Department of Energy & Climate Change

Offshore Oil & Gas Licensing

27th Seaward Round

Central English Channel

Blocks 97/13 and 98/12b

Habitats Regulations Assessment

Appropriate Assessment

March 2013

CONTENTS

1 Introduction

1.1 Background and purpose

On 1st February 2012, the Secretary of State for the Department of Energy and Climate Change (DECC) invited applications for licences in the 27th Seaward Licensing Round. Applications for Traditional Seaward, Frontier Seaward and Promote Licences covering over 400 Blocks/part Blocks were received.

To comply with obligations under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended), in summer 2012, 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 2012a).

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

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

An initial screening assessment (including consultation with the statutory agencies/bodies), identified 61 whole or part Blocks as requiring further assessment prior to decisions on whether to grant licences (DECC 2012a). 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
- West of Shetland
- Northern Ireland
- Eastern Irish Sea
- Central English Channel

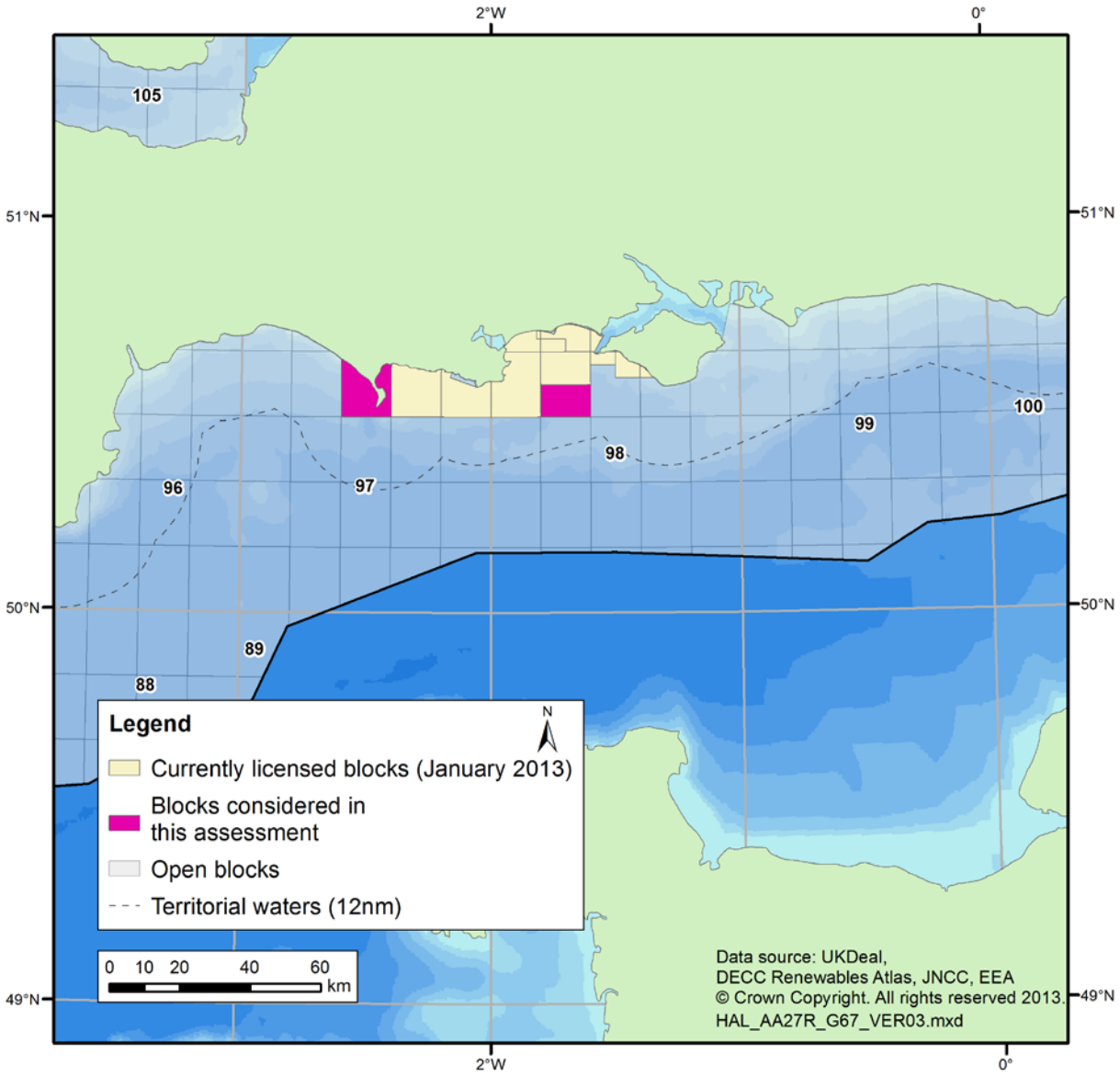
This report documents the further assessment in relation to 2 Blocks in the central English Channel (see Section 1.2).

1.2 Central English Channel Blocks

The central English Channel Blocks applied for in the 27th Round considered in this document are listed below and shown in magenta in Figure 1.1.

97/13 98/12b

Figure 1.1: Location of central English Channel Blocks



Note: Open blocks are currently unlicensed, although they may have been licensed in the past.

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). A variation on the Frontier Production Licence was introduced prior to the 26th Round. Designed for the particularly harsh West of Scotland environment, it is similar to the existing Frontier Licence but with an initial term of nine years with a Drill-or-Drop decision to be made by the end of the sixth year and (if the licensee chooses to drill) drilling to be completed within the remaining three years of the initial term.

- In the 21st Round (2002) the Department introduced Promote Licences. The general concept of the Promote Licence is that the licensee is given two years after award to attract the technical, environmental and financial capacity to complete an agreed Work Programme. In effect, 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 accidental events such as oil spills, the impacts can occur some distance from the licensed Blocks and the degree of activity is not necessarily proportional to the size or number of Blocks in an area. In the case of direct physical disturbance, the licence Blocks being

applied for are relevant, 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:

97/13 – Drill or Drop well. On account of the range of environmental sensitivities present, the applicant proposes that the exploration well would be drilled from land, although subsequent activities could involve offshore drilling.

98/12b – Drill or Drop well.

The hydrocarbon resources being targeted are conventional oil and gas in normally pressured reservoirs although 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 one of the Blocks considered in this assessment (Table 2.1).

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

Block	Period of concern for seismic surveys	Special Conditions
97/13	March - May	✓[1]
98/12b	-	✓[2]

Note: [1] Extensive naval or air operations in these blocks. Any production license granted for this block 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 27th 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 2 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 including Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) and potential sites for which there is adequate information on which to base an assessment.

The sites considered are listed and mapped in Appendix A. In accordance with Government policy (as set out in the National Planning Policy Framework (DCLG 2012[1]) and Marine Policy Statement (HM Government 2011), 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 2005) which states that: "*Prior to its submission to the European Commission as a cSAC, a proposed SAC (pSAC) is subject to wide consultation. At that stage it is not a European site and the Habitats Regulations do not apply as a matter of law or as a matter of policy. Nevertheless, planning authorities should take note of this potential designation in their consideration of any planning applications that may affect the site.*" This is also reflected in Scottish Planning Policy[3].

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, and along the French north coast (there may be a requirement to consult with relevant French authorities during the project-level consenting process)
- 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

[1] Which states that "listed or proposed Ramsar sites...should be given the same protection as European sites." 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.
[3] Paragraph 135 of Scottish Planning Policy – http://www.scotland.gov.uk/Resource/Doc/300760/0093908.pdf. Note that a review of the SPP was announced in the Scottish Parliament on September 18, running concurrently with a review of the Scottish National Planning Framework 3.

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 all 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).

The sites listed in Tables 3.1 and 3.2 and shown in Figures 3.1-3.2 are those taken forward from the block screening assessment (DECC 2012a) and have been re-screened in Appendix B in relation to the final Blocks proposed for licensing in the 27th Round and their related work programmes (Section 2.2). Those for which a likely significant effect was identified in the re-screening are highlighted in Tables 3.1 and 3.2 and subject to further assessment in Sections 5-8. Appendix C provides additional site details such as the status of qualifying features and related conservation objectives.

Figure 3.1: SPAs relevant to this Appropriate Assessment

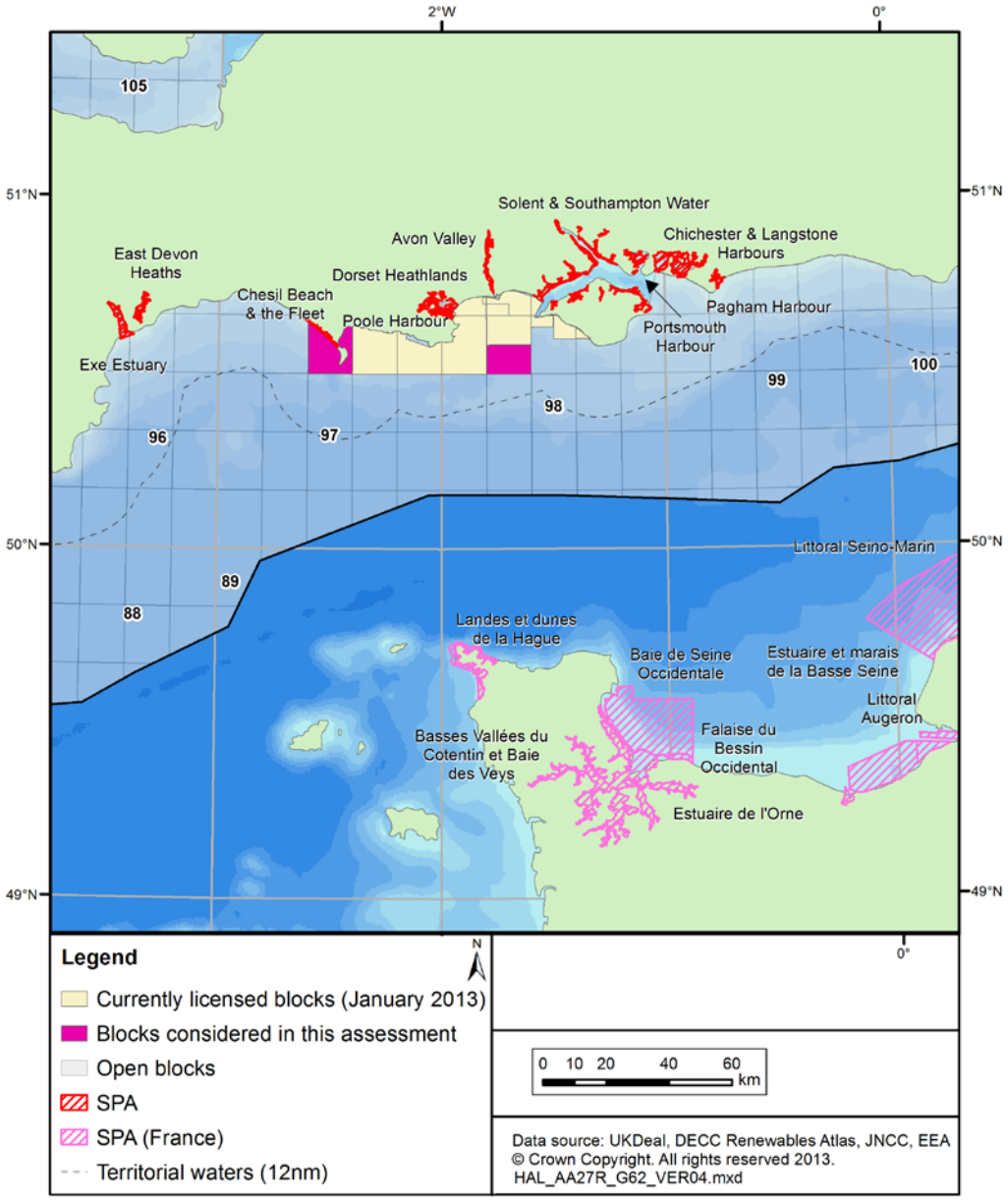


Figure 3.2: SACs relevant to this Appropriate Assessment

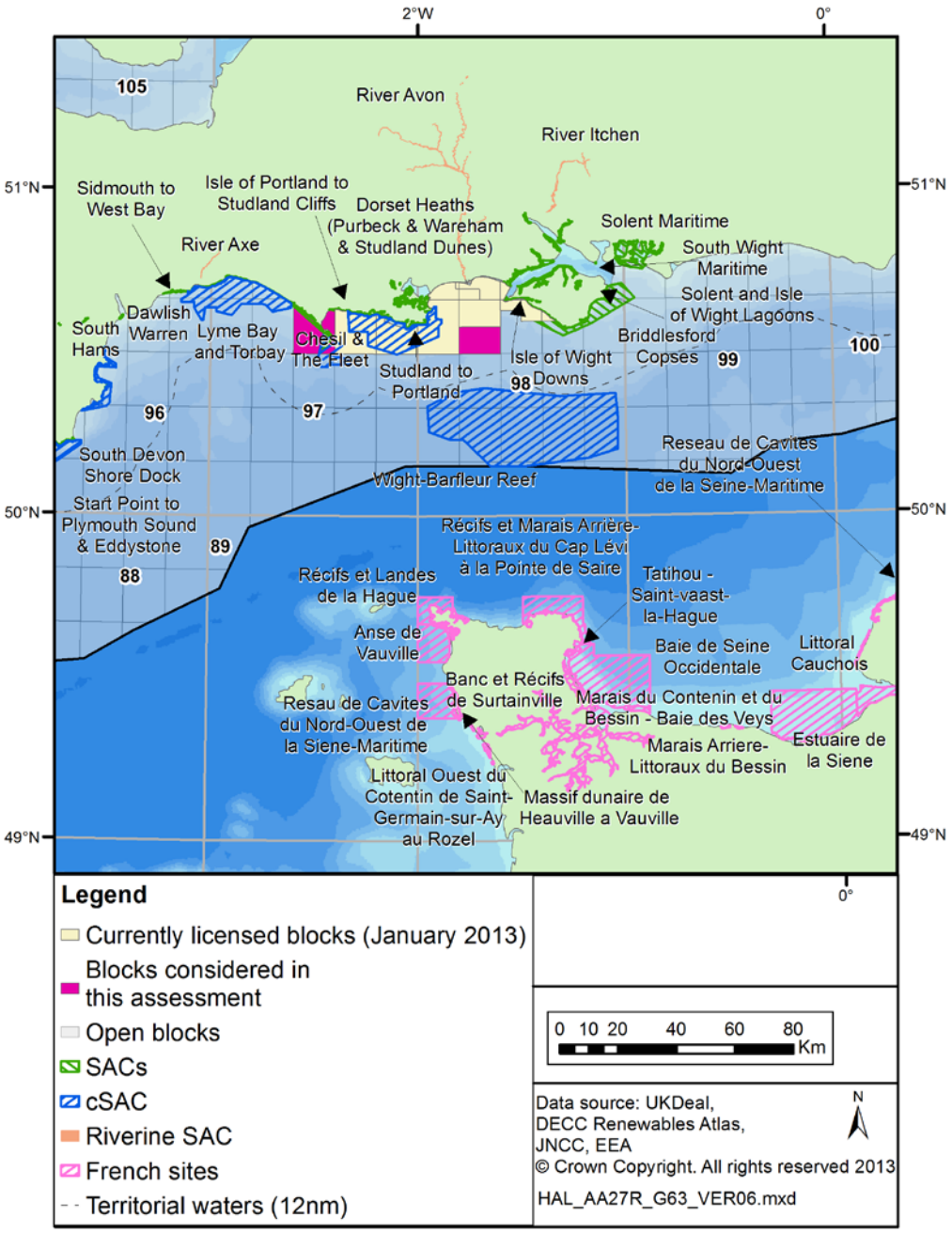


Table 3.1: SPA sites and qualifying features under Article 4.1 and 4.2, relevant to the English Channel AA

	Exe Estuary	East Devon Heaths	Chesil Beach and The Fleet	Poole Harbour	Avon Valley	Solent and Southampton Water	Portsmouth Harbour	Chichester and Langstone Harbours	Pagham Harbour
Redshank								W	
Little tern			B			B		B	B
Dark bellied Brent goose	W		W			W	W	W	W
Dartford warbler		B							
Nightjar		B							
Woodlark									
Hen harrier									
Merlin									
Common tern				B		B		B	B
Mediterranean gull				B		B			
Oystercatcher	W								
Avocet	W			W					
Little egret				P, W				P, W	
Aquatic warbler				P					
Black-tailed godwit	W			W		W	W	W	
Shelduck				W				W	
Honey buzzard									
Roseate tern						B			
Sandwich tern						B		B	
Ringed plover						W		P, W	
Wigeon								W	
Teal						W		W	
Bewick's swan					B				
Gadwall					W				
Slavonian grebe	W								
Bar tailed godwit								B	
Sanderling								W	
Dunlin	W						W	W	
Curlew								W	
Turnstone								W	
Grey plover	W							W	
Ruff									W
Pintail								W	W
Shoveler								W	
Red-breasted merganser							W	W	
Assemblage	W			W		W		W	
Site subject to AA*			✓	✓	✓	✓	✓	✓	✓

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

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

Annex 1 Habitats	Start Point to Plymouth Sound & Eddystone	South Devon Shore Dock	Lyme Bay and Torbay	South Hams	Dawlish Warren	Sidmouth to West Bay	Chesil & the Fleet	Isle of Portland to Studland Cliffs	Studland to Portland cSAC	St Albans Head to Durlston Head	Dorset Heaths (Purbeck and Wareham and Studland Dunes	Solent and Isle of Wight Lagoons	South Wight Maritime	Solent Maritime	Isle of Wight Downs	Wight-Barfleur Reef cSAC
Coastal dunes					P,Q						P			Q		
Coastal lagoons							P					P		Q		
Estuaries														P		
Grasslands				P				P		P	Q				P	
Heaths				P							P				P	
Forest				Q		P					Q					
Bog											P					
Fens											Q					
Mudflats and sandflats														Q		
Reefs	P		P						P				P			P
Salt marshes and salt meadows							P,Q							P,Q		
Sandbanks														Q		
Sea caves			P	Q									P			
Sea cliffs		P		Q		P		P		P			P		P	
Standing freshwater											P					
Vegetation of drift lines						Q	P	Q						Q		
Vegetation of stony banks							P							Q		
Site subject to AA*							✓	✓	✓	✓			✓	✓	✓	✓

*Note: P = Primary feature, Q = 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). * see Appendices B and C*

Annex 2 Species	South Devon Shore Dock	South Hams	Dawlish Warren	Isle of Portland to Studland Cliffs	St. Albans to Durlston Head	Dorset Heaths (Purbeck and Wareham) and Studland Dunes	Solent Maritime	Isle of Wight Downs	Briddlesford Copses	River Axe	River Avon	River Itchen
Greater horseshoe bat		P			Q							
Bechstein's bat									P			
Early gentian				P	P			P				
Shore dock	P											
Petalwort			P									
Southern damselfly						P						P
Desmoulin's whorl snail							Q				P	
Great crested newt						Q						
Bullhead										Q	P	P
White-clawed crayfish												Q
Sea lamprey										Q	P	
Brook lamprey										Q	P	Q
Atlantic salmon											P	Q
Otter												Q
Site subject to AA*				✓	✓		✓	✓		✓	✓	✓

*Note: P = Primary feature, Q = 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). * see Appendices B and C.*

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 *The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended), DECC has:

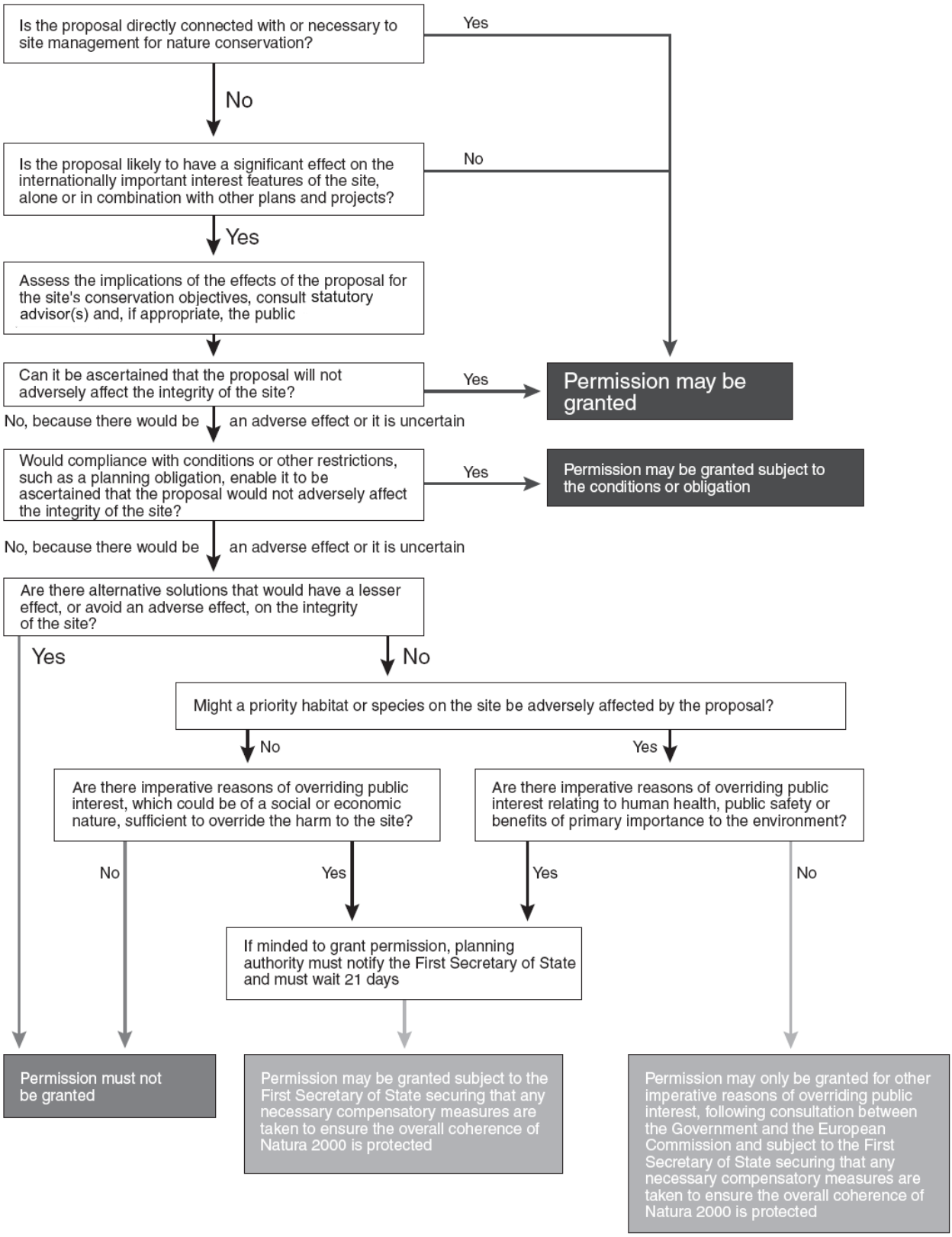
- Considered, on the basis of the precautionary principle, whether it could be concluded that the integrity of relevant European Sites would not be affected. This impact prediction involved a consideration of the cumulative and in-combination effects.
- Examined, in relation to elements of the plan where it was not possible to conclude that the integrity of relevant sites would not be affected, whether appropriate mitigation measures could be designed which 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), so that:

- Prior to the grant of any licence all activities which may be carried out following the grant of such a licence, and which by themselves or in combination with other activities can affect the site's conservation objectives, are identified in the light of the best scientific knowledge in the field.
- A licence can only be granted if DECC has made certain that the activities to be carried out under such a licence will not adversely affect the integrity of that site (i.e. cause deterioration to a qualifying habitat or habitat of qualifying species, and/or undermine the conservation objectives of any given site). That is the case where no reasonable scientific doubt remains as to the absence of such effects.

A flowchart summarising the process is shown in Figure 4.1 overleaf.

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 (2005).

4.2 Site integrity

Site integrity is defined by the ODPM Circular 06/2005 (ODPM 2005) 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 (see Table 4.2) 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.

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 National Planning Policy Framework (DCLG 2012), Circular 06/2005 (ODPM 2005), the English Nature Research Reports, No 704 (Hoskin & Tyldesley 2006) and the Scottish Natural Heritage Habitats Regulations Appraisal of Plans, No 1739 (Tyldesley & Associates 2012).

Appendix A lists and summarises the relevant European Sites as defined in Section 3. Appendix B then presents the results of a re-screening exercise of these sites to identify the potential for activities that could follow the licensing of the 2 Blocks in question (see work programmes in Section 2.2) to result in a likely significant effect. Where potential effects are identified in Appendix B, more detailed information on the relevant sites including their conservation objectives is provided in Appendix C.

Detailed assessments are made in Sections 5-8 of the implications for the integrity of the relevant European Sites (in terms of their qualifying features and species, and the site's conservation objectives) were a licence (or licences) to be granted for the two central English Channel Blocks. The assessment is based on an indication of the proposed work programmes for the Blocks and likely hydrocarbon resources if present, along with the characteristics and specific environmental conditions of the relevant sites as described in the Appendices. As noted in Section 2.2, the proposed 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:

- Physical disturbance and other effects (e.g. pipeline trenching, marine discharges)
- Underwater noise (in particular, seismic surveys)

- Oil spills (including all liquid phase hydrocarbons)
- 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 35[4] (formerly Regulation 33) 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 necessary as part of activity consenting.

A Natural England review of risks from ongoing activities within existing European Marine Sites (EMS) in England was undertaken to identify and prioritise action required to ensure site features were maintained or restored to favourable condition (Coyle & Wiggins 2010). Activities were scored as those which could pose a high, medium, low, or no risk to EMS features. Activities which could pose a high risk were those which have been prioritised by Natural England as potentially requiring additional management measures to avoid deterioration and disturbance in line with the obligations under Article 6(2) of the Habitats Directive. Activities which could pose a medium or low risk were considered to have existing management systems in place and/or they have less potential to pose harm to site features. The results were also separated into broad activities for further analysis, including commercial fishing; recreation; pollution; water resources; coastal defence; military; commercial vessels; illegal development; and other (includes the spread of non-natives and land management risks). Table 4.1 provides details of the risks assessed with respect to EMS of relevance to the central English Channel Blocks.

Table 4.1: Risk assessment of EMS of relevance to the central English Channel Blocks

European Marine Site	Activities assessed	Risk category			Total assessed [1]
		High	Medium	Low	
Pagham Harbour	Coastal defence, recreation, pollution, other	1	3	6	10
South Wight	Commercial fishing, commercial vessels, coastal defence, recreation, pollution, water resources, other	0	16	19	36
Solent and Isle of Wight lagoons	Coastal defence, pollution, recreation	0	3	5	8
Solent	Commercial fishing, commercial vessels, coastal defence, recreation, pollution, water resources, military, other	3	19	31	54

[4] The Conservation of Habitats and Species Regulations 2010

European Marine Site	Activities assessed	Risk category			Total assessed [1]
		High	Medium	Low	
Poole Harbour	Commercial fishing, commercial vessels, recreation, pollution, coastal defence, other	3	20	29	59
Chesil and The Fleet	Commercial fishing, commercial vessels, recreation, pollution, other	0	7	15	27
Exe Estuary	Commercial fishing, commercial vessels, recreation, pollution, other	1	14	27	42
Isle of Portland	-	0	0	0	0
Sidmouth to West Bay	-	0	0	0	0

Note: [1]Total activities assessed includes those scored as no risk.
Source: Coyle & Wiggins (2010)

It should be noted that few sites have risks in the high category which indicate that additional management and mitigation is required. The review did not directly cover oil or chemical spills at sea, but indicated they were a continued risk to EMS, with a number of incidents taking place each year. Additionally, potential future risks to sites (e.g. that could arise from coastal developments) were not considered, limiting the study to risks from existing activities (Coyle & Wiggins 2010).

As part of the Habitats and Wild Birds Directives Implementation Review[5], Natural England and JNCC are in the process of reviewing and updating the existing conservation objectives for all European Marine sites[6]. They aim to produce (where possible) quantified targets for:

- The populations and distribution of qualifying species.
- The extent and distribution of qualifying natural habitats and habitats of qualifying species.
- The structure of qualifying natural habitats and habitats of qualifying species.
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely.

The updated conservation objectives will be produced from April 2013, with a view to completion of all English sites within 2 years.

The current conservation objectives identified for SAC and SPA features for sites where a likely significant effect has 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 AA. The basis and primary concern of the conservation objectives are to maintain or achieve

[5] Report of the Habitats and Wild Birds Directives Implementation Review - http://www.defra.gov.uk/publications/files/pb13724-habitats-review-report.pdf
[6] Natural England website - http://www.naturalengland.org.uk/Images/action-14-announcement_tcm6-32928.pdf

favourable conservation status. Table 4.2 provides a definition of conservation status based on Articles 1(e) and (i) of the Habitats Directive.

Table 4.2: 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 4.3). 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 conservation objectives would not be undermined by 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 Appendix B.

Table 4.3: High level mitigation measures identified for potential sources of effect

High level Mitigation	
Physical disturbance	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 (e.g. following rig site and pipeline route surveys), 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.
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 limiting well testing to the minimum time required to satisfy test objectives and limit any flaring required to that which meets the technical requirements of processing. Rescheduling of activities, for instance by avoiding or limiting activities during months when large numbers of birds aggregate in the area, could help to reduce the risk of bird collision.
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 *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (& 2007 amendments) for oil and gas related seismic surveys that the JNCC, *Guidelines for minimising the risk of disturbance and injury to marine mammals from seismic surveys,* are followed. European Protected Species (EPS) disturbance licences can also be issued under the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended). Passive acoustic monitoring (PAM) may be required as a mitigation tool. DECC will take account of the advice provided by the relevant statutory nature conservation body in determining any consent conditions. Potential disturbance of certain species may be avoided by the seasonal timing of noisy activities, and periods of seasonal concern for individual Blocks

High level Mitigation	
	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, Natural England, and other relevant organisations. 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 defined 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.). Until recently, the MCA maintained four Emergency Towing Vessels (ETVs) which were stationed around the UK, however these have now been removed from service in waters relevant to this AA. At the time of writing, commercial arrangements are in place to provide ETV capability in the Dover Straits and the south west approaches[7]. The government is also in discussions with the oil industry on the potential of a commercial call-out arrangement to use their vessels[8].
In-combination effects	The competent authorities will assess the potential for in-combination effects during HRA of project specific consent applications; this process will ensure that mitigation measures are put in place to ensure that subsequent to licensing, specific projects (if consented) will not result in adverse effects on integrity of European sites.

[7] House of Commons Transport Committee (2012). The Coastguard, Emergency Towing Vessels and the Maritime Incident Response Group: follow up. Volume 1.
[8] Scotland Office website - http://www.scotlandoffice.gov.uk/scotlandoffice/17322.html

5 Consideration of sites and potential physical and other effects

5.1 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. One of the Blocks applied for in the central English Channel (97/13) has plans for land based drilling and therefore would have reduced impacts in terms of physical damage to the seabed. The drill or drop well in Block 98/12b will likely be drilled from an offshore location so 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, and whether these could adversely affect the integrity of these sites.

5.2 Physical damage at the seabed

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

- **Anchoring of semi-submersible rigs**. Semi-submersible rigs use anchors to hold position, typically between 8 and 12 in number at a radius 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 Block 98/12b, it is expected that any new field development 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 expected 'drill from shore' method for Block 97/13 would require onshore infrastructure (e.g. drill site) but no offshore trenching would be required.

The use of anchors by drill rigs and pipelay vessels will produce a linear scar along the trajectory from anchor placement and recovery. A larger overall surface scrape may be expected from catenary action of anchor chains or cables though this is dependent upon water depth, anchor spread and tension of the chain or cable. Anchor handling may also cause some re-suspension of sediments. The duration of physical impact on the seabed will, however, be short due to the temporary nature of anchor placement. The time taken for the recovery of the seabed is difficult to accurately determine and is dependent on severity of impact, location, sediment type, and water depth (see Table 5.1 for recovery times following dredging activities in different habitat types).

High energy environments are characterised by clean, coarse sandy bottoms, whereas low energy environments are characterised by muddy sediments. Benthic communities that inhabit the different sediment types have adapted to different levels of recovery based on the frequency of natural disturbance in that environment. Species typical of shallow, wave exposed sandy sediments will possess the ability to recover from disturbance at a much more rapid rate. Species that inhabit deep, muddy environments are not as well adapted to physical disturbance of their habitat and it is likely they will take a significantly longer time to recover (Dernie *et al.* 2003, Snelgrove 1999).

The dredging activities described in Table 5.1 result in more severe disturbance to benthic habitats and communities than the scarring of drill rig and other anchors. Environmental Statements report a typical area that will be affected by such anchor scarring as between 1.6km^2 and 2.4km^2 (e.g. Ithaca Energy 2008, Iona Energy 2012), while it is estimated that areas affected by anchor scarring will recover within 1-5 years (DECC 2011). Anchoring and catenary scarring are not expected to result in significant changes to sediment properties and rapid recovery of faunal communities within the disturbed area may be expected through a combination of larval settlement and immigration of animals from the adjacent seabed. Infill of scars can, however, produce alteration of sediment type within the feature which is longer-term

than the topographic expression of the scar, since the infill is usually of finer sediment (e.g. Robinson *et al*. 2005). Anchoring in areas of stiff clay can result in long lasting mounds of sediment.

Table 5.1: Physical and biological recovery following cessation of dredging

Habitat type	Hydrodynamics (tidal stress)	Depth (m)	Intensity; rate of dredging (t km^{-2} yr^{-1})	Area (km^2)	Recovery time (years)		Location
					Phys	Biol	
Fine sand	Strong tidal current estuaries	<20	nd	nd	nd	0.5-0.75	Bristol Channel
		<10	617,500	~1*	1-3	>1->3	Wadden Sea
	Low tidal current estuaries	Just below LW	1,045,000	~1*	1	5-10	Wadden Sea
Fine to medium sand	Seasonally strong tide & wind-driven current	20-23	2,850	1.4	>4	4	Terschelling, Netherlands
Medium sand	Strong	4	23,000	151.8	0.5	nd	Kwinte Bank, Belgium
	Seasonally strong tide & wind-driven current	16-18	950	0.5	nd	4	Torsminde, Denmark
Coarse sand	Weak-moderate	27-35	733,300	0.3	Decades	Decades	Thames estuary
Sand & sandy gravel	Weak	20-25	Up to 365,000	2.6	>5	>10	Coal Pit, Area 408, southern North Sea
	Moderate	16-25	400,000	3.1	Decades	8-9	Hastings Shingle Bank
	Weak	18-20	65,000	7.1	nd	4	Humber estuary
Gravel	Moderate-strong	12-46	75,000	107.0	~4	nd	Cross Sands, East Anglia
	Strong	15	67,000	1.5	nd	~3	Dieppe, English Channel
	Weak	30-40	nd	nd	nd	>2	Klaverbank, Dutch North Sea
Mixed: mud to gravel to cobbles	Moderate	20-30	nd	nd	>4	>4	Suffolk Coast
	Moderate-weak	28-34	80,000	6.1	Decades	nd	Southwold
	Moderate	10	150,000	1	nd	3	East of the Isle of Wight

Note: Phys – physical recovery, Biol – biological recovery
*Source: Foden et al. (2009), *: estimated value. nd: no data*

DECC 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 (Hall-Spencer *et al*. 2002). 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). The long-term effects of bottom fishing disturbance is less well understood due to the complex nature of the changes and the lack of pre-impact or control data (Frid *et al.* 2000, Bradshaw *et al.* 2002). Analysis of 101 experimental fishing impact studies undertaken by Kaiser *et al.* (2006)

predicted recovery times in sand and gravel habitats after a scallop trawl as *ca.* 8 years; muddy sand as *ca.* 1.6 years and reef as *ca.* 3.2 years), with the scallop trawl being particular severe in terms of benthic disturbance (Mason 1983). Beam and otter trawling of sandy and muddy sediments exhibited a quicker recovery rate of the benthic species. However, the recovery rate of muddy sand after beam and otter trawl is still predicted at *ca.* 0.6-0.65 years respectively (Kaiser *et al.* 2006).

Rock armouring of pipelines and cables is undertaken in some areas to protect against physical damage or scour in areas of strong tidal currents. The introduction of rock (as well as steel or concrete structures) into an area with a seabed of sand and/or gravel can provide "stepping stones" which might facilitate biological colonisation including by non-indigenous species by allowing species with short lived larvae to spread to areas where previously they were effectively excluded. However, on the UK continental shelf such "stepping stones" are already widespread and numerous, as a result of for example rock outcrops, glacial dropstones and moraines, relicts of periglacial water flows, accumulations of large mollusc shells, carbonate cemented rock etc. Rig site and pipeline route surveys in UK waters typically reveal the presence of such natural "stepping stones". Those activities that could follow licensing of the Blocks (e.g. drilling of a well, as described by the proposed work programme for Block 98/12b) are unlikely to result in significant introduction of rock or structures to the marine environment, are temporary in nature and are therefore unlikely to undermine the conservation objectives of SACs in the area. The location of drilling activities and extent of any subsequent further development including the installation of steel or concrete structures and protective rock dump if necessary, is not currently known and would be more appropriately assessed through project level EIA and HRA processes.

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. A number of sites are adjacent to or overlap with Block 97/13 (e.g. Chesil and The Fleet SAC/SPA, Isle of Portland to Studland Cliffs SAC and Studland to Portland cSAC). Given the potential onshore drilling location for this Block, the potential for physical disturbance is primarily associated with onshore drilling and construction activities (see Section 5.3). For offshore activities, sources of potential physical damage are assessed and controlled by a range of regulatory processes, such as EIA and the Petroleum Offshore Notices for drilling and pipeline activities (PON15B and PON15C respectively) and where relevant HRA's to underpin those applications. Provisions under the Marine and Coastal Access Act (2009) include certain activities previously covered by the Food and Environment Protection Act which are now permitted through a Marine Licence. DECC is collating guidance in relation to oil and gas activities which will require a Marine Licence. Based on the results of the assessments including HRA, DECC may require additional mitigation measures to avoid or minimise any adverse effects, or where this is not possible, refuse consent.

5.3 Onshore physical damage

As the work programme for Block 97/13 indicates potential drilling from shore there is the potential for physical damage to onshore habitats associated with infrastructure. Block 97/13 is adjacent to a coastline with a number of SAC and SPA sites present where the potential for physical disturbance from onshore activities has been identified (Appendix B). These include

Chesil and The Fleet SAC/SPA (designated for the Annex I habitats - coastal lagoons, vegetation of drift lines and stony banks, salt marshes and salt meadows, and for the SPA - breeding tern and overwintering geese) and Isle of Portland to Studland Cliffs SAC (sea cliffs, grassland, vegetation of drift lines). 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. Whilst Block 97/13 overlaps with the Studland to Portland cSAC there is very little risk of physical disturbance given the marine nature of the site and the potential onshore drilling activities.

5.4 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).

Most studies of produced water toxicity and dispersion, in the UK and elsewhere (see E&P Forum 1994, OLF 1998, Riddle *et al*. 2001, Berry & Wells 2004) 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. However, under some circumstances (e.g. strong stratification: Washburn *et al.* 1999), a plume concentration sufficient to result in sub-lethal effects may persist for >1,000m (Burns *et al*. 1999).

Monitoring with caged mussels in the Netherlands and Norwegian sectors of the North Sea has shown that mussels exposed to produced water discharges may accumulate PAH and show biological responses up to 1,000m from the discharge. Concentrations of PAHs and alkyl phenols and measured biological responses in wild fish such as cod and haddock caught in the vicinity of offshore installations from Norwegian waters in 2002 and 2005 showed a mixed pattern mostly with no increased concentrations, but some elevated biological responses suggesting past exposure. Exposure of cod sperm cells to environmentally relevant concentrations (100, 200, 500ppm) of produced water from the Hibernia platform, Newfoundland, did not result in a strong toxicity to the cells (only subtle changes were observed) or a significant change in fertilisation rate (Hamoutene *et al.* 2010).

The OSPAR QSR (2010) noted that results from water column monitoring are complex to interpret, particularly for wild fish for which it is not possible to link observed biological responses to a specific exposure source. Monitoring data is limited and does not yet allow conclusions to be drawn on the significance of observed responses for marine life and ecosystems. However, OSPAR Recommendation 2001/1 for the Management of Produced Water from Offshore Installations includes a presumption against the discharge to sea of produced water from new developments or existing installations subject to substantial modifications. Only under certain circumstances (e.g. injection pump maintenance) may the effluent be routed to sea. Any produced water discharged will be treated since it is still required to meet legal quality standards in terms of oil in water concentration (DECC 2011).

For existing installations discharging produced water, continued discharges may be justified through a risk based approach[9], where appropriate.

Drilling wastes are a major component of the total waste streams from offshore exploration and production, with typically around 1,000 tonnes of cuttings resulting from an exploration or development well. Water-based mud cuttings are discharged at, or relatively close to sea surface during "closed drilling" (i.e. when steel casing and a riser is in place), whereas surface hole cuttings will be discharged at seabed during "open-hole" drilling. Use of oil based mud systems, for example in highly deviated sections or in water reactive shale sections, would require the onshore disposal or reinjection of a proportion of waste material (DECC 2011).

Dispersion of mud and cuttings is influenced by various factors, including particle size distribution and density, vertical and horizontal turbulence, current flows, and water depth. In deep water, the range of cuttings particle size results in a significant variation in settling velocity, and a consequent gradient in the size distribution of settled cuttings, with coarser material close to the discharge location and finer material very widely dispersed away from the location, generally at undetectable loading (DECC 2009).

In contrast to historic oil based mud discharges, effects on seabed fauna of the discharge of cuttings drilled with WBM and of the excess and spent mud itself are usually subtle or undetectable, although the presence of drilling material at the seabed close to the drilling location (<500m) is often detectable chemically (e.g. Cranmer 1988, Neff *et al.* 1989, Hyland *et al.* 1994, Daan & Mulder 1996). Considerable data has been gathered from the North Sea and other production areas, indicating that localised physical effects are the dominant mechanism of ecological disturbance where water-based mud and cuttings are discharged (DECC 2011).

Currie & Isaacs (2005) reported that water based drilling muds and associated cuttings modified population densities of benthic infaunal species at sampling sites up to 200m from an exploration well in the Minerva field, Australia. The most pronounced effects were evident within 100m of the well-head, where declines in density of most abundant species exceeded 70% immediately following drilling. However, effects on the community structure at sites 100 and 200m from the wellhead did not persist beyond four months as natural species recruitment swamped residual effects over the same period. In contrast, benthic communities at the well-head site remained modified 11 months after drilling, in spite of recoveries in species diversity and abundance. This persistent community difference was likely due to the physical modification of the sediment at this site by drill cuttings discharge.

The physical disturbance of benthic ecosystems by water-based drill cuttings was examined in a series of mesocosm (Trannum *et al.* 2010) and field experiments (Trannum *et al.* 2011). The mesocosm experiments highlighted a potential reduction in number of taxa, abundance, biomass and diversity of macrofauna with increasing thickness of drill cuttings possibly as a result of oxygen depletion. However, comparison with the field-based experiments indicated that this was probably due to the lack of continuous water flow over the sediment surface in the mesocosm experiments (Trannum *et al.* 2011). The field experiments found that the difference

[9] See: OSPAR Recommendation 2012/5 for a risk-based approach to the Management of Produced Water Discharges from Offshore Installations, OSPAR Guidelines in support of Recommendation 2012/5 for a Risk-based Approach to the Management of Produced Water Discharges from Offshore Installations (OSPAR Agreement: 2012-7).

in faunal composition between the controls and those treated with drill cuttings was of small magnitude 6 months after drill cuttings deposition indicating a relatively rapid recovery process following discharge of water-based drill cuttings. This corresponds with field studies where complete recovery was recorded within 1–2 years after deposition of water-based drill cuttings (Daan & Mulder 1996, Currie & Isaacs 2005).

OSPAR (2009) concluded that the discharge of drill cuttings and water-based fluids may cause some smothering in the near vicinity of the well location. The impacts from such discharges are localised and transient, but may be of concern in areas with sensitive benthic fauna, for example corals and sponges.

In addition to these mainly platform-derived discharges, a range of discharges are 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) made 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, HRAs (where necessary) and chemical risk assessments (e.g. PONs) under existing permitting procedures.

5.5 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). Further oil and gas activity is unlikely to change the risk of the introduction of non-native species as the vessels typically operate in a geographically localised area although rigs may move between the Irish Sea to the North Sea and vice versa and the risk from hull fouling is low, given the geographical working region and scraping of hulls for regular inspection.

The potential effects of light on birds have been raised in connection with offshore oil and gas over a number of years (e.g. Wiese *et al*. 2001). As part of navigation and worker safety, oilfield installations and associated vessels are lit at night and the lights will be visible at distance (some 10-12nm in good visibility). Platform illumination has been shown to have an attractive

effect on many species of migratory birds, with attraction enhanced in conditions of poor visibility such as fog, haze and drizzle (Wiese *et al*. 2001 and references therein). Responses to a recent OSPAR questionnaire seemed to indicate that the main cause of death was dehydration, starvation and exhaustion, although some birds had physical damage resulting from collisions with the infrastructure, and an even smaller number had interacted with the flare or turbine exhausts. Birds which are attracted to these light sources at night typically circle around the illuminated platform for extended periods of time (sometimes many hours) and it has been suggested that the circling increases the risk of collision leading to traumas and deaths (OSPAR 2012). It was concluded that there was evidence that conventional lighting of human-made offshore structures had an impact on birds, but it could not be concluded that the effect was significant at the population level (OSPAR 2012).

The temporary nature of drilling activities means that a drilling rig will be present for a relatively short period of time minimising the potential for significant interaction with migratory bird populations. It is also unlikely that drilling rigs will be located so close to shore as to illuminate coastal habitats and affect the foraging behaviour of waders and waterfowl (e.g. Dwyer *et al.* 2012). It is therefore concluded that light effects will not affect site integrity, nor undermine the conservation objectives of sites with qualifying mobile species which could potentially interact with illuminated platforms and vessels. However, it is likely that any infrastructure associated with activity within Block 97/13 would be land based, due to proposed drilling methods and Block restrictions, and could theoretically overlap with the Chesil Beach and The Fleet SPA. Therefore, depending on the exact location of onshore infrastructure, it can be concluded that light effects may affect the qualifying features (breeding terns and overwintering geese) in this SPA. This would be further investigated and mitigated against, during specific site location and assessment 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. Given the potential drill from shore location for Block 97/13, it is unlikely that there would be significant vessel and aircraft traffic in the vicinity of relevant SPAs (e.g. Chesil Beach and The Fleet SPA). With respect to the drill or drop well in Block 98/12b, given the projected limited scale and nature of the development, and because mitigation is possible (which would be identified during activity specific assessment and permitting processes), physical disturbance of SPA qualifying features by support activities is unlikely to be significant. Available mitigation measures include strict use of existing shipping and aircraft routes, and timing controls on temporary activities to avoid sensitive periods.

5.6 Implications for relevant European Sites

The re-screening process (Appendix B) identified the potential for physical disturbance and marine discharge effects at a number of relevant sites associated with proposed onshore drilling and construction activities in Block 97/13. These sites include Chesil Beach and The Fleet SPA, Chesil and The Fleet SAC, Isle of Portland to Studland Cliffs SAC and Studland to Portland cSAC. The Natura 2000 data sheet for the Studland to Portland cSAC indicates that the qualifying feature (reefs) is potentially vulnerable to operations which could result in physical loss by removal and/or smothering, and physical damage by siltation and/or abrasion. Given the potential onshore location of the drill or drop well for Block 97/13, drilling operations are unlikely to physically damage the marine qualifying features of the site.

All activities that may cause physical disturbance to a Natura site would be subject to project-level assessment (e.g. EIA and HRA) and potential mitigation. Any proposed drilling activities and seabed development in this area would require survey to characterise the seabed allowing potential interactions to be assessed and mitigation to be developed. In the long-term, it is not expected that such effects would result in a reduction in the diversity, community structure and typical species of the supporting habitats and sites as a whole, resulting in deterioration in conservation status. Risks to overall site integrity from oil and gas exploration (e.g. drilling) and subsequent development activities (e.g. pipelaying) would be prevented (mitigated) by the existing legal framework for the respective activities, which includes HRA where necessary.

5.7 Conclusions

Likely significant effects identified with regards to physical effects on the seabed, marine discharges and other disturbance effects (e.g. lighting, vessel and aircraft traffic), when aligned with project level mitigation and relevant activity permitting, will not have an adverse effect on the integrity of the Natura 2000 sites considered in this assessment. It is unlikely that any new terminals would be built as a result of developments following licensing of Blocks. While new pipelines could conceivably be constructed and come ashore at existing terminals, either through or near to coastal SACs and SPAs, there are well proven methods (e.g. pipeline route surveys to identify sensitive seabed features) 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 the integrity of Natura 2000 sites.

Taking into account the information presented above and in the Appendices, it is concluded that activities arising from the licensing of Blocks 97/13 and 98/12b will not cause an adverse effect on the integrity of European Sites, though consent for activities will not be granted unless the operator can demonstrate that the proposed activities which may include the drilling of a number of wells and any related activity including the placement of a mobile rig, will not have an adverse effect on the integrity of European Sites.

6 Consideration of sites and potential acoustic effects

6.1 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. However, some pinnipeds are known to vocalise at low frequencies (100-300Hz) (Richardson *et al*. 1995), suggesting that they have good low frequency hearing and are therefore sensitive to acoustic disturbance. Otters in coastal habitats may also experience acoustic disturbance from seismic exploration or piling. However, they generally occupy shallow, inshore areas where the propagation of seismic noise is very limited.

DEFRA identified a period of concern for seismic from March to May for Block 97/13 (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). Relevant sites in the region include several designated for the presence of the Annex II species Atlantic salmon and sea lamprey (e.g. River Axe SAC, River Avon SAC and River Itchen SAC).

Atlantic salmon *Salmo salar* have been shown through physiological studies to respond to low frequency sounds (below 380Hz), with best hearing (threshold 95 dB re 1 µPa) at 160Hz. Hence, their ability to respond to sound pressure is regarded as relatively poor with a narrow frequency span, a limited ability to discriminate between sounds, and a low overall sensitivity (Hawkins & Johnstone 1978, cited by Gill & Bartlett 2010). There is, however, evidence that juvenile *S. salar* smolts (as well as other salmonid species) are sensitive to very low frequency sound. 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.

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 Sites. 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). Andre *et al*. (2011) indicated that controlled exposure of four cephalopod species to low-frequency sounds (exposure to 50–400Hz sinusoidal wave sweeps with 100% duty cycle and 1-second sweep period for 2 hours, received sound pressure level: 157 ± 5 dB re 1 µPa, with peak levels at 175 dB re 1 µPa) resulted in permanent and substantial alterations of the sensory hair cells of the statocysts, the structures responsible for the animals' sense of balance and position.

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 (e.g. penguins, considered as a possible proxy for auk species) would be high, hence only at short ranges would individuals be adversely affected. Mortality of seabirds has not been observed during extensive seismic operations in the North Sea and elsewhere. A study 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 6.5) 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 Exploration and Production (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.

6.2 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 (although no seismic survey is proposed by the work programmes). 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.

6.2.1 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. The proposed work programmes for the Blocks do not include undertaking a 2D or 3D seismic survey. However, prior to the drilling of a proposed drill or drop well in

Block 98/12b, a rig site survey would be required to determine the presence of shallow gas deposits or any other potential hazard prior to locating a drilling rig. Rig site surveys utilise a much reduced source level in comparison to deep seismic; a typical equipment spread includes analogue sidescan sonar (100/500kHz), hull-mounted single beam echo sounder, multibeam swathe bathymetry and sub-bottom profiler. For some high resolution digital surveys a small airgun source of 150-200 cubic inches may be used though a source of up to 500 cubic inches is not uncommon. The area covered by rig site surveys is small (a few km^2) and the surveys are of short duration (<5 days).

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 source increases, higher frequencies are attenuated more rapidly. 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.

6.2.2 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 2011a). 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 Block 97/13 is from land, underwater noise from drilling infrastructure is not expected (although onshore drilling may cause acoustic disturbance to birds as identified for Chesil Beach and The Fleet SPA in Appendix B). With respect to offshore drilling activities (as proposed for the drill or drop well in Block 98/12b), 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 drilling units used in shallower water (and more likely to be used in the Block 98/12b) is less because of reduced surface area contact between the water column and submerged parts of the drilling unit. Under some circumstances, cavitation of thruster propellers is a further appreciable noise source, as may be the use of explosive cutting methods (e.g. for conductor removal).

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

6.3 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.

Both harbour and grey seals have shown short-term avoidance behaviour during controlled exposure experiments with small airguns (Thompson *et al*. 1998). In both cases seals abandoned foraging sites and swam away from airguns but returned to forage in the same areas on subsequent days. By contrast, Harris *et al.* (2001) making observations from a seismic vessel operating in a shallow lagoon system in the Canadian Arctic, found no significant change in sightings rate between firing and non firing periods. Mean radial distance to sightings did increase, suggesting some local avoidance behaviour (Hammond *et al.* 2006).

6.3.1 Injury and behavioural criteria

The Offshore Energy SEAs (DECC 2009, 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 6.1 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.

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.

Table 6.1: 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)

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.

6.4 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 HRA procedures will allow further consideration of the nature, timing and location of any planned activities and mitigation measures (see Section 6.5) deemed necessary to be defined (including conditions attached to consents/permits or potentially consent/permit refusal). The re-screening process (Appendix B) identified the potential for acoustic disturbance in the following sites:

6.4.1 Chesil Beach and The Fleet SPA

(Qualifying features - Breeding tern and overwintering geese)

Given the potential onshore drilling and construction activities associated with the Block 97/13 drill or drop well, the possibility of acoustic disturbance of the SPA qualifying features was identified. Any activities that may cause disturbance to the qualifying features would be subject to project-level assessment (e.g. EIA and HRA) and potential mitigation.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities which could include the drilling of a well will not have an adverse effect on the integrity of the Chesil Beach and The Fleet SPA.

6.4.2 Migratory fish

The potential for acoustic disturbance effects was identified for the River Axe SAC, River Itchen SAC and River Avon SAC due to the 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.

No deep geological seismic survey is proposed by the work programmes and for migratory fish occurring beyond the site boundaries significant effects on qualifying features are unlikely. Noise levels associated with other activities potentially resulting from licensing of the Blocks such as rig site survey, drilling and vessel movements, are of a considerably lower magnitude than those resulting from a deep geological seismic survey, and are not expected to have an adverse effect on the integrity of the riverine SACs.

6.4.3 Adjacent waters SACs

The potential for acoustic disturbance of qualifying features of SACs and SPAs in France has been assessed (Appendix B). Given the distance from the Blocks, that no deep geological seismic survey is proposed by the work programmes and that mitigation would be possible, these sites are unlikely to be impacted by acoustic disturbance originating from activities in the Blocks.

Noise levels associated with other activities potentially resulting from licensing of the Blocks such as rig site survey, drilling and vessel movements, are of a considerably lower magnitude than those resulting from a deep geological seismic survey, and are not expected to have an adverse effect on the integrity of SACs and SPAs in France.

6.5 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) which may be supported by an Environmental Assessment to enable an accurate assessment of the environmental effects of the survey. Consultations with Government Departments and other interested parties are conducted as standard prior to issuing consent, and JNCC, Natural England, Cefas (and possibly others) may request additional risk assessment, specify timing or other constraints, or advise against consent. Any

proposed activity with a potentially significant acoustic impact on a designated SAC or SPA would also be subject to the requirement for HRA.

The major operational control over seismic surveys in the UK is through JNCC's *Guidelines for minimising the risk of disturbance and injury to marine mammals from seismic surveys* (August 2010 revision reflects amendments (2007 and 2009 amendments) to the *Conservation (Natural Habitats &c.) Regulations 1994 (Habitat Regulations) for England and Wales* and the *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (Offshore Marine Regulation*s, as amended in 2009 and 2010). 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 survey being undertaken to determine if cetaceans are in the vicinity, and a slow and progressive build-up of sound to enable animals to move away from the source. Passive Acoustic Monitoring (PAM) may also be required. Seismic operators are required, as part of the application process, to justify that their proposed activity is not likely to cause a disturbance etc. under the *Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001* (as amended) and *Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended). This assessment should consider all operational activities including shooting during hours of darkness or in poor visibility.

In their latest guidelines, JNCC (2010) advise that operators adopt mitigation measures which are appropriate to minimise the risk of an injury or disturbance offence[10] and stipulate, whenever possible, the implementation of several best practice measures, including:

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

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

- 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.

[10] 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.

- 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).

Passive acoustic monitoring (PAM) may be used as a mitigation tool where JNCC and country conservation agencies deem it appropriate. Additionally, a period of concern for seismic survey has been identified for Block 97/13 (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[11] highlight the sensitive post-smolt migration period for Atlantic salmon between April and May, and that mitigation, including a presumption against seismic survey at this time, is considered.

6.6 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 (see Defra 2010). 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.

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, taking account of the following:

- No geological seismic survey is proposed by the work programmes although a rig site survey may be required prior to locating a drilling rig in Block 98/12b. Should a rig site survey be proposed, further HRA may be required to assess the potential for adverse 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.

[11] JNCC's response to the 26th Seaward licensing Round.

Consent for activities will not be granted unless the operator can demonstrate that the proposed activities which may include a rig site survey will not adversely affect the site integrity of European Sites.

7 Consideration of potential effects from oil spills on relevant sites

7.1 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 not credible to conclude that an oil spill will never occur as a result of 27th Round licensing, in spite of the regulatory controls and other preventative measures in place.

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 5,000ft with the oil reservoir at 18,000ft. Several reports into the cause of the incident and implications for activities on the UKCS have been produced, with a number of recommendations being integrated into UK guidance (e.g. DECC 2012b). As part of the investigation UK regulators contacted 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 were implications for safety at offshore operations on the UK continental shelf. The independent, UK based, Maitland review panel (Maitland 2011) evaluated the recommendations emerging from these reports and considered their relevance to the oil and gas industry on the UKCS. They assessed to what extent modifications or improvements to the UK regulatory regime could be informed by lessons learnt from the Deepwater Horizon incident.

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

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[12] 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 'offshore environmental' inspectors in its Aberdeen office. This has increased the number of annual environmental inspections of mobile drilling rigs.

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. 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. OSPRAG was active for 16 months, before reaching conclusions that recommended the setting up of a number of bodies with responsibility for ensuring drilling operations in UK waters remain robust and fit for purpose. The Oil Spill Response Forum (under guidance of Oil and Gas UK) will keep the oil spill toolkit, including subsea dispersants and spill modelling, under review. The Well Life Cycle Practices Forum will have responsibility for drilling and well engineering management functions. Regular interaction between Oil and Gas UK and OPOL (Offshore Pollution Liability Association Limited) will be maintained to exchange views on financial responsibilities. Additionally, in June 2012, Oil and Gas UK issued draft guidelines on financial responsibility for well operations in the UKCS, including assessment methodology for potential costs of well control, pollution remediation and compensation.

4. In May 2011 exercise 'Sula' was undertaken to test the UK's capacity to respond to a deepwater drilling related oil spill to the West of Shetland. A tier 2/3 deployment demonstration took place in Sullom Voe, Shetland alongside a separate Emergency Equipment Response Deployment (EERP), designed to test the dispersion of free flowing oil from a well, clearing of a well head of debris and the placement of a capping device to close off the flow from a well. An independent assessment of the deployments concluded that the ability to deploy all the equipment mobilised for the exercises (including surveillance equipment, aerial and surface dispersant application, containment and

[12] See: DECC (2012). Offshore Oil & Gas in the UK: Government Response to an Independent Review of the Regulatory Regime, December 2012.

recovery and shoreline response) was proven and all the onshore equipment was seen in fully operational conditions with the oil spill response team fully conversant in its use.

5. 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. These were combined in supplementary guidance issued by DECC[13] with OPEP guidance updated in July 2012[14].

6. The EU has asked companies operating in EU waters to provide assurances that they are ensuring safe practice and that they are able to take on full responsibilities for environmental and other damage if an incident were to occur.

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 27th 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*).

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 2 Blocks in the 27th 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.

7.2 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.

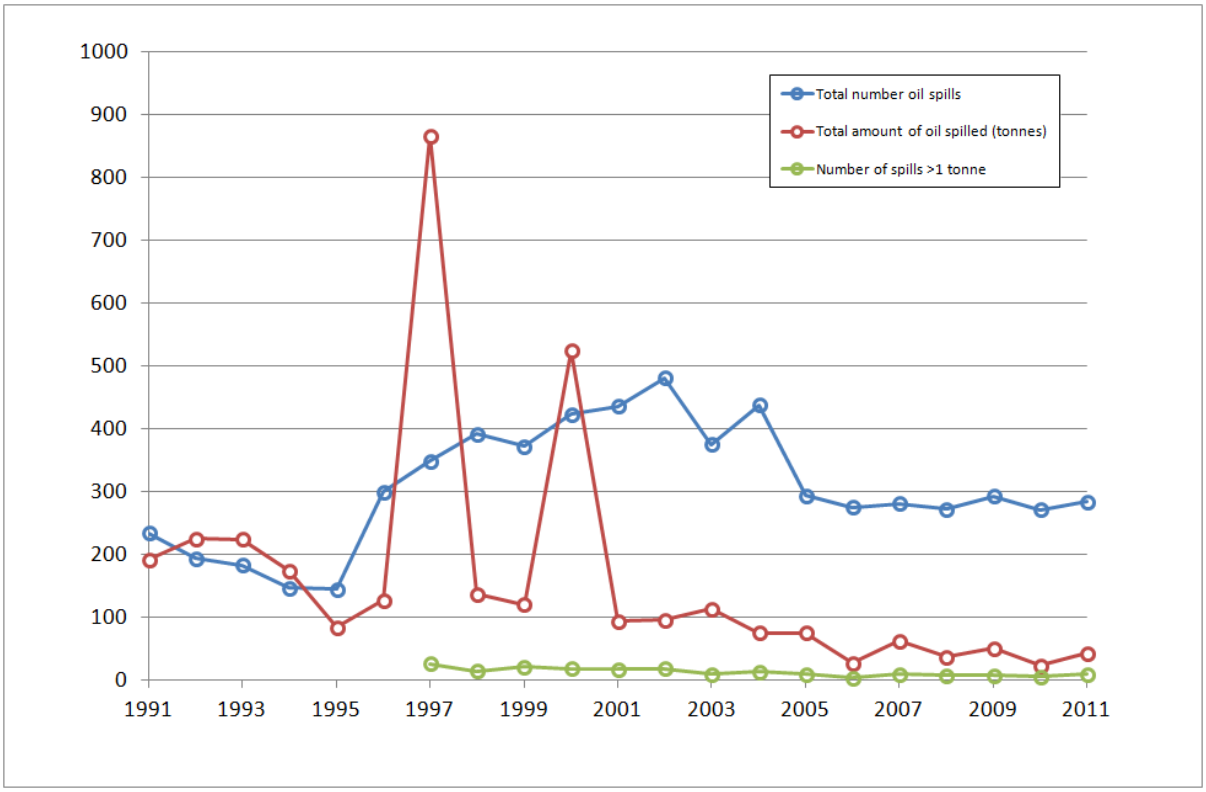
[13] DECC website https://www.gov.uk/oil-and-gas-offshore-environmental-legislation#supplementary-guidance-issued-following-the-deepwater-horizon-incident

[14] Guidance notes to operators of UK offshore oil and gas installations (including pipelines) on Oil Pollution Emergency Plan requirements https://www.gov.uk/oil-and-gas-offshore-emergency-response-legislation

7.2.1 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[15] (Figure 7.1). Discharges, spills and emissions data from offshore installations are also reported by OSPAR (e.g. OSPAR 2009).

Figure 7.1: Number and volume of reported oil spills from UKCS oil and gas installations over the period 1991-2011



Source: DECC website

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

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Oil and chemical discharge notifications (accessed January 2013) https://www.gov.uk/oil-and-gas-uk-field-data#oil-spills

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. Dixon 2011). This includes all spills reported by POLREP reports by the MCA and PON1 reports to DECC – note that notifications of spills through the PON1 process are now being reported on the DECC website on a monthly basis[16]. The review noted a 6.1% reduction was evident in the total number of reports by offshore oil and gas installations during 2010 which was the lowest annual total recorded since 2006, concluding that a combination of technical, operations and regulatory measures effectively contributed to the decrease. Of these discharges, 65% were fuel, lubrication or hydraulic oils; additionally, of the discharges with volume information, 95% were less than 455 litres. It is recorded in DECC data that the total number of oil spills, the related spill volume and those greater than 1 tonne all slightly increased in 2011 (Figure 7.1), however the total quantity of oil spilled remains low and is in keeping with the general spill trend since 2001.

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 2011 was 0.000001 tonnes). However, the underlying trend in spill quantity (excluding specifically-identified large spills) suggests a consistent annual average of around 100 tonnes. In comparison, oil discharged with produced water from the UKCS in 2011 totalled 2,508 tonnes (DECC website[17]).

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).

Following the recent gas release and evacuation of personnel from Total E&P UK's Elgin production facilities, DECC convened a Government Interest Group (GIG) to enable interested parties, such as DECC, the Secretary of State's Representative, the Health and Safety Executive, the Scottish Government and the Maritime and Coastguard Agency, to share information about the incident and to discuss issues such as the operator's plans to stop the release. A GIG update[18] with respect to the environmental aspects of the incident indicated that the vast majority of the release was methane gas entering the atmosphere, but that some of the condensate and associated liquid components impacted the sea surface. This resulted in a silvery sheen with occasional smaller patches of brown weathered material. In line with

[16] https://www.gov.uk/oil-and-gas-uk-field-data#oil-spills
[17] Oil discharged with produced water 2005 – 2011 https://www.gov.uk/oil-and-gas-uk-field-data#oil-discharged-with-produced-water
[18] National Archives website – http://webarchive.nationalarchives.gov.uk/20121217150421/http://og.decc.gov.uk/en/olgs/cms/environment/about_the_offs/elgin_gig/elgin_gig.aspx

the reduction in the release rate (from a peak of approximately 200,000m^3/day), the extent of the sea surface contamination significantly reduced and stabilised at consistently less than 5km^2, compared with earlier estimates of approximately 20km^2; and the quantity estimates also significantly reduced and stabilised at consistently less than 2 tonnes, compared with earlier estimates of approximately 20 tonnes (DECC 2012c).

7.2.2 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.

With respect to the recent Elgin gas release, the observed sea surface contamination (described above) was in line with modelling data derived for potential condensate spills, which predicted that there would be an equilibrium point when input was matched by natural loss as a result of evaporation and dispersion in the water column, with approximately 50% of the condensate evaporating within approximately 24 hours under conditions relevant to the Elgin release. The brown weathered material also appeared to disperse naturally and, during periods when the wind strength and wave height increased, this enhanced dispersion of the condensate and weathered material in the water column, reducing the quantity of material remaining on the sea surface (DECC 2012c).

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 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 close proximity to Block 98/12b. 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.

7.2.3 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 (Hampton *et al*. 2003, Camphuysen 2007).

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 7.1, 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 7.1: Monthly seabird vulnerability to surface pollution in 27th Round Blocks

Block	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall
97/13	2	1	2	4	4	4	4	4	4	4	2	2	3
98/12	3	3	4	4	4	4	4	4	4	4	3	3	4

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

Fortunately, there is little experience of major oil spills in the vicinity of seabird colonies in the UK. Census of seabird colonies in southwest Wales following the *Sea Empress* spill concluded that only guillemot and razorbill populations were impacted by the spill (Baines & Earl 1998). The *Sea Empress* spill occurred in February, when seabird numbers at colonies were relatively low, but the density of wintering birds including common scoter was high. Some species, particularly puffins, Manx shearwaters and storm petrels, had not returned to the area to breed and so avoided significant impact. Around 7,000 oiled birds were washed ashore following the spill, although it is likely that the total number of birds killed was several times higher than this (SEEEC 1998). Examination of seabird corpses suggested that most died directly from oil contamination rather than, for example, food chain effects. Over 90% of the oiled birds were of three species – common scoter, guillemot and razorbill. Counts of the breeding populations

confirmed the impact on guillemots and razorbills. There were 13% fewer guillemots and 7% fewer razorbills counted at breeding colonies in the area in 1996 compared with 1995, while numbers for both species increased at nearby colonies. The SEEEC (1998) report concluded that by the 1997 breeding season, numbers had recovered significantly. Banks *et al*. (2008) report the results of annual surveys of common scoter within Carmarthen Bay, an area partially affected by the spilled oil. While numbers were greatly reduced following the spill, and changes in distribution suggested the use of potentially sub-optimal foraging zones, rapid revival was observed with numbers increasing to pre-spill levels and a return to previous distributions within three winters of the event. At ten years following the incident, numbers of common scoter were not different to those recorded immediately before the spill (Banks *et al*. 2008).

On 18th January 2007 the container ship *MSC Napoli*, outward bound from Europe to South Africa in heavy weather, began to take in water. Two emergency towing vessels took her in tow and on the morning of the 20th January the ship suffered a serious structural failure and was beached in Lyme Bay, off Branscombe in Devon, to prevent her from sinking. Of the 4,000 tonnes of oil on board, most was safely removed and only around 150 tonnes of oil was lost in Lyme Bay. Most of the oil rapidly came onshore and was removed. Contamination of both the water column and shellfish in Lyme Bay due to oil was modest, localised and was not expected to persist. Oil spilled from the *MSC Napoli* resulted in over 3,000 seabird casualties. Necropsies of approximately 10% of these (306 birds) indicated that 168 were guillemots and 104 razorbills (55% and 34%, respectively). The sensitive areas of Chesil Beach and the Fleet were not significantly impacted (Cefas 2008).

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.

Assessments are currently ongoing to document and quantify levels of injury and pathways of exposure for bird species resulting from the Deepwater Horizon incident. These assessments will use the results of aerial and beach bird surveys, alongside laboratory analysis and detailed modelling (Natural Resource Damage Assessment (NRDA) 2012).

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.

The US National Oceanic and Atmospheric Administration (NOAA) reported a cetacean Unusual Mortality Event (UME)[19] in the northern Gulf of Mexico, with 754 cetacean strandings (5% stranded alive, 95% stranded dead) reported between 1st February 2010 and 15th July 2012 (NOAA Fisheries website[20]). This UME coincided with the Deepwater Horizon incident (April–August 2010) in the area, although 114 of the 754 strandings occurred prior to the blowout incident. An investigation is currently ongoing into the cause of the event, including direct or indirect effects of the Deepwater Horizon oil spill and clean up, although no definite cause or link has currently been identified (NOAA Fisheries website).

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.

Following the *Sea Empress* spill and concern that exposure to oil residues and dispersants used in the clean-up operation could affect the ability of salmonids to orientate and home to their natal rivers, Cefas initiated a study to determine whether exposure affected the ability of Atlantic salmon to detect biological odorants (Potter & Dare 2003). Because it was not possible to obtain sufficient numbers of adult salmon to carry out the study at the time of the emergency, the effects of oil residues and dispersants were studied using mature male salmon parr in freshwater. The ability of the parr to detect the biological odorants was greatly reduced or eliminated after exposure of the olfactory epithelia to the water soluble fraction (WSF) of Forties crude oil and the two dispersants used during the 'Sea Empress' cleanup operation. However, since information was not available on the concentrations of these contaminants in the sea during the clean-up, it was not possible to determine how severely fish may have been affected in the wild. Nevertheless, it was evident that the salmon parr were able to detect the WSF and dispersants at the concentrations likely to be present in the environment, and returning adult fish may therefore have been able to avoid the contaminated waters. Exposure of smolts to hydrocarbons might also have disturbed their mechanism of olfactory imprinting. This might have a greater effect on sea trout smolts because they remain longer in coastal waters than do salmon, which migrate rapidly away from the immediate coastal environment. Any effect on imprinting is also likely to have an impact on the behaviour of homing adults (Potter & Dare 2003).

[19] An unusual mortality event (UME) is defined under the US Marine Mammal Protection Act 1972 (as amended) as: "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response."

[20] NOOA Fisheries website (accessed October 2012) http://www.nmfs.noaa.gov/pr/health/mmume/cetacean_gulfofmexico2010.htm

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).

A post spill damage assessment, remediation and restoration programme is currently underway in the Gulf of Mexico following the Deepwater Horizon event. Results from sampling in the 4 months after the stabilisation of the well showed no deposits of liquid phase oil from the spill in sub-surface sediments beyond the shoreline, although tar mats were present in shallow subtidal areas near the shore and there were traces of oil in deep-sea sediments within approximately 6 miles of the wellhead. The results found that within the 4 month period <1% of water samples and ~1% of sediment samples taken exceeded US environmental protection agency's aquatic life benchmarks for polycyclic aromatic hydrocarbons (PAH), with all of the samples exceeding the benchmark taken within 3km of the wellhead. There is evidence of dead or dying corals within two hard-bottomed coral communities *ca*. 5 and 11km from the wellhead respectively, although further interpretation and analysis of data is currently ongoing (NRDA 2012).

With respect to the recent Elgin gas release, sampling and monitoring programmes to date indicate that it is considered unlikely that the incident has had any significant impact on marine organisms in the water column, and likely that any impact on seabed marine organisms will be restricted to the area immediately surrounding the platform, an area that has already been impacted by routine discharges relating to previous drilling operations. Any hydrocarbons entering the water column would have been widely dispersed, and rapidly broken down by marine bacteria. Whilst the location and nature of the release, and the comparatively small area affected, indicated that the potential impact on marine mammals and seabirds was likely to be insignificant, Total have instructed a specialist contractor to undertake bespoke aerial surveys to quantify and potentially identify any marine mammals or seabirds in a 200km^2 area around the Elgin facilities (DECC 2012c).

Those coastal and marine Annex I habitats and Annex II species which are most sensitive to oil spills are identified in Table 7.2 below. Generally, sheltered habitats of lower exposure to wave energy are considered most vulnerable; oil may persist for long periods in such environments.

7.3 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. The re-screening process (Appendix B) identified the potential for oil spill effects at relevant Natura 2000 sites. All sites where the potential for effects were identified are listed in detail in Appendix C. The identification of potential effects from oil spills on specific European Sites considers the following factors:

- 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.

7.3.1 Special Areas of Conservation

The ecological sensitivity of the qualifying features of relevant sites to oil spills varies and post-incident monitoring guidelines produced as part of the “PREMIAM: Pollution Response in Emergencies Marine Impact Assessment and Monitoring” project (Law *et al.* 2011), provide information on the sensitivity and vulnerability of relevant habitats and species. Additionally, where available, Regulation 35 advice is provided on a site specific basis which considers the sensitivity of a given site to activities such as oil and gas exploration and production. 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** – With respect to subtidal rock, the lack of substrata that could retain persistent oil contamination means that any impacts are only likely to be due to the acute effects of the dispersed oil, unless chronic oiling seeps down from an intertidal oil source. Generally considered unusual for notable quantities of dispersed oil from spills to reach depths greater than 10m, but there are known cases where this has happened (Law *et al.*

2011). Therefore 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.

- **Submerged sandbanks** - Dispersed oil in water and oil bound to shoreline sediments can make its way down to the seabed and contaminate subtidal sediments. Impacts to seabed sediment fauna have been described after a number of oil spills, but normally only in shallow depths where oil in water concentrations were particularly high or close to sandy beaches (Law *et al.* 2011). Therefore not generally vulnerable to surface oil pollution, except possibly following application of chemical dispersants (generally not permitted in waters shallower than 20m).

- **Lagoons, dunes** – sites above Mean High Water Springs not generally vulnerable to surface oil pollution, except possibly to wind-blown oil or evaporated hydrocarbons. No cases of oil or chemical spills contaminating lagoons in UK or north-west Atlantic coasts have been found. Most UK lagoons are not very vulnerable to marine spills and their vulnerability will be dependent on the frequency and route by which seawater enters the lagoon. For those with narrow entrances, relatively simple to protect them by damming or booming (Law *et al.* 2011).

- **Sea cliffs, sea caves** – The vulnerability of rocky shores is mainly dependent on the wave exposure. Exposed rocky shores are normally considered to be one of the least vulnerable habitats to oil spills, because the oil is quickly removed by wave action. Sheltered rocky shores are often more vulnerable and sensitive, particularly if they include lots of rockpools and crevices (Law *et al.* 2011). 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. Habitats above the level of spring high tides are not normally vulnerable to marine oil spills (Law *et al*. 2011). 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 7.2 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 (given the vulnerability of their qualifying features and location with respect to the Blocks, see Appendix B) are listed. Note: several sites are represented in more than one risk category.

Table 7.2: Annex I habitat types and Annex II species potentially vulnerable to oil spills

Mudflats and sandflats
Number of physical and biological characteristics of sediment shores that can influence their vulnerability and sensitivity, including wave exposure, shore topography, sediment composition, height of water table, presence of large burrows, abundance and diversity of infauna, and use of the shore by birds for feeding and roosting. Wave-exposed clean sandy shores are often considered to have a low vulnerability and sensitivity due to the natural cleaning of the waves and the relatively poor fauna in the sediment (Law *et al.* 2011). 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 (relevant Block):** Solent Maritime SAC (98/12b)
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 (relevant Block):** Solent Maritime SAC (98/12b)
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. Generally considered to be very vulnerable to oil spills, because they form in the upper part of sheltered muddy shores where oil becomes concentrated. Once oil gets into a marsh it is trapped by the vegetation where it becomes difficult to remove and causes long-term contamination (Law *et al.* 2011). **Sites potentially at risk (relevant Block):** Chesil & The Fleet SAC (97/13), Solent Maritime SAC (98/12b)
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. Much of the evidence of cetacean injuries is circumstantial, but it seems likely that individuals are occasionally exposed to oil from large spills, sometimes being attracted to the spill area by the response activity. While their skin is not thought to be particularly sensitive to oil, any accidental ingestion or breathing of oily fumes could cause physiological stress (Law *et al.* 2011). **Sites potentially at risk:** None
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. See harbour porpoise consideration above. **Sites potentially at risk:** None
Seals
Designated sites comprise coastal habitats (beaches, estuaries, sandflats and rocky shores) supporting important breeding colonies of harbour seals (*Phoca vitulina*) and/or grey seals (*Halichoerus grypus*). Seals spend considerable periods of time at these sites during the breeding season and during the moult. Seals forage for prey in surrounding waters and also travel considerable distances beyond the boundaries of sites (particularly grey seals). Toxic effects from oil vapours and aerosols can have severe effects on respiration and the nervous system and can result in death. If seals are trapped near the source of a spill, they may be seriously affected; particularly if the oil is light with a large proportion of aromatic hydrocarbons. Seal pups are likely to be more sensitive than the adults, and pups trapped on beaches when oil comes ashore will be more vulnerable (Law *et al.* 2011). **Sites potentially at risk:** None
Atlantic salmon
Fish are at greatest risk from contamination by oil spills when the water depth is very shallow. Below 10m, in open waters, the likelihood that contaminant concentrations will be high enough to affect fish populations is very small, even if chemical dispersants are used to disperse oil. In shallow or enclosed waters however, high concentrations of freshly dispersed oil may kill some fish and have sublethal effects on others. Juvenile fish, larvae and eggs are most sensitive to the oil toxicity (Law *et al*. 2011). Available evidence suggests that salmon smolts utilise shallow water depths (1-6m) and that adults show varying behaviour, swimming generally close to the surface (0- 40m depth), with occasional deeper dives – e.g. Holm *et al.* (2005, cited by Malcolm *et al.* 2010) noted dive depths of between 85 and 280m. **Sites potentially at risk (relevant Block):** River Avon SAC (98/12b), River Itchen SAC (98/12b)

7.3.1.1 Consideration

The qualifying features of the sites listed in Table 7.2 are potentially vulnerable due to their sensitivity to oil spill. There are a number of sites not listed in Table 7.2, which due to their proximity, a large oil spill in Block 98/12b could result in significant deterioration of habitats and disturbance to species. For example, the Studland to Portland cSAC supports Annex I reefs which according to the Natural England (2011) draft advice on operations, are likely to be of low to moderate intolerance to chemical contamination and recover relatively quickly once the contamination is removed. Where red algae dominated communities occur in the bedrock and stony reefs, sensitivity is likely to be higher as red algae are noted to be sensitive to chemical contamination. Overall the vulnerability of reef features within the Studland to Portland cSAC to toxic contamination was considered to be low. The reef qualifying feature for the Wight-Barfleur Reef cSAC was identified as moderately sensitive to the introduction of non-synthetic compounds (e.g. heavy metals, crude oil spills), although there was insufficient information to assess current exposure and vulnerability of the qualifying feature to toxic contamination (JNCC 2012). Similarly, the South Wight Maritime SAC which supports a number of Annex I habitats (e.g. reefs, sea cliffs and sea caves which are not generally as ecologically sensitive to oil spill as those habitats described in Table 7.2) could be vulnerable to a large oil spill due to the proximity of Block 98/12b to the site. English Nature (now Natural England, 2001a) advice for the site indicates that although in general the reef habitats are less vulnerable to the

introduction of non-synthetic compounds such as oil, primarily due to the more robust and high energy nature of reef habitat, reef communities may be damaged by the toxic and smothering effects of spilled oil and therefore procedures to respond to oil spill incidents need to be kept under review.

The qualifying features of the Solent Maritime SAC have been identified as being potentially vulnerable to oil spills given the sensitivity of some of the features and the proximity of the site to Block 98/12b. English Nature (2001b) advice on operations for the site indicate that oil contamination can cause deterioration of communities in intertidal and shallow subtidal systems and can persist in low energy environments where natural degradation and weathering of the oil tends to be slow. Oil can also have a significant smothering effect on marine communities. Consequently, procedures to respond to oil spill incidents within and adjacent to the European marine site need to be kept under review. Oil spills could also have a direct impact on the low growing vegetation which occurs at the top of the shore. The dispersants which are sometimes used in response to oil spills would also be likely to cause damage to growth and recovery rates. Similarly, saltmarsh interest features are sensitive to oil and oil products, even at relatively low levels. This is mainly by virtue of their ability to trap sediments. Dispersants used to treat oil spills can also have toxic effect on saltmarsh plants, sometimes to a greater degree than the spilled oil itself.

There are also a number of sites (e.g. Chesil and The Fleet SAC and Isle of Portland to Studland Cliffs SAC) which are potentially vulnerable to an oil spill from a terrestrial location given the drill or drop well in Block 97/13 is proposed to be drilled from land. The vulnerability of either site to an oil spill will depend on the actual location of the drill site. As the location and design of the proposed drill or drop well is not known, a detailed assessment of the potential for effects cannot be made at this time.

The likelihood of a large oil spill is extremely low (blowout occurrence frequency in the range of 1/1,000-10,000 well years, see Section 7.2). The proposed work programme for Block 98/12b indicates a drill or drop well. 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 7.4) and those considered to present a risk to European Sites 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 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 effect on the integrity of relevant SACs.

7.3.2 Migratory fish

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

The River Avon and River Itchen SACs are designated for fish species that migrate out to sea (sea lamprey and Atlantic salmon). There is therefore the theoretical possibility of oil spill impact on these species, although this is considered very remote and largely restricted to shallow areas close to shore where the fish may be more vulnerable to spills.

The proposed work programme for Block 98/12b indicates that 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 well is not known, a detailed assessment of the potential for effects cannot be made at this time. The drill or drop well in Block 97/13 is proposed to be drilled from land and therefore there is very little risk of an oil spill impacting migratory fish qualifying features.

Following licensing, specific activities require permitting (see Section 7.4) 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 which may include the drilling of a well will not have an adverse effect on the integrity of riverine SACs.

7.3.3 Special Protection Areas

Table 7.3 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. Note: several sites are represented in more than one risk category.

Table 7.3: 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. Seabirds feeding or resting on the sea surface are vulnerable to water-borne pollution, and the period when they will be most vulnerable is when large numbers of birds are aggregated on the water – including during the breeding season, when they are aggregated inshore, and, for species of auk, during the autumnal moult, when gatherings of flightless birds form rafts on the water (see Section 7.2.3). Vulnerability to pollutants will also be affected by the condition of the birds, so winter food shortages could increase the vulnerability of many birds (Law *et al.* 2011). **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 (relevant Block): Chesil Beach and The Fleet SPA (97/13), Poole Harbour SPA (98/12b), Solent and Southampton Water SPA (98/12b), Chichester and Langstone Harbour SPA (98/12b), Pagham Harbour SPA (98/12b)
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. Seaduck form non-breeding concentrations in certain shallow coastal areas, spending most of the time on the water, diving in shallow areas for bivalve shellfish, and are therefore very vulnerable to oil spills (Law *et al.* 2011). **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. Waterfowl appear to have a relatively low vulnerability to the direct effects of oil spills. The primary concern for waterfowl during oil spills is the effects of the oil and the clean-up on their feeding and roosting resources. Avoidance of oiled sediment flats, which can be exacerbated by disturbance from clean-up activity, drives the birds away to find feeding and roosting areas elsewhere (Law *et al.* 2011). **Sites potentially at risk(relevant Block):** Chesil Beach and The Fleet SPA (97/13), Poole Harbour SPA (98/12b), Solent and Southampton Water SPA (98/12b), Chichester and Langstone Harbour SPA (98/12b), Pagham Harbour SPA (98/12b), Portsmouth Harbour SPA (98/12b), Avon Valley SPA (98/12b)

7.3.3.1 Consideration

The conservation features of the sites listed in Table 7.3 are potentially vulnerable to a large oil spill due to both coastal and wider foraging (e.g. by breeding terns and gulls) which could result in significant disturbance to species. These species are not as vulnerable to surface oil spills as those that spend a substantial period of their lives on the water surface, particularly divers, Manx shearwaters, guillemots, puffins and razorbills. Similarly, wintering waterfowl appear to have a relatively low vulnerability to the direct effects of oil spills (see Table 7.3).

The qualifying features of the Chesil Beach and The Fleet SPA are potentially vulnerable to an oil spill from a terrestrial location given the drill or drop well in Block 97/13 is proposed to be drilled from land. The vulnerability of the features will depend on the actual location of the drill site. As the location and design of the proposed drill or drop well is not known, a detailed assessment of the potential for effects cannot be made at this time.

The likelihood of a large oil spill is extremely low (blowout occurrence frequency in the range of 1/1,000-10,000 well years, see Section 7.2). The proposed work programme for Block 98/12b indicates a drill or drop well. 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 7.4) 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 which may include the drilling of a well will not have an adverse effect on the integrity of the SPAs listed in Table 7.3.

7.3.4 Adjacent waters SACs and SPAs

The potential for oil spills to impact the integrity of SACs and SPAs in France has been assessed (see Appendix B). Given the rigorous spill prevention, response and other mitigation measures that would be in place these sites are unlikely to be impacted by spills originating from activities in the Blocks.

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 effect on the integrity of SACs and SPAs in France.

7.4 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 relevant Devolved Authority, the Joint Nature Conservation Committee, the relevant inshore statutory nature conservation body, e.g. Natural England, and other relevant organisations. An OPEP will only be approved following consultation and satisfactory operator response to any comments. Approval of an OPEP does not constitute approval of the operations covered by the plan. Operators are responsible for ensuring compliance with all other regulatory requirements. OPEPs set out the arrangements for responding to incidents with the potential to cause marine pollution by oil, with a view to preventing such pollution or reducing or minimising its effect. Additional 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 MCA is responsible for a National Contingency Plan and until recently, maintained four Emergency Towing Vessels

(ETVs) which were stationed around the UK, though these have now been removed from service in areas relevant to this AA[21]. The government is also in discussions with the oil industry on the potential of a commercial call-out arrangement to use their vessels. 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 2012b) 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[22] 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 7.1). 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. OSPRAG's work is documented in their final report, *Strengthening*

[21] The UK Government recently announced that a new ETV for the waters around the Northern and Western Isles will be stationed in Orkney up to 2015.

[22] 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).

UK Prevention and Response, published September 2011 and the Secretary of State is examining its findings closely.

In relation to OPEP's, the assessment and approval process and the toolkit of response measures which UKCS operators can draw upon have been strengthened by a more robust approach to oil spill trajectory modelling which includes worst case scenario planning and the availability of the new OSPRAG capping device which is now built and ready for deployment. The Oil Spill & Emergency Response Review Group (OSERRG) also recommended that a new forum, the Oil Spill Response Forum (OSRF), be set up to 'further develop and maintain an effective, robust and sustainable oil spill response capability for upstream operations on the UKCS'. This includes workgroups on oil pollution emergency planning, subsea dispersant injection, shoreline response and science and new technology.

OSPRAG's technical review group reviewed 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 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.

Whilst the indemnity and insurance group of OSPRAG concluded that to date the current OPOL level of US $250 million is appropriate, draft guidance issued by Oil & Gas UK in June 2012 outlines a new process by which operators assess the potential cost of well control, pollution remediation and compensation, with a subsequent requirement to demonstrate to DECC financial capability to address these potential consequences.

7.5 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 creates an offence of such spills to enable prosecutions. It is not possible to say that in spite of the regulatory controls and other preventative measures, an 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 HRA 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 mitigation measures, DECC considers that that exploration and production activities that could follow the licensing of Blocks 97/13 and 98/12b, in so far as they may cause oil spills, would not adversely affect the integrity of European Sites.

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 adversely affect the site integrity of Natura 2000 sites.

8 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 2009, 2011; see also OSPAR 2000, 2010).

8.1 Underwater Noise

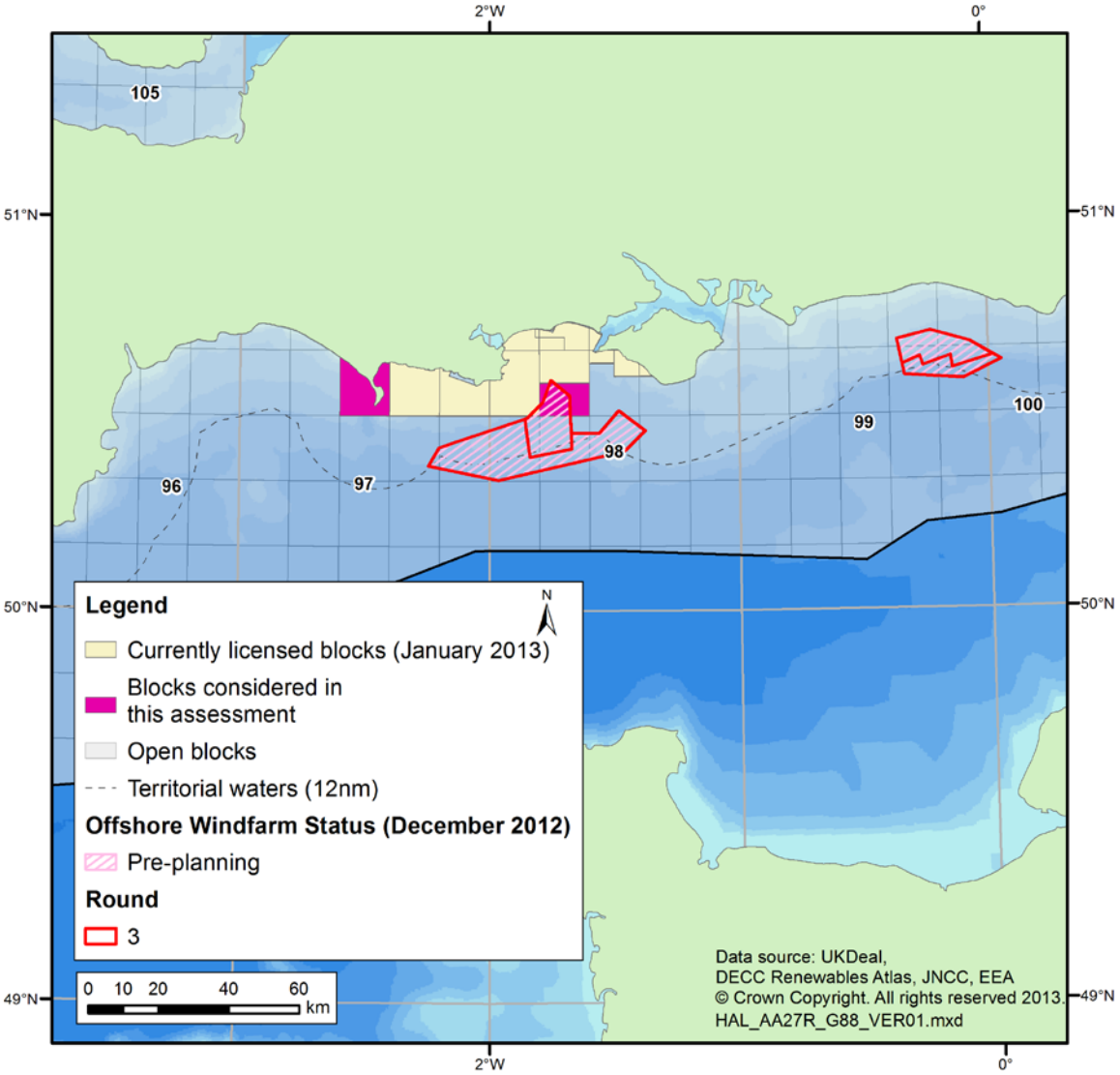
Seismic survey and other noise producing activities that might follow the proposed licensing are anticipated to be widely separated in space and time. Therefore, any acoustic disturbance to marine mammals causing displacement from foraging areas will be short-term and infrequent. SMRU (2007) note that "The effects of repeated surveys are not known, but insignificant transient effects may become important if potentially disturbing activities are repeated and/or intensified". 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. Following a Zone Appraisal Planning process, the developers (Eneco Wind UK Ltd (Eneco) and EDF Energy) have selected an Offshore Development Area (ODA) in the northern part of the R3 offshore wind zone (Figure 8.1) known as Navitus Bay to develop first. The ODA covers 191km^2 and overlaps with Block 98/12b. The cable corridor is expected to run directly north of the ODA towards landfall options east of Christchurch, close to Barton on Sea and Milford on Sea. The expected maximum capacity of the Navitus Bay wind park is 1,200 megawatt (MW). The construction programme is planned to last for 3.5 years, from mid 2016 to the end of 2019. Onshore works will commence before offshore works, where at least 60 foundations and turbines will be installed every year, on average. The consenting of the development will be subject to detailed project-specific EIA and HRA and the developers plan to submit a Development Consent Order and Environmental Statement at the end of 2013 (Navitus Bay Wind Park website[23]).

The Isle of Wight Council has secured an Agreement for Lease for a managed Marine Current Energy Converter (MCEC) testing facility, called the Solent Ocean Energy Centre, located off the south of the Isle of Wight near St. Catherine's Point[24]. There is currently an approved application for a 2MW tidal barrage and tidal stream energy project at Wooton Bridge (north side of the Isle of Wight) which is awaiting construction (RESTATS website[25]).

[23] Navitus Bay Wind Park website - http://www.navitusbaywindpark.co.uk/about-navitus-bay.aspx
[24] The Crown Estate website - http://www.thecrownestate.co.uk/news-media/news/2012/further-tidal-project-sites-announced
[25] RESTATS website - http://restats.decc.gov.uk/app/pub/map/map/

Figure 8.1 – Relevant marine renewable energy development in the area



While the operation, maintenance and decommissioning of marine renewable energy developments will introduce noise into the marine environment, these are typically of low intensity. The greatest noise levels arise during the construction phase, and it is these which have the greatest potential for acoustic disturbance effects (see Faber Maunsell & Metoc 2007, DECC 2009, 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" (August 2010) 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 likely number and scale of activities proposed by the work programmes (see Section 2.2) 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 HRA.

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. Task Group 11 reported on underwater noise and other forms of energy (though note that at present only noise is considered), and developed three possible indicators of underwater sound (Tasker *et al*. 2010). In no case was the Task Group able to define precisely (or even loosely) when GES 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. The EC decided in 2010 that guidance was needed to help member states implement the indicators. Established in 2010, the Technical Sub Group (TSG) Noise focussed on clarifying the purpose, use and limitation of the indicators and described methodology that would be unambiguous, effective and practicable (Van der Graaf *et al.* 2012).

A UK Government consultation was undertaken on proposals for characteristics of GES for the UK's seas and for more detailed targets and indicators of GES (HM Government 2012a)[26]. The report recognised that there was insufficient data to provide a quantitative assessment of the current status and trends of underwater noise due to the lack of monitoring studies. However, increases in construction levels were likely to have contributed to localised increases in noise levels. The document indicated that further research, monitoring and investigation were necessary to fully understand the effects of noise at an individual and population level, the risks and significance of sound inputs to the environment, and appropriate options for mitigation. However, currently there is no evidence to suggest that current levels of noise in UK waters were having an impact at the population level on cetaceans or other noise sensitive animals (HM Government 2012a).

Following consultation a Government (HM Government 2012b) response defined the UK characteristics of Good Environmental Status for noise (covering impulsive sound, caused primarily by activities such as oil and gas seismic activity and pile driving for wind farms) as:

- Loud, low and mid frequency impulsive sounds and continuous low frequency sounds introduced into the marine environment through human activities do not have adverse effects on marine ecosystems: Human activities potentially introducing loud, low and mid

[26] Note that proposed GES characteristics, targets and indicators were subject to consultation in March 2012, with a Government response expected in November/December 2012.

frequency impulsive sounds into the marine environment are managed to the extent that no significant long term adverse effects are incurred at the population level or specifically to vulnerable/threatened species and key functional groups. Continuous low frequency sound inputs do not pose a significant risk to marine life at the population level, or specifically to vulnerable/threatened species and key functional groups e.g. through the masking of biologically significant sounds and behavioural reactions.

It was recognised in the consultation document (HM Government 2012a) that setting a specific target representing GES was difficult, given current uncertainties. Due to the high level of uncertainty about the effects of noise, it has not been possible for experts to recommend a specific target for either impulsive sounds or ambient sounds which they believe to be equivalent to GES. Instead, an operational target has been developed for impulsive sounds and a surveillance indicator developed for ambient sounds (HM Government 2012b):

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

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

It is anticipated that monitoring data arising from the latter ambient noise surveillance indicator will help to develop an appropriate target for 2018. The noise registry would likely be managed by JNCC and require a degree of coordination from regulating authorities around the UK. It would enable a better understanding of the potential for cumulative and in-combination effects, and allow for some adjustment in the scheduling of activities if it appeared significant adverse impacts may arise (HM Government 2012a, b).

DECC is cognisant of the ongoing efforts to determine an indicator, descriptor of good environmental status and targets for noise. DECC will review the results of the ongoing process closely with respect to the consenting of relevant activities which may result from the draft plan/programme, as well as other activities which generate noise in the marine environment.

8.2 Other potential in-combination effects

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. Navitus Bay, part of the West of Isle of Wight Round 3 wind farm zone), 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 HRAs.

8.2.3 Marine discharges

As described in Section 5.4, 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 lack of existing oil and gas installations within the region and the presumption against the discharge to sea of produced water from new developments, 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 5.4). 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 have 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 HRA of project specific consent applications; this process will ensure that mitigation measures are put in place to ensure that subsequent to licensing, specific projects (if consented) will not result in

adverse effects on the integrity of European sites. Therefore, bearing this in mind, it is concluded that the in-combination effects from activities arising from the licensing of Blocks 97/13 and 98/12b with those from existing and planned activities in the central English Channel will not adversely affect the integrity of 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 97/13 and 98/12b. 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.gov.uk/oil-and-gas-offshore-environmental-legislation and https://www.gov.uk/oil-and-gas-petroleum-operations-notices) which apply to developer activities which could follow plan adoption. Where necessary, project-specific HRA based on detailed project proposals would be undertaken by the competent authority before the granting of a permit/consent. The competent authority needs to be satisfied that the proposed activity will not result in adverse effects on integrity of 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 HRA 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. JNCC[27] note that, "*The legal list of qualifying species, for which a Special Protection Area (SPA) has been selected and is managed, is given on the relevant SPA citation (available from the country agency concerned). A review of UK network of SPAs was co-ordinated by JNCC in the late 1990s. Following formal submission to, and agreement by, relevant Ministers, the results were published in 2001. This Review revised the list of qualifying species at some SPAs.*

However, it is taking some time to revise all the relevant SPA citations in the light of these agreed changes to the affected lists of qualifying species. Where there is a mismatch between species listed in extant citations and listed in the 2001 Review for the same sites, there has been confusion as to the 'correct' list of qualifying species to be used at any site for purposes of management, assessment and development control.

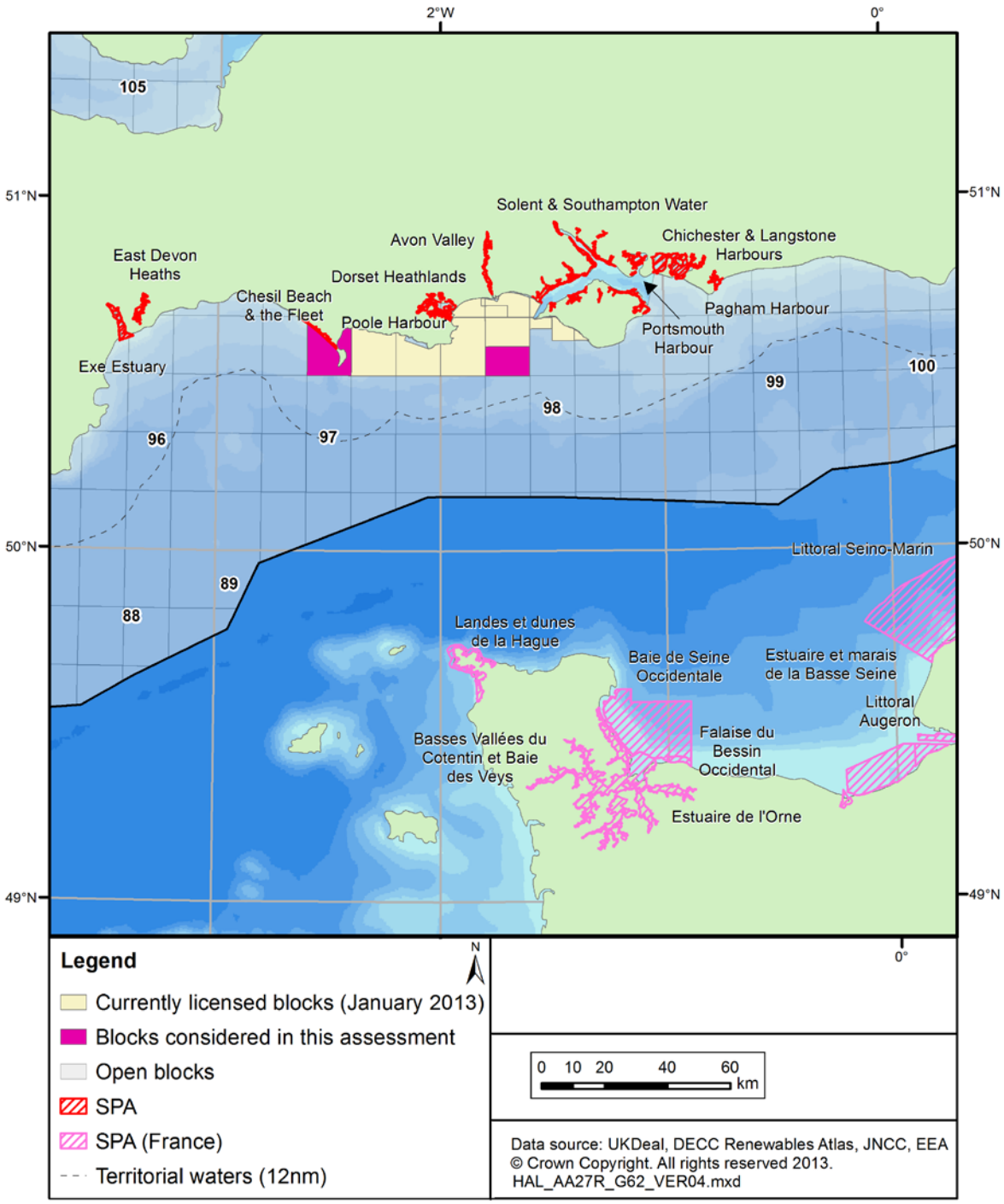
The individual site accounts in 2001 Review should be taken as the definitive list of qualifying species at the SPAs concerned. However, at sites where there remain differences between that list of qualifying species and the extant site citation, then the relevant country agency should be contacted for further guidance."

A review of SPA sites was undertaken to identify where a mismatch between the qualifying species lists existed. Each country agency (NE, SNH, CCW, NIEA) was contacted to clarify those features which should be considered. The species listed in Table A.1 reflect the outcome of this review.

[27] http://jncc.defra.gov.uk/page-5485 (accessed: October 2012)

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[28]
Exe Estuary SPA	2,345.71	Over winter: Avocet Slavonian grebe	Over winter: Dark-bellied brent goose Oystercatcher Black-tailed godwit Dunlin Grey plover	Over winter: Waterfowl
East Devon Heaths SPA	1,119.94	Breeding: Dartford warbler Nightjar	N/A	N/A
Chesil Beach and The Fleet SPA	748.11	Breeding: Little Tern	Over winter: Dark bellied brent goose	N/A
Poole Harbour SPA	2,271.99	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
Avon Valley SPA	1,385.08	Over winter: Bewick's swan	Over winter: Gadwall	N/A
Solent and Southampton Water SPA	5,505.86	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
Portsmouth Harbour SPA	1,248.77	N/A	Over winter: Dark bellied brent goose Dunlin Black-tailed godwit Red-breasted merganser	N/A
Chichester and Langstone Harbours SPA	5,810.03	Breeding: Little tern Sandwich tern Common tern Over winter: Bar tailed godwit Little egret	Over winter: Dark bellied brent goose Black-tailed godwit Dunlin Ringed plover Grey plover Redshank	Over winter: Waterfowl

[28] - 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[28]
		On passage: Little egret	Pintail Shoveler Teal Wigeon Turnstone Sanderling Red-breasted merganser Curlew Shelduck On passage: Ringed plover	
Pagham Harbour SPA	636.68	Breeding: Little tern Common tern Over winter: Ruff	Over winter: Pintail Dark-bellied brent goose	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 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 Great egret Little egret Peregrine falcon Bar-tailed godwit Ruff	Breeding: Sedge warbler Shoveler Teal Garganey Snipe Black-headed gull Black-tailed godwit Curlew Shelduck Common redshank Lapwing Kentish plover Over winter: Pintail Gadwall Icelandic greylag goose Turnstone Dunlin Sanderling Ringer plover Horned lark Oystercatcher Common gull	

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

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
		Mediterranean gull Little gull Little tern Common tern Arctic tern Sandwich tern Red-throated diver	Great black-backed 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	1,200	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	1,000	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 Slavonian grebe On passage / moulting: Common tern Sandwich tern Little tern	Over winter: Razorbill Herring gull Common gull Common scoter Red-breasted merganser Eider Cormorant Great-crested grebe Northern gannet Common murre Great black-backed gull Little gull Scaup Black-headed gull On passage / moulting: Manx shearwater Lesser black-backed gull Little 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 White stork Marsh harrier Corncrake Peregrine falcon Bluethroat Spotted crake Hen harrier European honey-buzzard Avocet Black winged stilt pied Little bittern Red-backed shrike	Breeding: Sedge warbler Pintail Teal Garganey Dunlin Ringed plover Snipe Oystercatcher Black-tailed godwit Curlew Shelduck Common redshank Lapwing Marsh warbler Eurasian reed warbler 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
		Over winter: Common kingfisher Short-eared owl Eurasian bittern Marsh harrier Little egret Peregrine falcon Bar-tailed godwit Hen harrier Merlin Avocet Black-throated diver Great northern diver Red-throated diver Slavonian grebe On passage / moulting: Aquatic warbler Common kingfisher Short-eared owl Eurasian bittern Nightjar White stork Black stork Marsh harrier Corncrake Little egret Peregrine falcon Bar-tailed godwit Ruff Common tern Sandwich tern Hen harrier Merlin Osprey Eurasian spoonbill Smew Purple heron Tawny pipit Whiskered tern Black tern Black-throated diver Red-throated diver Gull-billed tern Common crane Black-winged stilt pied Mediterranean gull Woodlard Red kite Black kite Golden plover Caspian tern Arctic tern Wood sandpiper	Reed bunting Common kestrel Grasshopper warbler Bearded reedling Redstart Whinchat Stonechat Kentish plover Over winter: Pintail Shoveler Teal Garganey Gadwall Icelandic greylag goose Dunlin Sanderling Red knot Ringed plover Snipe Oystercatcher Black-tailed godwit Curlew Common scoter Grey plover Eider Shelduck Spotted redshank Common redshank Lapwing Pochard Tufted duck Cormorant Common murre Scaup Common sandpiper Razorbill European widgeon Greater white-footed goose Grey heron Long-eared owl Goldeneye Eurasian siskin Green sandpiper Greylag goose Twite Kentish plover Little gull Velvet scoter Northern wheatear Snow bunting Great crested grebe Red necked grebe On passage / moulting: Shoveler Icelandic greylag goose Turnstone	

Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
			Dunlin Sanderling Red knot Snipe Red-breasted merganser Spotted redshank Common redshank Lapwing Common sandpiper Eurasian widgeon Curlew sandpiper Little ringed plover Whimbrel Great skua Common greenshank Green sandpiper Reed warbler Gadwall Barnacle goose Little stint Temmincki's stint Kentish plover Little gull Common merganser Red-crested pochard Comorant Arctic skua	
Littoral Seino-Marin	148,907	Breeding: Peregrine falcon Over winter: Black-throated diver Great northern diver Red-throated diver Mediterranean gull Slavonian grebe On passage / moulting: Short-eared owl Mediterranean gull 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 Slavonian grebe	Resident: Lesser black-backed gull Breeding: Fulmar Herring gull Great black-backed gull Cormorant Kittiwake Shag Over winter: Razorbill Purple sandpiper Fulmar Herring gull Cormorant Red necked grebe Great crested grebe Manx shearwater Kittiwake Northern gannet Common murre Little gull Velvet scoter Common scoter Red-breasted merganser Shag Eider On passage / moulting:	

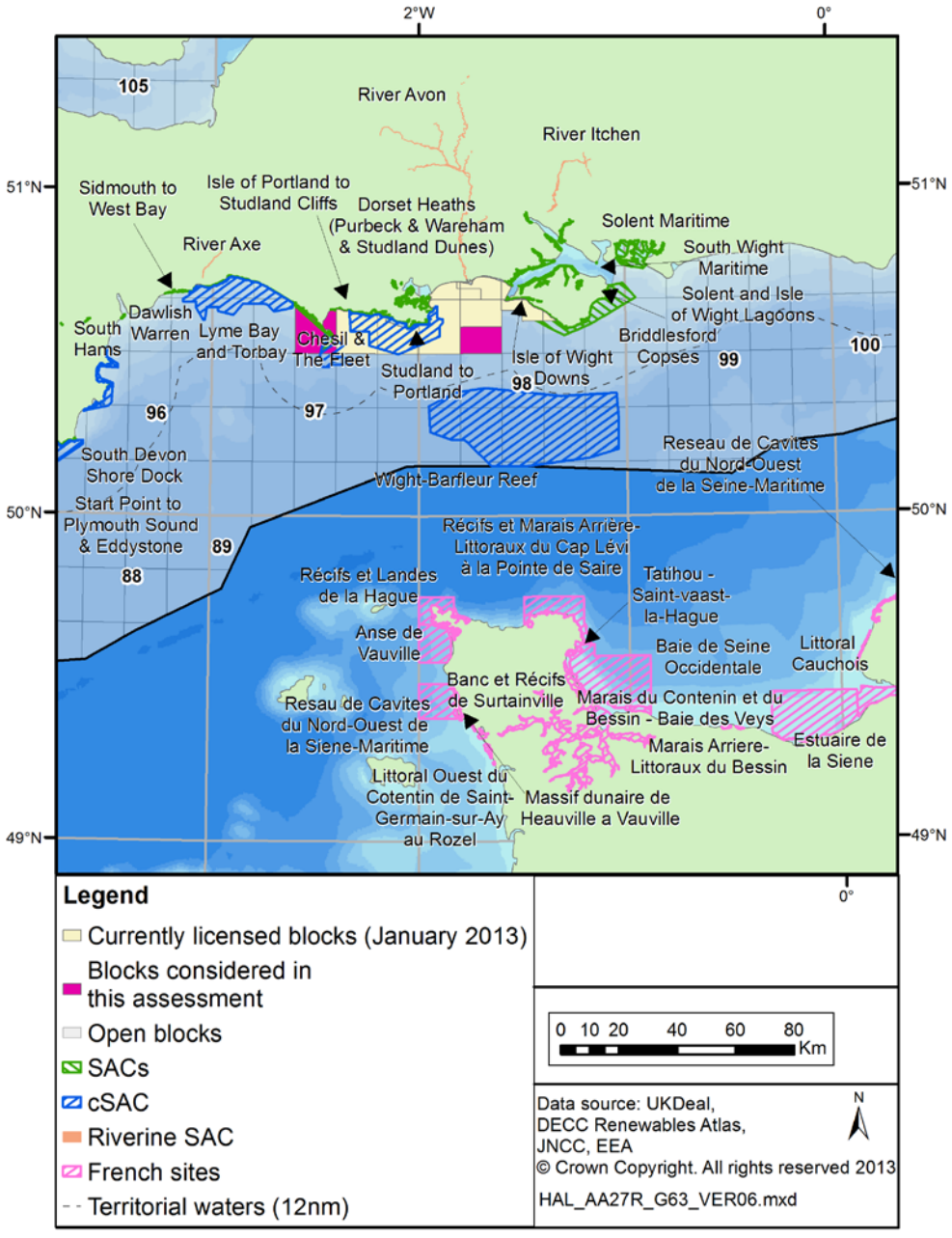
Site Name	Area (ha)	Article 4.1 Species	Article 4.2 Migratory species	Article 4.2 Assemblages
			Sabine's gull Manx shearwater Fulmar Cormorant Great-crested grebe Kittiwake Northern gannet Common murre Red-necked grebe Common sandpiper Razorbill Greater white-fronted goose Great skua Arctic skua Pomarine skua Icelandic greylag goose Little gull Velvet scoter Common scoter Red-breasted merganser Shag Black-necked grebe Eider Shelduck	

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. SACs in adjacent waters are considered in Section A.6.

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
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*)

Annex I Habitat (abbreviated)	Annex I Habitat(s) (full description)
	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. 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 1 Habitat Primary	Annex 1 Habitat Qualifying	Annex II Species Primary	Annex II Species Qualifying
Start Point to Plymouth Sound & Eddystone cSAC	34,076.13	Reefs	N/A	N/A	N/A
South Devon Shore Dock SAC	341.01	Sea cliffs	N/A	Shore dock *Rumex rupestris*	N/A
Lyme Bay and Torbay cSAC	31,248	Reefs Sea caves	N/A	N/A	N/A
South Hams SAC	129.53	Heath Grassland	Sea cliffs Caves Forest	Greater horseshoe bat *Rhinolophus ferrumiquinum*	N/A
Dawlish Warren SAC	58.84	Coastal dunes	Coastal dunes	Petalwort *Petalophyllum ralfsii*	N/A
Sidmouth to West Bay SAC	897.3	Sea cliffs Forest	Vegetation of drift lines	N/A	N/A
Chesil and the Fleet SAC	1,631.63	Coastal lagoons Vegetation of drift lines Vegetation of stony banks Salt marshes and salt meadows	Salt marshes and salt meadows	N/A	N/A
Isle of Portland to Studland Cliffs SAC	1,447.5	Sea cliffs Grassland	Vegetation of drift lines	Early gentian *Gentianella anglica*	N/A
Studland to Portland cSAC	33,177	Reefs	N/A	N/A	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	2,221.94	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 and Isle of Wight Lagoons SAC	36.24	Coastal lagoons	N/A	N/A	N/A
South Wight Maritime SAC	19,862.71	Reefs Sea cliffs Sea caves	N/A	N/A	N/A
Solent Maritime SAC	11,325.09	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*
Isle of Wight Downs SAC	461.8	Sea cliffs Heaths Grassland	N/A	Early gentian *Gentianella anglica*	N/A
Briddlesford Copses SAC	167.22	N/A	N/A	Bechstein`s bat *Myotis bechsteinii*	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 cSAC	137,344	Reefs	N/A

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[29]
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 Inlets and bays Reefs	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal Allis shad Twaite shad River lamprey Sea lamprey Atlantic salmon
Baie de Seine orientale	44,456	Sandbanks Inlets and bays Reefs	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal Allis shad Twaite shad River lamprey Sea lamprey Atlantic salmon

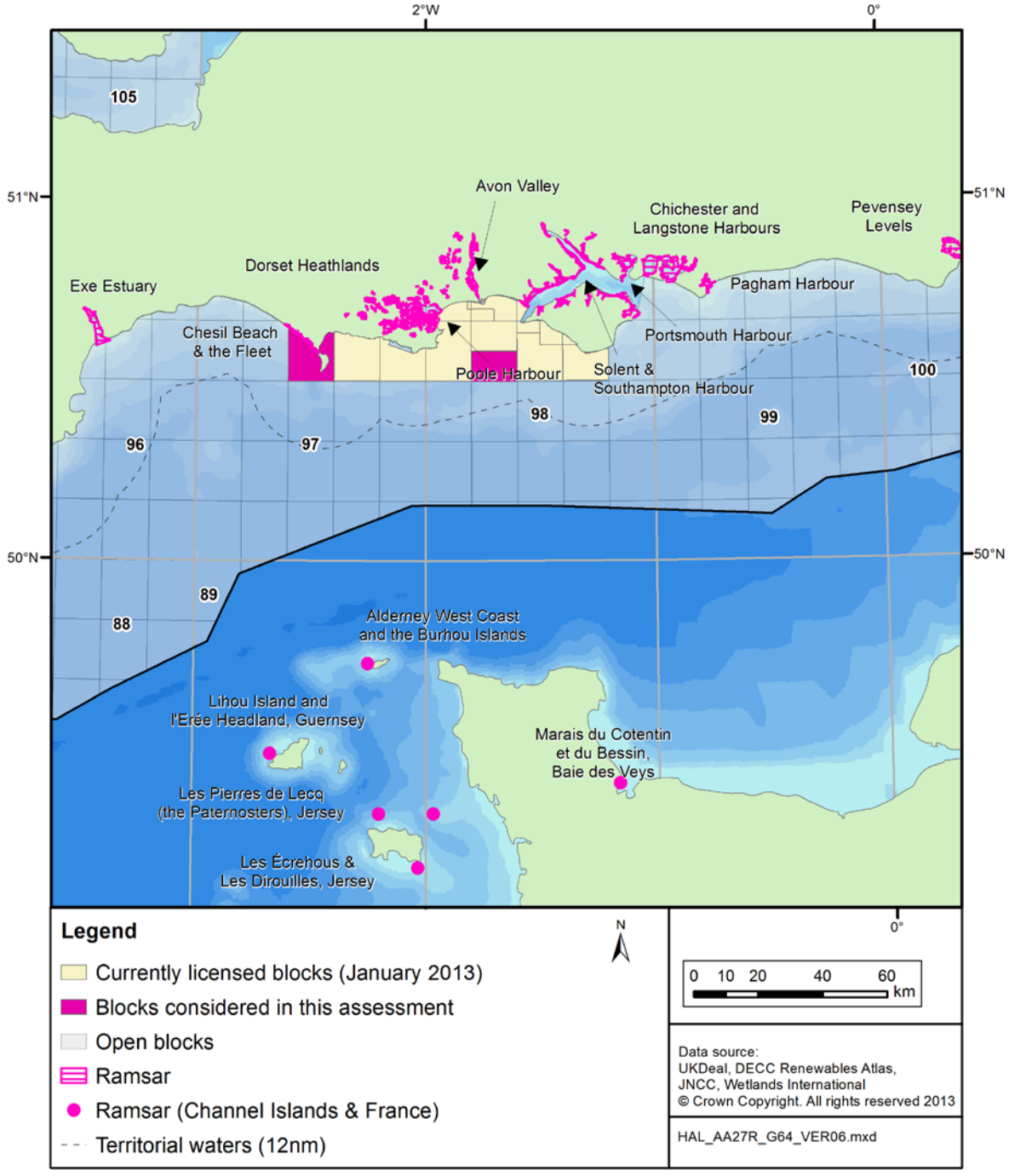
[29] SL - Sea lamprey *Petromyzon marinus*, AS - Atlantic salmon *Salmo salar*

Site Name	Area (ha)	Annex I Habitat	Annex II Species
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 Reefs Standing freshwater Running freshwater Forest Coastal dunes Salt marshes and salt meadows Grasslands Caves Vegetation of stony banks Vegetation of drift lines	Harbour porpoise Harbour seal Grey seal Greater horseshoe bat Lesser horseshoe bat Western Barbastelle bat Mouse-eared bat Jersey tiger moth Great-crested newt Southern damselfly Marsh fritillary Jersey tiger moth Stag beetle Allis shad Twait shad Bullhead River lamprey European brook lamprey Sea lamprey Atlantic salmon
Littoral Cauchois	4,574	Reefs Sea cliffs Forests Mudflats and sandflats Sandbanks Bogs Heaths Vegetation of stony banks	Bottlenose dolphin Harbour porpoise Harbour seal Grey seal
Littoral Ouest du Cotentin de Saint-Germain-sur-Ay au Rozel	2316	Coastal dunes Mudflats and sandflats Salt marshes and salt meadows Grasslands Vegetation of drift lines Sea cliffs	Jersey tiger moth Great-crested newt Yellow widelip orchid Creeping marshwort
Marais Arriere-Littoraux du Bessin	359	Coastal dunes	N/A
Marais du Cotentin et du Bessin - Baie des Veys	29,270	Mudflats and sandflats Salt marshes and sea meadows Coastal dunes	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

Site Name	Area (ha)	Annex I Habitat	Annex II Species
Massif dunaire de Heauville a Vauville	707	Coastal dunes Mudflats and sandflats	Great-crested newt
Récifs et Landes de la Hague	9,187	Reefs Heaths Vegetation of drift lines Sea cliffs Salt marshes and sea meadows	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 Coastal dunes Vegetation of drift lines Salt marshes and sea meadows	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 horseshoe 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 – Re-screening tables for the identification of likely significant effects on the sites

In the original block screening assessment, the implications of geophysical survey, drilling and physical effects were considered in a generic way for all Blocks applied for in the 27th Round (DECC 2012) for sites where there was a foreseeable possibility of interactions[30]. Subsequent to the publication of the screening assessment (DECC 2012), proposed work programmes for the Blocks have been confirmed by the applicant companies (see below), or in some cases applications made for Blocks have been withdrawn.

Proposed work programmes for the Blocks from the range of licence applications received are as follows, (see also Section 2.2 for details):

- 97/13 – Drill or Drop well. On account of the range of environmental sensitivities present, the applicant proposes that the exploration well would be drilled from land, although subsequent activities could involve offshore drilling.
- 98/12b – Drill or Drop well.

In light of the proposed work programmes, and confirmation of those Blocks proposed to be taken forward for licensing, those sites initially identified in the screening document as having a foreseeable interaction with offshore oil and gas activities are re-screened below. The potential for likely significant effects on relevant Natura 2000 sites (listed in Appendix A) is considered in the table below and where relevant, the location of further appropriate assessment is clearly signposted. More information on the conservation objectives and status of those sites identified as requiring consideration in the AA is provided in Appendix C.

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 considered under the following broad headings:

- Physical disturbance and other effects (e.g. pipeline trenching, marine discharges)

[30] Coastal and marine sites along the coasts of the United Kingdom and in territorial waters, Offshore sites (i.e. those largely or entirely beyond 12nm from the coast), Riverine sites designated for migratory fish and/or the freshwater pearl mussel, sites designated for breeding red-throated divers, sites in the waters of other member states at or adjacent to the UK median line.

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

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	
England								
Exe Estuary	-	✓	-	-	-	-	-	**Qualifying features:** Overwintering waterfowl, waders and grebe **Consideration of likely significant effects:** Site conservation objectives would not be undermined by emissions or discharges from routine operations. As the drill or drop well in Block 97/13 will be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
East Devon Heaths	✓	-	-	-	-	-	-	**Qualifying features:** Breeding warbler and nightjar **Consideration of likely significant effects:** 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. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Chesil Beach & The Fleet	-	✓	-	✓	✓	✓	-	**Qualifying features:** Breeding tern and overwintering geese **Consideration of likely significant effects:** Block 97/13 is adjacent to the site although as the drill or drop well will be drilled from land there is no risk of an oil spill undermining the conservation objectives of the qualifying features via the marine environment. Depending on the location of the drill site, there is the potential that a terrestrial spill could affect qualifying features although mitigation would be possible.

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								Potential for physical and acoustic disturbance from terrestrial drilling and construction operations although mitigation would be possible. **Appropriate Assessment:** See Sections 5.5, 6.4 and 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Poole Harbour	✓	✓	✓	✓	-	-	-	**Qualifying features:** Breeding tern and gulls, overwintering and on passage waterfowl and waders **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could affect the qualifying features when foraging within the SPA and in adjacent areas beyond the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Avon Valley	-	✓	-	✓	-	-	-	**Qualifying features:** Overwintering waterfowl **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil is not likely to affect the qualifying features within the site boundaries as the site does not include marine habitats but may affect them if foraging outwith the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Solent & Southampton Water	✓	✓	-	✓	-	-	-	**Qualifying features:** Breeding terns, overwintering waterfowl and waders

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								Consideration of likely significant effects: 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 Block 98/12b, weathered spilled crude oil could affect the qualifying features within the SPA and in adjacent areas beyond the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Portsmouth Harbour	-	✓	-	✓	-	-	-	**Qualifying features:** Overwintering geese, waterfowl and waders **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could affect the qualifying features within the SPA and in adjacent areas beyond the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Chichester & Langstone Harbours	✓	✓	✓	✓	-	-	-	**Qualifying features:** Breeding terns, passage and overwintering waterfowl and waders **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could affect the qualifying features within the SPA and in adjacent areas beyond the site boundaries although mitigation would be possible. **M Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								once project plans are known.
Pagham Harbour	✓	✓	-	✓	-	-	-	**Qualifying features:** Breeding terns, overwintering waders and waterfowl **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could affect the qualifying features within the SPA and in adjacent areas beyond the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
France								
Basses Vallées du Contenin et Baie des Veys	✓	✓	✓	-	-	-	-	**Qualifying features:** Breeding, passage and wintering gulls, terns, waterfowl, waders, birds of prey and owls, crakes **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** N/A
Landes et dunes de la Hague	✓	✓	✓	-	-	-	-	**Qualifying features:** Breeding and wintering waterfowl, waders, divers, birds of prey and gulls **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features although the site is a considerable

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Baie de Seine occidental	✓	✓	✓	-	-	-	-	**Qualifying features:** Breeding, passage and wintering gulls, terns, seabirds, divers waterfowl and waders **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Falaise du Bessin occidental	✓	✓	✓	-	-	-	-	**Qualifying features:** Breeding warbler, seabirds and gulls, wintering seabirds and waterfowl **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Estuaire de l'Orne	✓	✓	✓	-	-	-	-	**Qualifying features:** Passage terns, wintering and passage waders, waterfowl, birds of prey and seabirds **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								theoretically affect qualifying features although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Littoral Augeron	✓	✓	✓	-	-	-	-	**Qualifying features:** Passage terns, seabirds and waterfowl, wintering seabirds, gulls and waterfowl **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Estuarie et marais de la Basse Seine	✓	✓	✓	-	-	-	-	**Qualifying features:** Breeding, passage and wintering waterfowl, waders, divers, gulls, seabirds, crakes, birds of prey and owls **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Littoral Seino-Marin	✓	✓	✓	-	-	-	-	**Qualifying features:** Breeding birds of prey, seabirds and gulls, passage terns, gulls, divers and seabirds, wintering divers, gulls, grebes and waterfowl **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions

Site name	Features present[1]			Vulnerability to effects[2]				Consideration
	Breeding	Wintering	Passage	Oil spills	Physical Disturbance	Acoustic Disturbance	In-combination	
								or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect qualifying features, although the site is a considerable distance from the Blocks and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect

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	
England							
Start Point to Plymouth Sound & Eddystone	✓	-	-	-	-	-	**Qualifying features:** Reefs **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. As a drill or drop well in Block 97/13 could be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							activities and site negates likely significant effect
South Devon Shore Dock	✓	✓	-	-	-	-	**Qualifying features:** Sea cliffs, shore dock **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. As the drill or drop well in Block 97/13 will be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Lyme Bay & Torbay	✓	-	-	-	-	-	**Qualifying features:** Reefs, sea caves **Consideration of likely significant effects:** Site conservation objectives would not be undermined by emissions or discharges from routine operations. As a drill or drop well in Block 97/13 could be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
South Hams	✓	✓	-	-	-	-	**Qualifying features:** Heath, grassland, sea cliffs, caves, forest, bats **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. As a drill or drop well in Block 97/13 could be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Dawlish Warren	✓	✓	-	-	-	-	**Qualifying features:** Coastal dunes, petalwort **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. As a drill or drop well in Block 97/13

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							could be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Sidmouth to West Bay	✓	✓	-	-	-	-	**Qualifying features:** Sea cliffs, forest and vegetation of drift lines **Consideration of likely significant effects:** Site conservation objectives would not be undermined by emissions or discharges from routine operations. As a drill or drop well in Block 97/13 could be drilled from land there is no risk of an oil spill affecting the qualifying features. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Chesil & The Fleet	✓	-	✓	✓	-	-	**Qualifying features:** Coastal lagoons, vegetation of drift lines and stony banks, salt marshes and salt meadows **Consideration of likely significant effects:** Block 97/13 is adjacent to the site although as a drill or drop well could be drilled from land there is no risk of an oil spill undermining the conservation objectives of the qualifying features via the marine environment. Depending on the location of the drill site, there is the potential that a terrestrial spill could affect qualifying features although mitigation would be possible. Onshore drilling and construction activities could potentially cause physical disturbance to the site. **Appropriate Assessment:** See Sections 5.5 and 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Isle of Portland to Studland Cliffs	✓	✓	-	✓	-	-	**Qualifying features:** Sea cliffs, grassland, vegetation of drift lines, early gentian **Consideration of likely significant effects:** Block 97/13 is adjacent to the site although as a drill or drop well could be drilled from land there is no risk

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							of an oil spill undermining the conservation objectives of the qualifying features via the marine environment. Depending on the location of the drill site, there is the potential that a terrestrial spill could affect qualifying features although these are not particularly sensitive to spills and mitigation would be possible. Onshore drilling and construction activities could potentially cause physical disturbance to the site. **Appropriate Assessment:** See Section 5.5. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Studland to Portland	✓	-	✓	✓	-	-	**Qualifying features:** Reefs **Consideration of likely significant effects:** Block 97/13 is within part of the site although as a drill or drop well could be drilled from land there is no risk of an oil spill undermining the conservation objectives of the qualifying feature via the marine environment. Given the marine nature of the site there is very little risk of physical disturbance of the qualifying feature during potential onshore drilling/construction activities. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying feature, although the feature is not considered particularly sensitive to spills. However the proximity of the site to Block 98/12b means that a spill could cause significant impact although mitigation would be possible. **Appropriate Assessment:** See Sections 5.5 and 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
St Albans Head to Durlston Head	✓	✓	✓	-	-	-	**Qualifying features:** Sea cliffs, grassland, early gentian, bats **Consideration of likely significant effects:** Site conservation objectives would not be undermined by emissions or discharges from routine operations. As a drill or drop well in Block 97/13 could be drilled from land

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							there is no risk of an oil spill from that Block undermining the conservation objectives of the qualifying features. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically undermine the conservation objectives of the qualifying features although these are not considered particularly sensitive to spills. However the proximity of the site to Block 98/12b means that a spill could cause significant impact although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Dorset Heaths (Purbeck & Wareham) & Studland Dunes	✓	✓	-	-	-	-	**Qualifying features:** Coastal dunes, standing freshwater, heath, bogs, grassland, fens, forest, damselfly and newt **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying features although these are not considered particularly sensitive to spills and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Solent & Isle of Wight Lagoons	✓	-	-	-	-	-	**Qualifying features:** Coastal lagoons **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying features although these are not considered particularly sensitive to spills, sea walls limit the entry of seawater to the site and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							activities and site negates likely significant effect
South Wight Maritime	✓	-	✓	-	-	-	**Qualifying features:** Reefs, sea cliffs, sea caves **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying features although features not considered particularly sensitive to spills. However the variety of marine Annex I habitats and proximity of the site to the Block means that a spill could cause significant impact although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Solent Maritime	✓	✓	✓	-	-	-	**Qualifying features:** Estuaries, salt marshes and salt meadows, sandbanks, mudflats and sandflats, coastal lagoons, vegetation of drift lines and stony banks, coastal dunes and snail **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could theoretically affect the sensitive qualifying features although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Isle of Wight Downs	✓	✓	✓	-	-	-	**Qualifying features:** Sea cliffs, heaths, grassland, early gentian **Consideration of likely significant effects:** 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 Block 98/12b,

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							weathered spilled crude oil could theoretically affect the qualifying features although these are not considered particularly sensitive to spills. However the proximity of the site to Block 98/12b means that a spill could cause significant impact although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
Briddlesford Copses	✓	-	-	-	-	-	**Qualifying features:** Bats **Consideration of likely significant effects:** Site is terrestrial and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
France							
Anse de Vauville	✓	✓	-	-	-	-	**Qualifying features:** Sandbanks, reefs, cetaceans and pinnipeds **Consideration of likely significant effects:** 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 outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Baie de Seine occidentale	✓	✓	-	-	-	-	**Qualifying features:** Sandbanks, inlets and bays, reefs, cetaceans and pinnipeds, migratory fish **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Baie de Seine orientale	✓	✓	-	-	-	-	**Qualifying features:** Sandbanks, inlets and bays, reefs, cetaceans and pinnipeds, migratory fish **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Banc et récifs de Surtainville	✓	✓	-	-	-	-	**Qualifying features:** Sandbanks, reefs, cetaceans and pinnipeds **Consideration of likely significant effects:** 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

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							(i.e. seismic surveys) may cause temporary acoustic disturbance to the species features outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Estuaire de la Seine	✓	✓	-	-	-	-	**Qualifying features:** Sandbanks, estuaries, mudflats and sandflats, reefs, standing and running freshwater, forest, dunes, salt marshes and salt meadows, grasslands, caves, vegetation of drift lines and stony banks, cetaceans and pinnipeds, migratory fish, bats, insects, newts **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (cetacean and pinniped species, migratory fish) outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Littoral Cauchois	✓	✓	-	-	-	-	**Qualifying features:** Reefs, sea cliffs, forests, mudflats and sandflats, sandbanks, bogs, heath, vegetation of stony banks, cetaceans and pinnipeds **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Littoral Ouest du Cotentin de Saint-Germain-sur-Ay au Rozel	✓	✓	-	-	-	-	**Qualifying features:** Coastal dunes, mudflats and sandflats, salt marshes and salt meadows, grasslands, vegetation of drift lines, sea cliffs, newt, moth, plant species **Consideration of likely significant effects:** Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Marais Arriere-Littoraux du Bessin	✓	-	-	-	-	-	**Qualifying features:** Coastal dunes **Consideration of likely significant effects:** Site is remote from blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations or accidental spills. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Marais du Cotentin et du Bessin - Baie des Veys	✓	✓	-	-	-	-	**Qualifying features:** Mudflats and sandflats, salt marshes and salt meadows, coastal dunes, harbour seal, migratory fish, bats, insects and

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							plants **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. Certain activities (i.e. seismic surveys) may cause temporary acoustic disturbance to the species features (pinniped species and migratory fish) outside of the site boundaries, although very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Massif dunaire de Heauville a Vauville	✓	✓	-	-	-	-	**Qualifying features:** Coastal dunes, mudflats and sandflats, newt **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Récifs et Landes de la Hague	✓	✓	-	-	-	-	**Qualifying features:** Reefs, heaths, vegetation of drift lines, sea cliffs, salt marshes and salt meadows, cetaceans and pinnipeds, bats, insects and plants **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. 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 very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Récifs et Marais Arrière-littoraux du Cap Lévi à la Pointe de Saire	✓	✓	-	-	-	-	**Qualifying features:** Reefs, sandbanks, coastal dunes, vegetation of drift lines, salt marshes and salt meadows, cetaceans and pinnipeds, bats, newts **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying features although the site is a considerable distance from the Block and mitigation would be possible. 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 very unlikely given distance from Block, no seismic survey proposed and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect
Reseau de Cavites du Nord-Ouest de la Seine-Maritime	✓	✓	-	-	-	-	**Qualifying features:** Caves, bats **Consideration of likely significant effects:** 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
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							Appropriate Assessment: No foreseeable interaction between plan activities and site negates likely significant effect
Tatihou - Saint-vaast-la-Hougue	✓	-	-	-	-	-	**Qualifying features:** Mudflats and sandflats, reefs **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect sensitive qualifying although the site is a considerable distance from the Block and mitigation would be possible. **Appropriate Assessment:** No foreseeable interaction between plan activities and site negates likely significant effect

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]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
Wight-Barfleur Reef	✓	✓	✓	-	-		**Qualifying features:** Reefs **Consideration of likely significant effects:** 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 Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying feature although not considered particularly sensitive to spills. However the proximity of the site to the Block means that a spill could cause significant impact although mitigation would be possible. **Appropriate Assessment:** See Section 7.3. Further, project specific mitigation measures would be defined by subsequent HRA 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 Axe	-	✓	-	-	✓	-	**Qualifying features:** Sea lamprey **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations and accidental spills. Certain activities (i.e. seismic survey) could cause temporary acoustic disturbance to qualifying feature outside the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Section 6.4. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
River Avon	-	✓	✓	-	✓	-	**Qualifying features:** Sea lamprey, Atlantic salmon **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying features although only if qualifying features are present in shallow coastal areas and mitigation would be possible. Certain activities (i.e. seismic survey) could cause temporary acoustic disturbance to qualifying features outside the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Sections 6.4 and 7.3. Further, project specific mitigation measures would be defined by subsequent HRA once project plans are known.
River Itchen	-	✓	✓	-	✓	-	**Qualifying features:** Atlantic salmon **Consideration of likely significant effects:** Site is remote from Blocks and its conservation objectives would not be undermined by emissions or

Site name	Features present[1]		Vulnerability to effects[2]				Consideration
	Habitats	Species	Oil spills[3]	Physical Disturbance	Acoustic Disturbance	In-combination	
							discharges from routine operations. In the unlikely event of a major crude oil spill from Block 98/12b, weathered spilled crude oil could theoretically affect the qualifying feature although only if qualifying features are present in shallow coastal areas and mitigation would be possible. Certain activities (i.e. seismic survey) could cause temporary acoustic disturbance to qualifying feature outside the site boundaries although mitigation would be possible. **Appropriate Assessment:** See Sections 6.4 and 7.3. Further, project specific mitigation measures would be defined by subsequent HRA 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

As part of the 2012 Habitats and Wild Birds Directives Implementation Review[31], it was concluded that conservation objectives should be up-to-date, accessible and allow applicants to assess the impact of their proposed development against them, and that Natural England, with the JNCC, should publish a new approach[32] to the information contained in Conservation Objectives, together with a statement of how their delivery will be prioritised. In the first instance, a set of high level conservation objectives have been applied to all English terrestrial sites (including those with marine components, though not wholly within inshore and offshore waters). It is these conservation objectives which have been used in the Appropriate Assessment, and which are reproduced for each relevant site below.

These high level objectives will be built upon, including the application of (where possible) quantified targets relating to:

- The populations and distribution of qualifying species
- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure of qualifying natural habitats and habitats of qualifying species
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely

A consultation on this approach is due to take place in autumn 2012 and new conservation objectives are to be set from April 2013, with a view to completing these within 2 years.

[31] Report of the Habitats and Wild Birds Directives Implementation Review, 2012 (http://www.defra.gov.uk/publications/files/pb13724-habitats-review-report.pdf)

[32] Announcement on 'New Approach' to information contained in European site Conservation Objectives (http://www.naturalengland.org.uk/Images/action-14-announcement_tcm6-32928.pdf)

C1 Coastal and marine Special Protection Areas

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) ***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:	
Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive. Subject to natural change, to maintain or restore: • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The populations of the qualifying features; • The distribution of the qualifying features within the site.	

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:
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)

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 waterfowl
Assemblage qualification: A wetland 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:

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features,

Site Name: Poole Harbour SPA

ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

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)

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:

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

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)

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 waterfowl
Assemblage qualification: A wetland 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 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:

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;

Site Name: Solent and Southampton SPA

- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

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) Black-tailed godwit *Limosa limosa islandica*, 31 individuals representing at least 0.4% of the wintering Great Britain population (5 year peak mean 1991/92-1995/96) Red-breasted merganser *Mergus serrator*, 87 individuals representing at least 0.9% of the wintering Great Britain population (5 year peak mean 1991/92-1995/96)	
Conservation objectives:	
Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive. Subject to natural change, to maintain or restore: • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The populations of the qualifying features; • The distribution of the qualifying features within the site.	

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)

Common tern *Sterna hirundo*, 33 pairs representing up to 0.3% of the breeding population in Great Britain (5 year mean, 1992-1996)

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 1991/92 - 1995/96)

Little egret *Egretta garzetta*, 100 individuals representing up to 20.0% of the wintering population in Great Britain (Count as at 1998)

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 1991/92 - 1995/96)

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 1991/92 - 1995/96)

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 1991/92 - 1995/96)

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 1991/92 - 1995/96)

Grey plover *Pluvialis squatarola*, 3,825 individuals representing up to 2.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/92 - 1995/96)

Redshank *Tringa totanus*, 1,788 individuals representing up to 1.2% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/92 - 1995/96)

Ringed plover *Charadrius hiaticula*, 846 individuals representing up to 1.7% of the wintering Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Pintail *Anas acuta*, 330 individuals representing up to 1.2% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

Site Name: Chichester & Langstone SPA

Shoveler *Anas clypeata*, 100 individuals representing up to 1% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

Teal *Anas crecca,* 1824 individuals representing 0.5% of the wintering North-western Europe – wintering population (5 year peak mean 19991/92-1995/96)

Wigeon *Anas penelope*, 2055 individuals representing 0.7% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

Turnstone *Arenaria interpres*, 430 individuals representing 0.7% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

Sanderling *Calidris alba*, 236 individuals representing 0.2% of the wintering Eastern Atlantic/Western and Southern Africa – wintering population (5 year peak mean 19991/92-1995/96)

Red-breasted merganser *Mergus serrator*, 297 individuals representing 3% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

Curlew *Numenius arquata*, 1861 individuals representing 16% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

Shelduck *Tadorna tadorna*, 2410 individuals representing 3.3% of the wintering Great Britain population (5 year peak mean 19991/92-1995/96)

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

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

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)

Common tern *Sterna hirundo*, 0 pairs (Count, as at 1996)

Over winter:
Ruff *Philomachus pugnax*, 160 individuals representing at least 22.9% of the wintering population in Great Britain

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

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)

Dark-bellied brent goose *Branta bernicla bernicla*, 1794 individuals representing at least 0.6% of the Western Siberia/Western Europe wintering population (5 year peak mean 1991/92-1995/96)

Conservation objectives:

Avoid the deterioration of the habitats of the qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.

Subject to natural change, to maintain or restore:

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The populations of the qualifying features;
- The distribution of the qualifying features within the site.

C2 Coastal and marine Special Areas of Conservation

Site Name: Chesil & The Fleet SAC	
Location	Grid Ref: SY630795 (central point) 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:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: Isle of Portland to Studland Cliffs SAC	
Location	Grid Ref: SY840802 (central point) Latitude 50°37'14" N Longitude 02°13'34" W
Area (ha)	1447.5
Summary	The Isle of Portland to Studland Cliffs site includes the detached peninsula of Portland with St. Albans Head to Durlston head and form a single unit of cliffed coastline some 40km in length. The cliffs are formed of hard limestone, with chalk at the eastern end, interspersed with slumped sections of soft cliff of sand and clays. The cliffs support species-rich, calcareous grassland with species that are rare in the UK, such as wild cabbage *Brassica oleracea* var. *Oleracea*, early spider-orchid *Ophrys sphegodes* and Nottingham catchfly *Silene nutans*. The Portland peninsula, extending 8 km south of the mainland, demonstrates very clearly the contrast between the exposed western and southern coasts, with sheer rock faces and sparse maritime vegetation, and the sheltered eastern side, with sloping cliffs supporting scrub communities, where wood spurge *Euphorbia amygdaloides* grows in grassland. Semi-natural dry grassland occurs at this site in both inland and coastal situations on both chalk and Jurassic limestone. The site contains extensive species-rich examples of CG4 *Brachypodium pinnatum* grassland in the southern part of its UK range. Smaller areas of CG2 *Festuca ovina – Avenula pratensis* grassland occur on shallow soils on steeper slopes. Transitions from calcareous grassland to both chalk heath and acid grassland are also present. The site has well-developed terricolous and saxicolous lichen and bryophyte communities associated with open turf, chalk rock and pebbles, and flinty soils. Long-standing populations of early gentian *Gentianella anglica* numbering several thousands of plants in floristically-rich calcareaous grassland is a primary qualifying feature under Annex II.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Reefs, Vegetated sea cliffs of the Atlantic and Baltic coasts, semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*). Secondary features: Annual vegetation of drift lines ***Annex II Species*** Primary features: Early gentian *Gentianella anglica* Secondary features: None	
Conservation objectives:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: Studland to Portland cSAC	
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:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: St. Albans Head to Durlston Head SAC	
Location	Grid Ref: SZ006770 (central point) Latitude 50°35'32" N Longitude 01°59'28" W
Area (ha)	287.22
	St Albans Head to Durlston Head, with Isle of Portland to Studland Cliffs, form a single unit of cliffed coastline some 40km in length. The cliffs are formed of hard limestones, with chalk at the eastern end, interspersed with slumped sections of soft cliff of sand and clays. The cliffs support species-rich calcareous grassland with species that are rare in the UK, such as wild cabbage *Brassica oleracea* var. *oleracea*, early spider-orchid *Ophrys sphegodes* and Nottingham catchfly *Silene nutans.* This site contains extensive species-rich examples of CG4 *Brachypodium pinnatum* calcareous grassland. The site holds the largest UK population of early spider-orchid *Ophrys sphegodes*. This species has declined very dramatically in the UK since the 1950s, in both population size and range. This site on the Dorset coast, together with Isle of Portland to Studland Cliffs, supports important long-standing populations of early gentian *Gentianella anglica* numbering several thousands of plants in floristically-rich calcareous grassland.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Vegetated sea cliffs of the Atlantic and Baltic coasts, semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) Secondary features: None ***Annex II Species*** Primary features: Early gentian *Gentianella anglica* Secondary features: Greater horseshoe bat *Rhinolophus ferrumequinum*	
Conservation objectives:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: South Wight Maritime SAC	
Location	Grid Ref: SZ462771 (central point) 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:

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Site Name: Solent Maritime SAC	
Location	Grid Ref: SU756003 (central point) 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:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: Isle of Wight Downs SAC	
Location	Grid Ref: SZ373857 (central point) Latitude 50°40'08" N Longitude 01°28'18" W
Area (ha)	461.8
Summary	The Isle of Wight Downs represents one of the best examples of chalk grassland in the south of England under maritime influence. The most exposed chalk cliff tops support important assemblages of nationally rare lichens, including *Fulgensia fulgens*. The western end of the site adjoins the cliffs of the South Wight Maritime SAC. Here, species-rich calcareous grassland vegetation is present on the cliff tops. The instability and maritime influence has altered the chalk grassland vegetation to include maritime species such as yellow horned-poppy *Glaucium flavum*, rock samphire *Crithmum maritimum*, wild cabbage *Brassica oleracea*, and buck's-horn plantain *Plantago coronopus*, together with calcareous grassland species such as common restharrow *Ononis repens*, wild carrot *Daucus carota*, carline thistle *Carlina vulgaris* and lesser hawkbit *Leontodon saxatilis*. This site represents an uncommon transition from chalk grassland species to sea cliff vegetation, which can include the Annex II species Early gentian *Gentianella anglica.* This site comprises tracts of semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) together with areas of dry heath (qualifying feature: European dry heath) belonging to NVC type H2 *Calluna vulgaris – Ulex minor* heath. The dry heath supports small breeding populations of Dartford warbler *Sylvia undata* and a wide range of invertebrates and plants. There are also some stands of the rare chalk heath (not defined by the NVC), with features intermediate between CG2 *Festuca ovina – Avenula pratensis* grassland and *Calluna – Ulex* heath. Heathland on deep gravel overlying chalk is an unusual biological feature in the UK.
Qualifying features for which the site is designated:	
Annex I Habitat Primary feature: Vegetated sea cliffs of the Atlantic and Baltic coasts, European dry heaths, semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*). Secondary feature: None ***Annex II Species*** Primary features: Early gentian *Gentianella anglica* Secondary features: None	
Conservation objectives:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: Wight-Barfleur cSAC	
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: None ***Annex II Species*** Primary features: None Secondary features: None	
Draft conservation objectives:	
Subject to natural change, restore the reefs to favourable condition, such that: • The natural environmental quality is maintained • The natural environmental processes are maintained • The extent, physical structure, diversity, community structure and typical species representative of bedrock reef in the Central English Channel are restored.	

Site Name: River Axe SAC	
Location	Grid Ref: SY267961 (central point) 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: None
Secondary features: Sea lamprey *Petromyzon marinus,* brook lamprey *Lampetra planeri,* bullhead *Cottus gobio*

Conservation objectives:

Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.

Subject to natural change, to maintain or restore:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- The populations of qualifying species;
- The distribution of qualifying species within the site.

Site Name: River Avon SAC	
Location	Grid Ref: SU124339 (central point) 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 20km 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:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

Site Name: River Itchen SAC	
Location	Grid Ref: SU467174 (central point) 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:	
Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features. Subject to natural change, to maintain or restore: • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species; • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely; • The populations of qualifying species; • The distribution of qualifying species within the site.	

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