mediterranean gull *Larus melanocephalus*, 2 pairs representing at least 20.0% of the breeding population in Great Britain (5 year peak mean, 1994-1998)

Roseate tern *Sterna dougallii*, 2 pairs representing at least 3.3% of the breeding population in Great Britain (5 year peak mean, 1993-1997)

Sandwich tern *Sterna sandvicensis*, 231 pairs representing at least 1.7% of the breeding population in Great Britain (5 year peak mean, 1993-1997)

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter:
Black-tailed godwit *Limosa limosa islandica*, 1,125 individuals representing at least 1.6% of the wintering Iceland - breeding population (5 year peak mean, 1992/3-1996/7)

Dark-bellied brent goose *Branta bernicla bernicla*, 7,506 individuals representing at least 2.5% of the wintering Western Siberia/Western Europe population (5 year peak mean, 1992/3-1996/7)

Ringed plover *Charadrius hiaticula*, 552 individuals representing at least 1.1% of the wintering Europe/Northern Africa - wintering population (5 year peak mean, 1992/3-1996/7)

Teal *Anas crecca*, 4,400 individuals representing at least 1.1% of the wintering Northwestern Europe population (5 year peak mean, 1992/3-1996/7)

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.
Over winter, the area regularly supports 53,948 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: gadwall *Anas strepera*, teal *Anas crecca*, ringed plover *Charadrius hiaticula*, black-tailed godwit *Limosa limosa islandica*, little grebe *Tachybaptus ruficollis*, great crested grebe *Podiceps cristatus*, cormorant *Phalacrocorax carbo*, dark-bellied brent goose *Branta bernicla bernicla*, wigeon *Anas penelope*, redshank *Tringa*

Site Name: Solent and Southampton SPA

totanus, pintail *Anas acuta*, shoveler *Anas clypeata*, red-breasted merganser *Mergus serrator*, grey plover *Pluvialis squatarola*, lapwing *Vanellus vanellus*, dunlin *Calidris alpina alpina*, curlew *Numenius arquata*, shelduck *Tadorna tadorna*.

Conservation objectives:

Subject to natural change, maintain in favourable condition the habitats for the **internationally important**

- **populations of the regularly occurring Annex 1 species**, in particular:
  - Sand and shingle
  - Saltmarsh
  - Intertidal mudflats and sandflats
  - Shallow coastal waters
-

Subject to natural change, maintain in favourable condition the habitats for the **internationally important**

- **populations of the regularly occurring migratory species**, in particular:
  - Saltmarsh
  - Intertidal mudflats and sandflats
  - Boulder and cobble shores
  - Mixed sediment shores
-

Subject to natural change, maintain in favourable condition the habitats for the **internationally important**

- **assemblage of waterfowl** , in particular:
  - Saltmarsh
  - Intertidal mudflats and sandflats
  - Boulder and cobble shores
  - Mixed sediment shores

Site Name: Chichester & Langstone SPA	
Location	Latitude 50°48'23" N Longitude 00°55'12" W
Area (ha)	5810.03
Summary	Chichester and Langstone Harbours are located on the south coast of England in Hampshire and West Sussex. They are large, sheltered estuarine basins comprising extensive sand- and mud-flats exposed at low tide. The two harbours are joined by a stretch of water that separates Hayling Island from the mainland. Tidal channels drain the basin and penetrate far inland. The mud-flats are rich in invertebrates and also support extensive beds of algae, especially *Enteromorpha* species, and eelgrasses *Zostera* spp. The basin contains a wide range of coastal habitats supporting important plant and animal communities. The site is of particular significance for waterbirds, especially in migration periods and in winter. It also supports important colonies of breeding terns.
Qualifying features for which the site is designated:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Little tern *Sterna albifrons*, 100 pairs representing up to 4.2% of the breeding population in Great Britain (5 year mean, 1992-1996) Sandwich tern *Sterna sandvicensis*, 158 pairs representing up to 1.1% of the breeding population in Great Britain (1998) **On passage:** Little egret *Egretta garzetta*, 137 individuals representing up to 17.1% of the population in Great Britain (Count as at 1998) **Over winter:** Bar-tailed godwit *Limosa lapponica*, 1,692 individuals representing up to 3.2% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) Little egret *Egretta garzetta*, 100 individuals representing up to 20.0% of the wintering population in Great Britain (Count as at 1998) ***This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:*** **On passage:** Ringed plover *Charadrius hiaticula*, 2,471 individuals representing up to 4.9% of the Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6) **Over winter:** Black-tailed godwit *Limosa limosa islandica*, 1,003 individuals representing up to 1.4% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6) Dark-bellied brent goose *Branta bernicla bernicla*, 17,119 individuals representing up to 5.7% of the wintering Western Siberia/Western Europe population (5 year peak mean 1991/2 - 1995/6) Dunlin *Calidris alpina alpina*, 44,294 individuals representing up to 3.2% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6) Grey plover *Pluvialis squatarola*, 3,825 individuals representing up to 2.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6) Redshank *Tringa totanus*, 1,788 individuals representing up to 1.2% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6) Ringed plover *Charadrius hiaticula*, 846 individuals representing up to 1.7% of the wintering Europe/Northern	

Site Name: Chichester & Langstone SPA

Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds
Assemblage qualification: A seabird assemblage of international importance.
Over winter, the area regularly supports 93,142 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: wigeon *Anas penelope*, bar-tailed godwit *Limosa lapponica*, dark-bellied brent goose *Branta bernicla bernicla*, ringed plover *Charadrius hiaticula*, grey plover *Pluvialis squatarola*, dunlin *Calidris alpina alpina*, black-tailed godwit *Limosa limosa islandica*, redshank *Tringa totanus*, little grebe *Tachybaptus ruficollis*, little egret *Egretta garzetta*, shelduck *Tadorna tadorna*, curlew *Numenius arquata*, teal *Anas crecca*, pintail *Anas acuta*, shoveler *Anas clypeata*, red-breasted merganser *Mergus serrator*, oystercatcher *Haematopus ostralegus*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, sanderling *Calidris alba*, cormorant *Phalacrocorax carbo*, whimbrel *Numenius phaeopus*.

Conservation objectives:

- Subject to natural change, maintain in favourable condition the habitats for the **internationally important populations of the regularly occurring Annex 1 species**, in particular:
  - Sand and shingle
  - Shallow coastal waters

Subject to natural change, maintain in favourable condition99 the habitats for the **internationally important populations of the regularly occurring migratory species**, in particular
- Shingle
- Saltmarsh
- Intertidal mudflats and sandflats
- Mixed sediment shores

Subject to natural change, maintain in favourable condition10 the habitats for the **internationally important assemblage of waterfowl** , in particular:
- Shingle
- Saltmarsh
- Intertidal mudflats and sandflats
- Mixed sediment shores
- Shallow coastal waters

Site Name: Chesil Beach & The Fleet SPA	
Location	Latitude 50°36'40" N Longitude 02°31'10 "W
Area (ha)	748.11
Summary	Chesil Beach and The Fleet SPA is located on the south coast of England in Dorset. It is a long linear shingle beach (Chesil Bank) enclosing a brackish lagoon (the Fleet). The Fleet is the largest and best example of a barrier-built saline lagoon in the UK and Chesil is one of the three major shingle structures in the UK. The salinity gradient, peculiar hydrographic regime and varied substrates, together with associated reedbed and intertidal habitats and the relative lack of pollution in comparison to most other lagoons, have resulted in the Fleet being extraordinarily rich in wildlife. Outstanding communities of aquatic plants and animals are present, supporting large numbers of wintering waterbirds, including dark-bellied brent goose *Branta bernicla bernicla.* In spring and summer, Chesil Bank is an important breeding site for little terns *Sterna albifrons* which feed in the shallow waters of the lagoon, as well as adjacent waters outside the SPA.
Qualifying features for which the site is designated:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season:** Little tern *Sterna albifrons*, 55 pairs representing up to 2.3% of the breeding population in Great Britain (Count as at 1997) ***This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:*** **Over winter;** Dark-bellied brent goose *Branta bernicla bernicla*, 3,182 individuals representing up to 1.1% of the wintering Western Siberia/Western Europe population (5 year peak mean 1991/2 - 1995/6)	
Conservation objectives:	
The objectives focus on the feeding habitats of little tern: • Maintain the frequency and abundance of crustaceans, annelids, fish and molluscs in lagoon water which should not alter significantly from the baseline. In relation to migratory species, objectives focus on the condition of habitats: • Seagrass bed communities • brent geese and wigeon require e.g. *Zostera*, waders prefer invertebrates – see above • maintain absence of obstructions to view lines • Intertidal sediment communities • maintain extent in terms of habitat and food availability • ensure no increase in disturbance in feeding and roosting areas	

Site Name: Portsmouth Harbour SPA	
Location	Latitude 50°49'41" N Longitude 01°07'32" W
Area (ha)	1248.77
Summary	Portsmouth Harbour is located on the central south coast of England It is a large industrialised estuary and includes one of the four largest expanses of mud-flats and tidal creeks on the south coast of Britain. The mud-flats support large beds of narrow-leaved eelgrass *Zostera angustifolia* and dwarf eelgrass *Z. noltii*, extensive green algae beds, mainly *Enteromorpha* species, and sea lettuce *Ulva lactuca*. Portsmouth Harbour has only a narrow connection to the sea via the Solent, and receives comparatively little fresh water, thus giving it an unusual hydrology. The site supports important numbers of wintering dark-bellied brent goose *Branta b. bernicla,* which feed also in surrounding agricultural areas away from the SPA.
Qualifying features for which the site is designated:	
Under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **Over winter;** Dark-bellied brent goose *Branta bernicla bernicla*, 2,847 individuals representing at least 0.9% of the wintering Western Siberia/Western Europe population (5 year peak mean 1991/2 - 1995/6)	
Conservation objectives:	
Subject to natural change, maintain in favourable condition the habitats for the nationally and internationally important populations of the regularly occurring migratory species, in particular: • Saltmarsh • Intertidal mudflats and sandflats • Shallow coastal waters	

Site Name: Avon Valley SPA	
Location	Latitude 50°47'02" N Longitude 01°47'46" W
Area (ha)	1385.08
Summary	The Avon Valley SPA encompasses the lower reaches of the River Avon and its floodplain on the south coast of England. The site extends for approximately 20 km between Bickton and Christchurch. The River Avon displays wide fluctuations in water level and parts of the valley are regularly flooded in winter. Consequently, the valley includes one of the largest expanses of unimproved floodplain grassland in Britain, including extensive areas managed as hay meadows and grazing marsh under low–intensity agricultural systems. These extensive floodplain grasslands support wintering bewick's swans *Cygnus columbianus bewickii* in numbers of European importance, and Blashford Lakes Gravel Pits within the SPA are particularly important for wintering gadwall *Anas strepera.*
Qualifying features for which the site is designated:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **Over winter:** Bewick's swan *Cygnus columbianus bewickii*, 135 individuals representing at least 1.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6) ***This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:*** **Over winter:** Gadwall *Anas strepera*, 667 individuals representing at least 2.2% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)	
Conservation objectives:	
Subject to natural change, to maintain in favourable condition the habitats for Bewick's swan and gadwall with particular reference to: • open water • standing water • floodplain • grazing marsh	

Site Name: Pagham Harbour SPA	
Location	Latitude 50°45'48" N Longitude 00°45'38" W
Area (ha)	636.68
Summary	Pagham Harbour is located on the south coast of England in West Sussex. It is an estuarine basin that comprises an extensive central area of saltmarsh and intertidal mud-flats, surrounded by lagoons, shingle, open water, reed swamp and wet permanent grassland. The mud-flats are rich in invertebrates and algae, and provide important feeding areas for birds. The lower saltmarsh is dominated by common cord-grass *Spartina anglica,* with patches of glasswort *Salicornia* spp. The area supports breeding little tern *Sterna albifrons* in summer, as well as wintering concentrations of ruff *Philomachus pugnax* and pintail *Anas acuta*.
Qualifying features for which the site is designated:	
Under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: **During the breeding season;** Little tern *Sterna albifrons*, 12 pairs representing 0.5% of the breeding population in Great Britain (Count as at 1995) **Over winter:** Ruff *Philomachus pugnax*, 160 individuals representing at least 22.9% of the wintering population in Great Britain ***This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:*** **Over winter:** Pintail *Anas acuta*, 628 individuals representing at least 1.0% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)	
Conservation objectives:	
Subject to natural change, to maintain the habitats and geological features in favourable condition, or restored to favourable condition if features are judged to be unfavourable, with particular reference to any dependent component special interest features (habitats, vegetation types, species, species assemblages etc.) for which the land is designated as individually listed above.	

C2 Coastal and marine Special Areas of Conservation

Site Name: Solent Maritime SAC	
Location	Latitude 50°47'47" N Longitude 00°55'40" W
Area (ha)	11325.09
Summary	Solent Maritime SAC has the largest number of small estuaries in the tightest cluster anywhere in Great Britain and is located in one of only a few major sheltered channels in Europe, lying between a substantial island (the Isle of Wight) and the mainland. The Solent and its inlets are unique in Britain and Europe for their complex tidal regime, with long periods of tidal stand at high and low tide, and for the complexity and particularly dynamic nature of the marine and estuarine habitats present within the area. There is a wide variety of marine sediment habitats influenced by a range of salinities, wave shelter and intensity of tidal streams, resulting in a uniquely complex site. Sediment habitats within the estuaries include extensive areas of estuarine flats, with intertidal areas often supporting eelgrass *Zostera* spp. and green algae, saltmarshes and natural shoreline transitions, such as drift line vegetation. Many of the intertidal areas within the site are important for a number of nesting, roosting and feeding birds.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Estuaries, *Spartina* swords (*Spartinion maritimae*), atlantic sea meadows (*Glauco-Puccinellietalia maritimae*) Secondary feature: Sandbanks which are slightly covered by sea water all the time, mudflats and sandflats not covered by seawater at low tide, coastal lagoons (priority feature), annual vegetation of drift lines, perennial vegetation of stony banks, *Salicornia* and other annuals colonising mud and sand, shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`) ***Annex II Species*** Primary features: None Secondary features: Desmoulin`s whorl snail (*Vertigo moulinsiana*)	
Conservation objectives:	
For Annex I Habitats Subject to natural change, maintain the estuaries in favourable condition, in particular: • Saltmarsh communities • Intertidal mudflat & sandflat communities • Intertidal mixed sediment communities • Subtidal sediment communities Subject to natural change, maintain the atlantic salt meadows (*Glauco-Puccinellietalia*) in favourable condition, in particular: • Low marsh communities • Mid-marsh communities • Upper marsh communities • Transitional high marsh communities Subject to natural change, maintain the annual vegetation of drift lines in favourable conditions Subject to natural change, maintain the *Salicornia* and other annuals colonising mud and sand in favourable condition, in particular: • Annual *Salicornia* saltmarsh communities (SM8) • *Suaeda maritima* saltmarsh communities (SM9) Subject to natural change, maintain the cordgrass swards (*Spartinion*) in favourable condition8, in particular: • Small cordgrass (*Spartina maritima*) communities	

Site Name: Solent Maritime SAC
• Smooth cordgrass (*Spartina alterniflora*) communities • Townsend's cordgrass (*Spartina x townsendii*) communities Subject to natural change, maintain the mudflats and sandflats not covered by seawater at low tide in favourable condition in particular: • Intertidal mud communities • Intertidal muddy sand communities • Intertidal sand communities • Intertidal mixed sediment communities Subject to natural change, maintain the sandbanks slightly covered by seawater all the time in favourable condition, in particular: • Subtidal gravelly sand and sand • Subtidal muddy sand • Subtidal eelgrass *Zostera marina* beds
No specific objectives set in present Regulation 33 advice, though assumed that, subject to natural change, to maintain the habitats and geological features in favourable condition, or restored to favourable condition if features are judged to be unfavourable, with particular reference to any dependent component special interest features (habitats, vegetation types, species, species assemblages etc.) for which the land is designated as individually listed above.

Site Name: South Wight Maritime SAC	
Location	Latitude 50°35'29" N Longitude 01°20'51" W
Area (ha)	19862.71
Summary	The southern shore of the Isle of Wight, off the coast of southern England, includes a number of subtidal reefs that extend into the intertidal zone. This site is selected on account of its variety of reef types and associated communities, including chalk, limestone and sandstone reefs. To the west and south-west some of the most important subtidal British chalk reefs occur, representing over 5% of Europe's coastal chalk exposures, including the extensive tide-swept reef off the Needles and examples at Culver Cliff and Freshwater Bay. These support a diverse range of species in both the subtidal and intertidal. Other reef habitats within the site include areas of large boulders off the coast around Ventnor. There is a large reef of harder limestone off Bembridge and Whitecliff Bay, where the horizontal and vertical faces and crevices provide a range of habitats. The bedrock is extensively bored by bivalves. Their presence, together with the holes they create, give shelter to other species, which adds further to habitat diversity. Intertidal pools support a diverse marine life, including a number of rare or unusual seaweeds, such as the shepherd's purse seaweed *Gracilaria bursa-pastoris*. A number of other species reach their eastern limit of distribution along the English Channel at the Isle of Wight. The western and eastern extremities of the site consist of high chalk cliffs with species-rich calcareous grassland vegetation, the former exposed to maritime influence and the latter comparatively sheltered. At the western end, the site adjoins the Isle of Wight Downs, providing an unusual combination of maritime and chalk grassland. The most exposed chalk cliff tops support important assemblages of nationally rare lichens, including *Fulgensia fulgens*. The vegetation communities are a mixture of acidic and mesotrophic grasslands with some scrub and a greater element of maritime species, such as thrift *Armeria maritima*, than is usual on soft cliffs. This section supports the Glanville fritillary butterfly *Melitaea cinxia* in its main English stronghold. A small, separate section of the site on clays has a range of successional stages, including woodland, influenced by landslips. These cliffs are minimally affected by sea defence works, which elsewhere disrupt ecological processes linked to coastal erosion, and together they form one of the longest lengths of naturally-developing soft cliffs on the UK coastline. The exposure of the south coast of the island to high wave energy has allowed the erosion of the Cretaceous calcareous hard cliffs to form sea caves. The large littoral caves in the chalk cliffs are of ecological importance, with many hosting rare algal species, which are restricted to this type of habitat. The fauna of these sea caves includes a range of mollusc species such as limpets Patella spp. and the horseshoe worm *Phoronis hippocrepia*.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Reefs, Vegetated sea cliffs of the Atlantic and Baltic coasts, Submerged or partially submerged sea caves Secondary features: None ***Annex II Species*** Primary features: None Secondary features: None	
Conservation objectives:	
Subject to natural change, maintain the reefs in favourable condition, in particular: • Rocky shore communities • Kelp forest communities • Subtidal red algae communities • Sea cave communities Subtidal faunal turf communities	

Site Name: Studland to Portland pSAC	
Location	Latitude 50°33'20" N Longitude 02°09'58" W
Area (ha)	32,958
Summary	Numerous areas of reef (in many forms) exist within the Studland Bay to Ringstead Bay area. The reefs exhibit a large amount of geological variety, ranging from exposed chalk bedrock east of Ringstead Bay, through to exposed shales and clays, limestone and cementstone ledges, and boulders around Kimmeridge to Durlston, and back to exposed chalk bedrock between Ballard Cliffs and Handfast Point in the east of the site. The Portland Reefs area lies off the south, east and west coasts of Portland Bill and is characterised by flat bedrock, limestone ledges (Portland stone), large boulders and cobbles. Diver surveys on the western side of Portland Bill have recorded rugged limestone boulders providing deep gullies and overhangs. These occur where the coastal cliffs extend underwater and are clearly visible as 20m drop offs. *Mytilus edulis* beds are found to occur in very high densities on bedrock associated with strong currents off Portland Bill.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Reefs Secondary features: None ***Annex II Species*** Primary features: None Secondary features: None	
Conservation objectives:	
Subject to natural change, maintain the reefs in favourable condition, in particular the subfeatures: • Bedrock reef communities • Biogenic reef communities	

Site Name: Chesil & The Fleet SAC	
Location	Latitude 50°36'47" N Longitude 02°31'22" W
Area (ha)	1631.63
Summary	Chesil Beach and The Fleet SPA is located on the south coast of England in Dorset. It is a long linear shingle beach (Chesil Bank) enclosing a brackish lagoon (the Fleet). The Fleet is the largest and best example of a barrier-built saline lagoon in the UK and Chesil is one of the three major shingle structures in the UK. The salinity gradient, peculiar hydrographic regime and varied substrates, together with associated reedbed and intertidal habitats and the relative lack of pollution in comparison to most other lagoons, have resulted in the Fleet being extraordinarily rich in wildlife. Outstanding communities of aquatic plants and animals are present.

Qualifying features for which the site is designated:

Annex I Habitat

Primary species: Coastal lagoons, annual vegetation of drift lines, perennial vegetation of stony banks, Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

Secondary species: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Annex II Species

Primary features: None

Secondary features: None

Conservation objectives:

Subject to natural change, maintain the **lagoon** in favourable condition, in particular:

- Seagrass bed communities
- Tide-swept communities
- Subtidal coarse sediment (gravel, cobbles, pebbles) communities
- Intertidal sediment communities
- Shingle spring line communities

Subject to natural change, maintain the **Annual vegetation of drift lines** in favourable condition, in particular:

- *Beta vulgaris maritima* (sea beet) - *Atriplex* (orache) communities
- *Honkenya peploides* (sea sandwort) - *Cakile maritima* (sea rocket) communities

Subject to natural change, maintain the **Mediterranean and thermo-Atlantic halophilous scrub** in favourable condition, in particular:

- Shrubby sea-blite (*Suaeda vera)* communities

Site Name: Wight-Barfleur dSAC	
Location	Latitude 50°16'40″ N Longitude 01°28'25″W
Area (ha)	137344
Summary	The Wight-Barfleur reef is an area of bedrock and stony reef located in the central English Channel, between St Catherine's point on the Isle of Wight and Barfleur Point on the Cotentin Peninsula in northern France. The large area of bedrock reef within the SAC is characterised by a series of well-defined exposed bedrock ridges, up to 4m high. The rock is generally sandstone, mudstone and siltstone, although different regions within the SAC can be distinguished on the basis of the different textures formed by different types of rock. The southern area of the site is composed of flat, smooth, mudstone and sandstone, with overlying coarse sediment (gravels, cobbles and boulders) which in places forms stony reef. The south-eastern area of the site contains part of a large palaeochannel known as the Northern Palaeovalley, which forms a major channel running roughly north-east/south-west across the English Channel. I n this area the palaeovalley remains largely unfilled by sediment due to the strong currents in the area, and is characterised by a gravel, cobble and boulder substrate which in places forms stony reef. The bedrock and stony reef areas support a diverse range of reef fauna. There are many types of sponges present, from encrusting sponges to larger branching types. Tube worms, anemones and tunicates (sea squirts) are also common on the large boulders and bedrock.
Qualifying features for which the site is designated:	
Annex I Habitat Primary features: Reef Secondary features: Harbour porpoise (*Phocoena phocoena*) (non-qualifying), bottlenose dolphin (*Tursiops truncatus*) (non-qualifying) ***Annex II Species*** Primary features: None Secondary features: None	
Conservation objectives:	
For Annex I Habitat: Reefs Draft objectives are to restore the Wight-Barfleur reef to favourable condition. The exact impact of any operation will be dependent upon the nature, scale, location and timing of events. Management actions should enable the Wight-Barfleur reef to achieve Favourable Condition. This will require assessment and management of human activities likely to affect the feature adversely, and of activities likely to impact natural environmental quality and environmental processes upon which the features are dependent. Wight-Barfleur reef is highly or moderately vulnerable to the following pressures. Therefore, to fulfil the conservation objectives for the Annex I Reefs, the competent authorities for this area are advised to manage human activities within their remit such that they do not result in deterioration or disturbance of this feature through any of the following: • Physical loss by obstruction (installation of submarine cables) • Physical damage by physical disturbance or abrasion (demersal fishing) • Biological disturbance by selective extraction of species (demersal fishing)	

Site Name: River Itchen SAC	
Location	Latitude 50°57'14" N Longitude 01°20'05" W
Area (ha)	309.26
Summary	The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans.* Strong populations of southern damselfly *Coenagrion mercuriale* occur here, estimated to be in the hundreds of individuals. The site represents one of the major population centres in the UK. It also represents a population in a managed chalk-river flood plain, an unusual habitat for this species in the UK, rather than on heathland. The Itchen supports high densities of bullhead *Cottus gobio* throughout much of its length. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Secondary features: None ***Annex II Species*** Primary features: Southern damselfly *Coenagrion mercurial, Bullhead Cottus gobio* Secondary features: White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes, Brook lamprey Lampetra planeri, Atlantic salmon Salmo salar, Otter Lutra lutra*	
Conservation objectives:	
To maintain, in favourable condition, the river as a habitat for: • floating formations of water crowfoot (*Ranunculus*) of plain and sub-mountainous rivers • populations of Atlantic salmon (*Salmo salar*) • populations of bullhead (*Cottus gobio*) • populations of brook lamprey (Lampetra planeri) • populations of white-clawed crayfish (*Austropotamobius pallipes*) and the river and adjoining land as habitat for: • populations of southern damselfly (*Coenagrion mercuriale*) • populations of otter (*Lutra lutra*)	

Site Name: River Avon SAC	
Location	Latitude 51°06'14" N Longitude 01°49'24" W
Area (ha)	498.24
Summary	There is an extensive population of Desmoulin's whorl snail *Vertigo moulinsiana* along about 20 km of the margins and associated wetlands of the Rivers Avon, Bourne and Wylye. This is one of two sites representing the species in the south-western part of its range, in chalk stream habitat. There are excellent examples of the features that sea lamprey needs for survival, including extensive areas of sand and gravel in the middle to lower reaches of the river where sea lampreys are known to spawn. The represents the southern part of the range of brook lamprey *Lampetra planeri*. A healthy, stable population occurs in the main river and in a number of tributaries. The main river, and in particular its tributaries, provides clean beds of gravel for spawning and extensive areas of fine silt for juveniles to burrow into. Salmon populations are typical of a high-quality chalk stream, unaffected by the introduction of genetic stock of non-native origin. The Avon has an excellent mosaic of aquatic habitats, which include extensive areas of gravels essential for spawning and growth of juvenile fry. There has been limited modification of the river course by comparison with many other southern lowland rivers in England. The bullhead is also an important component of this community, particularly in the tributaries.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Secondary features: None ***Annex II Species*** Primary features: Desmoulin`s whorl snail *Vertigo moulinsiana , Sea lamprey Petromyzon marinus, Brook lamprey Lampetra planeri, Atlantic salmon Salmo salar, Bullhead Cottus gobio* Secondary features: None	
Conservation objectives:	
Subject to natural change, to maintain the following habitats and geological features in favourable condition (or restored to favourable condition if features are judged to be unfavourable), with particular reference to any dependent component special interest features (habitats, vegetation types, species, species assemblages etc.) for which the land is designated as individually listed above.	

Site Name: River Axe SAC		
Location	Latitude	50°45'33" N
	Longitude	03°02'21" W
Area (ha)	498.24	
Summary	The Axe is a south-western example of sub-type 2. Only the lower reaches of the main river have been designated, where the mixed catchment geology of sandstones and limestones gives rise to calcareous waters where *R. penicillatus* ssp. *pseudofluitans* dominates, giving way to *R. fluitans* further downstream. Short-leaved water-starwort *Callitriche truncata* is an unusual addition to the *Ranunculus* community and gives additional interest.	
Qualifying features for which the site is designated:		
Annex I Habitat Primary feature: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. Secondary features: None ***Annex II Species*** Primary features: *Sea lamprey Petromyzon marinus, Brook lamprey Lampetra planeri, Bullhead Cottus gobio* Secondary features: None		
Conservation objectives:		
Subject to natural change, to maintain the following habitats and geological features in favourable condition (or restored to favourable condition if features are judged to be unfavourable), with particular reference to any dependent component special interest features (habitats, vegetation types, species, species assemblages etc.) for which the land is designated as individually listed above.		

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