Habitats Regulations Assessment

for

Leiston Neighbourhood Plan 2015-2029

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for

Leiston Neighbourhood Plan 2015-2029

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Non-technical summary

The Landscape Partnership was commissioned by Leiston Town Council to undertake a Habitats Regulations Assessment for their draft Neighbourhood Plan, covering the Parish of Leiston-cum-Sizewell.

The objectives of the study were to identify any European sites within the local area along with their qualifying features and to determine if they would be directly or indirectly affected by the policies proposed in the Neighbourhood Plan, either as a standalone document or in-combination with any other relevant land-use plans. Overall, the aim was to determine whether the policies of Leiston Neighbourhood Plan would have a likely significant effect upon the integrity of any European site.

The Habitats Regulations Assessment was drafted by Annie Porter MCIEEM BSc in Spring 2015, and updated in January 2016 by Nick Sibbett MCIEEM CEnv. The document was checked by Dr Jo Parmenter MCIEEM CEnv.

Four European sites were identified as being (partly) within Leiston Parish: Minsmere-Walberswick Heaths and Marshes SAC, Minsmere-Walberswick SPA/Ramsar, Sandlings SPA and Outer Thames Estuary SPA. Four European sites were identified within 10km of Leiston Parish boundary: Alde-Ore Estuary SPA/Ramsar, Alde-Ore and Butley Estuaries SAC, Orfordness-Shingle Street SAC and Dew's Ponds SAC.

The following policies with Leiston Neighbourhood Plan were deemed to have potential to cause adverse impact upon European site/s: PL1 Leiston town physical limits boundary; H1 Housing Strategy; SA1 Land at Highbury Cottages; SA2 Land at Red House Lane; SA3 Land to the rear of St Margaret's Crescent; SA4 Land at Abbey Road; ACC1 Land off King George's Avenue.

The assessment concluded that as a standalone document, Leiston Neighbourhood Plan could be likely to have a significant effect upon nearby European sites. However, Leiston Neighbourhood Plan would only be one part of the planning policy that will guide development within Leiston. When assessed in-combination with Suffolk Coastal District Council's Core Strategy and Development Management Polices Development Plan Document and its accompanying Appropriate Assessment, it is concluded that there will be no likely significant effect upon any European sites. That Appropriate Assessment required mitigation for recreational impacts on European sites; a project to implement that mitigation is in progress to provide confidence that it will occur. Suffolk Coastal District Council's Leisure Strategy 2014 – 2024 also acts in combination to provide alternative recreational facilities and further avoid impacts.

The Outer Thames Estuary SPA was not included in the Appropriate Assessment for the Suffolk Coastal District Council's Core Strategy and Development Management Polices Development Plan Document. This European site was assessed separately, with the conclusion that on the basis of the information considered for this assessment, there would not be a likely significant effect upon the integrity of the SPA.

Overall, the conclusion of this Habitats Regulations Assessment is that when considered in-combination with SCDC Core Strategy and Development Management Polices Development Plan Document, the Leiston Neighbourhood Plan would be unlikely to have a significant effect upon the integrity of any European site.

1 Introduction

1.1 Plan to be assessed

1.1.1 In October 2013 Suffolk Coastal District Council designated Leiston-cum-Sizewell Parish (hereafter known as 'Leiston' in this document) a Neighbourhood Area. Consequently, Leiston-cum-Sizewell Town Council prepared a Neighbourhood Plan which, along with the 2013 Suffolk Coastal District Local Plan, contains policies that will guide development within the Parish. The Neighbourhood Plan has been prepared by the Town Council in consultation with the community and will cover the period 2015 to 2029.

1.1.2 This document assesses Leiston Neighbourhood Plan 2015-2029 (dated January 2016), in line with the Habitats Regulations 2010, to ascertain whether the policies within that Plan and the guidance that it provides, are likely to have an adverse effect upon the integrity of any European sites.

1.2 What are the Habitats Regulations?

1.2.1 The Conservation of Habitats and Species Regulations 2010 are often abbreviated to the 'Habitats Regulations'. The Habitats Regulations interpret the European Birds Directive and Habitats Directive into English and Welsh law. For clarity, the following paragraphs consider the case in England only, with Natural England given as the appropriate nature conservation body. In Wales, the Countryside Council for Wales is the appropriate nature conservation body.

1.2.2 Special Protection Areas and Special Areas of Conservation are defined in the regulations as a 'European site'. The Regulations regulate the management of land within European sites, requiring land managers to have the consent of Natural England before carrying out management. Byelaws may also be made to prevent damaging activities and if necessary land can be compulsorily purchased to achieve satisfactory management.

1.2.3 The Regulations define competent authorities as public bodies or statutory undertakers. Competent authorities are required to make an appropriate assessment of any plan or project they intend to permit or carry out, if the plan or project is likely to have a significant effect upon a European site. The permission may only be given if the plan or project is ascertained to have no adverse effect upon the integrity of the European site. If the competent authority wishes to permit a plan or project despite a negative assessment, imperative reasons of over-riding public interest must be demonstrated, and there should be no alternatives to the scheme. The permissions process would involve the Secretary of State and the option of consulting the European Commission. In practice, there will be very few cases where a plan or project is permitted despite a negative assessment. This means that a planning application or indeed, a plan such as Leiston Neighbourhood Plan, has to be assessed and the assessment must either decide that it is likely to have no significant effect on a European site or ascertain that there is no adverse effect upon the integrity of the European site.

1.3 Habitats Regulations Assessment process

1.3.1 A Habitats Regulations Assessment is a step-by-step process which is undertaken in order to determine whether a project or plan will have a likely significant effect (LSE) upon a European site. Before a competent authority can authorise a proposal, they must carry out an Appropriate Assessment of a plan or project in line with procedure detailed in the Habitats Regulations. The whole procedure is called a Habitats Regulations Assessment, with the Appropriate Assessment being part of only one of four stages necessary to complete an HRA. The results of the HRA are intended to influence the decision of the competent authority when considering whether or not to authorise a proposal.

1.3.2 *Stage One of the HRA is 'Screening'.* Plans or projects will be investigated for their potential to have a likely significant effect upon a European site. Proposals that are found not likely to have a significant effect upon a European site will be 'screened out' at this stage and no further investigation will be required.

1.3.3 *Stage Two of the HRA is the 'Appropriate Assessment and the Integrity Test'.* The Competent Authority must undertake an Appropriate Assessment which seeks to provide an objective and scientific assessment of how the proposed project may affect the qualifying features and conservation strategies of a European site. The Competent Authority may undertake their own Appropriate Assessment using information provided by the project proposer. However, the Competent Authority must also consult the Statutory Nature Conservation Body in order to obtain their views on how the proposed activity may affect the integrity of the European sites' qualifying features and conservation objectives, and it is possible that they may adopt this Appropriate Assessment for their own purposes.

1.3.4 The UK Government accepts the definition for the 'integrity' of a site as *'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 the site is (or will be) designated.'*. Other factors may also be used to describe the 'integrity' of a site. The Competent Authority must conclude, using scientific evidence and a precautionary approach, that there will be no harm to the integrity of a European site, prior to authorising the proposed activity. Information provided in the Appropriate Assessment will be used when considering the Integrity test.

1.3.5 *Stage Three of the HRA is 'Alternative solutions'.* If the Competent Authority is unable to determine that the proposed activity would not have an adverse impact upon the integrity of a European site, it may refuse to authorise the proposed activity or consider 'alternative solutions' if there are imperative reasons of overriding public interest (IROPI). If the proposed activity cannot ensure that the integrity of a site is maintained, it is likely that the proposal will be refused or withdrawn, but if changes to the proposal can be made which would rectify this a fresh application could be submitted.

1.3.6 *Stage Four of the HRA is 'Imperative reasons of overriding public interest and compensatory measures'.* If the Competent Authority determines that there are imperative reasons of overriding public interest that outweigh the potential adverse impacts upon the integrity of the site, they may decide to consent the proposed activity. In this case, the Competent Authority must notify the Secretary of State (or equivalent if not in England) at least 21 days before authorisation so that the Government can notify them with their agreement to consent, or otherwise.

1.4 Why is Appropriate Assessment required?

1.4.1 The appropriate assessment process is required under the Conservation of Habitats and Species Regulations 2010. Regulation 102 states that

> (1) Where a land use plan—
>
> (a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and
>
> (b) is not directly connected with or necessary to the management of the site,
>
> the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site's conservation objectives.
>
> (2) The plan-making authority shall for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specify.
>
> (3) They must also, if they consider it appropriate, take the opinion of the general public, and if they do so, they must take such steps for that purpose as they consider appropriate.
>
> (4) In the light of the conclusions of the assessment, and subject to regulation 103 (considerations of overriding public interest), the plan-making authority or, in the case of a regional spatial strategy, the Secretary of State must give effect to the land use plan

only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(5) A plan-making authority must provide such information as the appropriate authority may reasonably require for the purposes of the discharge of the obligations of the appropriate authority under this chapter.

(6) This regulation does not apply in relation to a site which is—

(a) a European site by reason of regulation 8(1)(c); or

(b) a European offshore marine site by reason of regulation 15(c) of the 2007 Regulations (site protected in accordance with Article 5(4) of the Habitats Directive

1.4.2 The plan-making authority, as defined under the Regulations, is Suffolk Coastal District Council and the appropriate nature conservation body is Natural England.

1.4.3 The Appropriate Assessment in this report is carried out on behalf of Suffolk Coastal District Council to allow them to decide whether to give effect to the plan under Regulation 102.

1.5 European sites

1.5.1 European sites (also known as Natura 2000/N2K sites) are sites that have been classified or designated by Defra/Welsh Ministers or Natural England/Natural Resources Wales, as Special Protection Areas (SPA) for those sites where birds are the special interest feature, and Special Areas of Conservation (SAC) where the habitats or species (other than birds) are the reason for designation.

1.5.2 Wetlands of International Importance, designated under the Ramsar Convention, Ramsar sites, are not European sites. There may often be considerable overlap between the special interest features and physical boundaries of Ramsar sites, with European sites. However, for the purposes of planning and development, Government policy, through the NPPF, states that Ramsar sites should be treated equally/in the same way as European sites. The same applies for sites under consideration for designation including potential Special Protection Area (pSPA), Site of Community Importance (SCI), Candidate Special Area of Conservation (cSAC) and proposed Ramsar sites. In summary, although Appropriate Assessment only legally applies to European sites, National Planning Policy provides further obligations to ensure that all those sites previously mentioned are subject to assessment. Therefore, for the purposes of this report, the term 'European site(s)' refers to all sites under assessment.

1.5.3 As the interest features of the Ramsar sites are usually very similar to the interest features of the SPA and / or SAC designations, both geographically and ecologically, the assessment below, for clarity does not always repeat Ramsar site names. The assessment does however consider Ramsar sites fully, and if an assessment for a Ramsar site was found to differ from that for the respective SPA / SAC, this would be clearly identified.

1.5.4 European Marine Site (EMS) is a term that is often used for a SPA or SAC that includes marine components (i.e. land/habitats up to 12 nautical miles out to sea and below the Mean High Water Mark). A European Marine Site does not have a statutory designation of its own but is designated for the same reasons as the relevant SPA or SAC, and because of this they are not always listed as a site in their own right, to save duplication. For the purpose of this document, a EMS is referred to as an Inshore SPA (or SAC) with Marine Components and it will be made clear if an SPA/SAC has marine components.

1.6 Iteration and consultation

1.6.1 In May 2015, a draft HRA of the Leiston Neighbourhood Plan draft was assessed. This was discussed by Suffolk Coastal District Council planning officers, Natural England and the Leiston Neighbourhood Plan team in August 2015. The discussions led to updates to this Habitats Regulations Assessment.

2 European sites potentially affected

2.1 European sites within Leiston Neighbourhood Plan area

2.1.1 A search using Natural England's Interactive 'Magic Map'[1] revealed that a number of European sites lie within or partially within Leiston Parish; the area served by the Leiston Neighbourhood Plan. Each European site is listed below with a brief description of its qualifying features. The location of the European sites is shown in the Magic Map screenshot in Appendix 1. More detailed information relating to each European site, including their component SSSI's, their Conservation Objectives and their Site Improvement Plans and any additional information, is given in Appendix 2.

Minsmere – Walberswick SPA/Ramsar/Inshore SPA with Marine Components

2.1.2 The heathland, grazing marsh and reedbed habitats of this SPA are designated for supporting a number of rare or vulnerable (Article 4.1) Annex I bird species during the breeding season including, Bittern *Botaurus stellaris*, Nightjar *Caprimulgus europaeus*, Marsh Harrier *Circus aeruginosus*, Avocet *Recurvirostra avosetta*, Little Tern *Sterna albifrons* and over the winter, Hen Harrier *Circus cyaneus*. In addition the SPA is designated for supporting regularly occurring migratory (Article 4.2) species including Northern Shoveler *Anas clypeata*, Eurasian Teal *Anas crecca and* Gadwall *Anas strepera* during the summer, and Northern shoveler, Gadwall and Greater White-fronted Goose *Anser albifrons albifrons* over the winter.

Minsmere to Walberswick Heaths and Marshes SAC/Inshore SAC with Marine Components

2.1.3 There are two Annex I habitats that are qualifying features for this site: Annual vegetation of drift lines and, European dry heath. One of two areas of Annual vegetation of drift lines habitat on the east coast of England, this site is an extensive example of its type, supporting typical species such as sandwort *Honckenya peploides* and Sea Beet *Beta vulgaris* ssp. *maritima*.

2.1.4 Lowland European dry heath habitat covers a large part of this site and is at the extreme eastern-most point of its range in the UK. On this site, the heath is typical of NVC type H8 *Calluna vulgaris – Ulex gallii* which is more commonly associated with western England. This type of heath is dominated by Heather *Calluna vulgaris*, Western Gorse *Ulex gallii* and Bell Heather *Erica cinerea*.

2.1.5 Perennial vegetation of stony banks is an Annex I habitat that is present on site as a qualifying feature but is not a primary reason for its designation as a SAC. None the less, this habitat should be considered using the same assessment process as for those habitats which *are* primary reasons for selection.

Sandlings SPA

2.1.6 The Sandlings is a series of SSSI heathlands with habitats including acid grassland and heather-dominated plant communities. Lack of management in past years, along with the conversion to commercial conifer plantations and arable cultivation has resulted in remnants of heath that have been threatened with successional changes and bracken invasion. Recent initiatives are working towards restoration of the heathland habitats.

2.1.7 The Sandlings qualifies as an SPA under Article 4.1 of the Birds Directive due to the presence of Woodlark *Lullula arborea* and Nightjar *Caprimulgus europaeus* during the breeding season; both are species of European importance and listed in Annex 1 of the Directive. The Sandlings supports at least 3.2% of the GB breeding population of Nightjar and at least 10.3% of the GB breeding population of Woodlark.

Outer Thames Estuary Inshore SPA with Marine Components

2.1.8 This SPA is entirely marine and is designated because its habitats support 38% of the Great British population of over-wintering Red-throated Diver *Gavia stellata*, a qualifying species under Article 4.1 of the Birds Directive. The Outer Thames Estuary SPA covers vast areas of marine habitat

[1] http://magic.defra.gov.uk/home.htm

off the east coast between Caistor-on-Sea, Norfolk in the north, down to Margate, Kent in the south. The habitats covered by the SPA include marine areas and sea inlets where Red-throated Diver is particularly susceptible to noise and visual disturbance e.g. from wind farms and coastal recreation activities. Threats from effluent discharge, oil spillages and entanglement/drowning in fishing nets are significant.

2.2 European sites outside Leiston Neighbourhood Plan area

2.2.1 A further search using 'Magic Map' revealed that a number of European sites lie within or partially 10km of Leiston Parish boundary, but not within the Parish itself. These sites are listed below together with a short description of their qualifying features. More detailed information for each European site within 10km of Leiston Parish boundary is given in Appendix 2.

Alde – Ore Estuary SPA/Ramsar/Inshore SPA with Marine Components

2.2.2 Alde-Ore Estuary SPA is an estuary with extensive areas of saltmarsh and shingle habitats, which support a large number of wintering and breeding bird species.

2.2.3 The Ramsar site, with the same boundaries as the SPA, comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. There are a variety of habitats including, intertidal mudflats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and grazing marsh. The Orfordness/Shingle Street landform is unique within Britain in combining a shingle spit with a cuspate foreland. The site supports nationally-scarce plants, British Red Data Book invertebrates, and notable assemblages of breeding and wintering wetland birds.

Dews Ponds SAC

2.2.4 This site is designated for supporting populations of Great Crested Newt *Triturus cristatus*. The site comprises a network of 12 ponds (old field ponds and newly created wildlife ponds) in an area of former, largely arable land. Much of the arable land has been converted to grassland of varying types with associated ditches and hedgerows.

Alde – Ore & Butley Estuaries SAC/Inshore SAC with Marine Components

This estuary, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed.

Orfordness – Shingle Street SAC/Inshore SAC with Marine Components

2.2.5 Orfordness – Shingle Street SAC contains coastal lagoons, annual vegetation of drift lines and perennial vegetation of stony banks.

2.2.6 The lagoons at this site have developed in the shingle bank adjacent to the shore at the mouth of the Ore estuary. The salinity of the lagoons is maintained by percolation through the shingle, although at high tides sea water can overtop the shingle bank. The fauna of these lagoons includes typical lagoon species, such as the cockle *Cerastoderma glaucum*, the ostracod *Cyprideis torosa* and the gastropods *Littorina saxatilis tenebrosa* and *Hydrobia ventrosa.* The nationally rare starlet sea anemone *Nematostella vectensis* is also found at the site.

2.2.7 Orfordness is an extensive shingle spit some 15 km in length and is one of two sites representing Annual vegetation of drift lines on the east coast of England. The drift-line community is widespread on the site and comprises sea beet *Beta vulgaris* ssp. *maritima* and orache *Atriplex* spp. in a strip 2-5 m wide.

2.2.8 The spit supports some of the largest and most natural sequences in the UK of shingle vegetation affected by salt spray. The southern end of the spit has a particularly fine series of undisturbed ridges, with zonation of communities determined by the ridge pattern. Pioneer communities with sea pea *Lathyrus japonicus* and false oat-grass *Arrhenatherum elatius* grassland occur. Locally these are nutrient-enriched by the presence of a gull colony; elsewhere they support rich lichen communities. The northern part of Orfordness has suffered considerable damage from defence-related activities but a restoration programme for the shingle vegetation is underway.

2.3 Other relevant Plans or Projects potentially affecting these sites

2.3.1 In addition to the potential impact that Leiston Neighbourhood Plan may have upon the nearby European sites described above, other plans/documents/guidance may also impact upon these sites, the most relevant of which are listed below and these may need to be considered alongside Leiston Neighbourhood Plan.

- Suffolk Coastal District Council Local Plan – Core Strategy and Development Management Policies[2]
- Waveney District Council Core Strategy and Development Management Policies
- A project to implement mitigation for recreational impacts of the Suffolk Coastal District and Ipswich Borough Local Plans
- Suffolk Coastal District Council's Leisure Strategy 2014 – 2024

2.3.2 Other actions may also cause impact to European sites, such as management practices by landowners (with consent from Natural England), use by the general public (recreational pressure), existing developments, future (planned) developments and unplanned events, whether accidental, intentional or natural e.g. fires, storms, surges/flooding.

[2] Suffolk Coastal District Council *Suffolk Coastal District Council Local Plan – Core Strategy and Development Management Policies* 5th July 2013

3 Likely significant effects of Leiston Neighbourhood Plan Policies on European sites

3.1 Likely significant effects connected with the management of European sites

3.1.1 It is considered that the Leiston Neighbourhood Plan is not necessary for, or connected with, the nature conservation management of any European sites.

3.2 Criteria for the screening of individual policies

3.2.1 The screening of individual policies is a process to determine which, if any, of the individual policies requires individual assessment. For example, some of the proposed policies might each have a direct or indirect effect upon an international site, whilst other individual policies may have no effect. Criteria are set to determine which individual polices may have an effect. Effects from a combination of policies are also considered.

3.2.2 The criteria for determining if an individual policy, or a combination of policies, would have a likely significant effect, and require assessment, are based on the characteristics of the relevant European site and the objectives set by Natural England. The main factors to consider are

- Development on or close to the European site destroying part or all of the site, or changing the ecological functioning of the site (e.g. disrupting water flows or migration routes, or providing damaging levels of air pollution)
- Increased public recreation, causing disturbance to birds, damage to vegetation, increased littering / flytipping, or leading to management compromises (e.g. grazing being restricted).
- Reduction in water levels or flow, from increased water demand in the District requiring greater water abstraction
- Reduction of water quality, from increased discharges of sewage and surface water drainage, or from pollution incidents, either during, or after, construction

3.2.3 Development on or close to the European site is a location-dependent factor, but the other factors may affect a European site at some distance from development.

3.3 Screening of individual policies

3.3.1 The table in Appendix 3 lists each policy, with a brief explanation of the policy, and an assessment of whether the policy is likely to have a significant affect upon a European site.

3.3.2 In conclusion, the information in Appendix 3 shows that the following policies are likely to have a significant affect upon European sites

- PL1 – Leiston town physical limits boundary
- H1 – Housing strategy
- SA1 – Land at Highbury Cottages
- SA2 – Land at Red House Lane
- SA3 – Land to the rear of St Margaret’s Crescent
- SA4 – Land at Abbey Road
- ACC1 – Land off King George’s Avenue

3.3.3 These policies are all concerned with residential or tourism development within Leiston parish. None of the areas of proposed development directly affect a European site; they are not within or adjacent to a European site, nor do they compromise the management techniques being used at any European site.

3.3.4 However, the development of additional housing within Leiston is likely to increase the population of Leiston and may therefore lead to increased visitor pressure upon nearby European sites. There are four European sites that fall (partly) within Leiston parish and a further four sites that are outside of the parish but within close proximity. Residents of Leiston may travel to nearby European sites for recreation, including walking, bird watching, dog walking etc. These activities, and others, may have negative impacts upon the qualifying features of European sites.

3.3.5 Policy TM1 *Dedicated access for cyclists and pedestrians* proposes to provide/improve cycle paths in various locations, within the immediate vicinity of Leiston town centre, including the closure of a section of Valley Road to through traffic. Measures such as these which would improve the cycle/pedestrian access out of the busy areas of town and into the countryside may encourage more people to use the wider countryside and specifically the European sites for recreation and may therefore increase visitor pressure upon these sites.

3.3.6 The table in Appendix 3 includes the following policies which demonstrate that the parish is encouraging the development of recreation facilities in allocated places within the physical limits boundary. This is a defined area within the parish that incorporates the town centre and main residential and employment areas of Leiston. By improving existing recreation facilities within the town and providing new recreation opportunities, people seeking nearby recreational activities may be drawn to these rather than local European sites, thus reducing visitor pressure upon their vulnerable features.

- IN2 – Provision of a new community centre and facilities, Victory Road
- IN3 – Provision of community facilities at the Recreation Ground, Victory Road
- LG2 – Greens and verges
- TC1 – Leiston town centre
- TC2 – Redevelopment of land at High Street, Leiston town centre

3.3.7 Policy H4: *Low carbon residential development* does not directly affect European sites. However, it encourages carbon neutral developments and energy saving/CO_2 reduction, which will have general environmental benefits and would indirectly improve atmospheric conditions for nearby European sites.

3.4 Screening of the Plan as a whole

3.4.1 Policies in Leiston Neighbourhood Plan may have a slight cumulative effect upon European sites. This is because there are policies referring to development such as H1 that promote residential development within the town, thus potentially increasing the population size of Leiston. Policy TM1 supports improvements to cyclist/pedestrian routes out of the busy parts of town, thus encouraging people to leave the town for recreational activities, and potentially heading towards European sites. In combination, these Policies have a potentially but probably only marginally, greater significant affect upon European sites, than when considered in isolation. This is because the policies both support/encourage an increase in population size along with recreation outside of the town centre i.e. more people and more opportunity for recreational pursuits in the countryside (potentially European sites).

3.5 Screening of the Plan in combination with other plans

Suffolk Coastal District Core Strategy & Development Management Policies

3.5.1 Suffolk Coastal District Core Strategy and Development Management Policies was adopted in July 2013. This document sets out the strategic vision for the district and its communities. The Core Strategy document promotes the provision of at least 7,900 new homes across the District over the period 2010-2027. The focus for growth will be on the major centres e.g. east of Ipswich and the Felixstowe peninsula. Within market towns e.g. Leiston, new growth will be at a sustainable level that is appropriate to the function, character and environmental capacity of the town: 1,520 new homes (19% of 7,900) will be distributed across 5 market towns (inc. Leiston) within the District. Policy SP24 within the Suffolk Coastal District Council (SCDC) Core Strategy and Development Management Policies Development Plan Document[3], is specific to Leiston:

The strategy for Leiston is to consolidate and build on the role of the town not only in relation to its own residents and rural hinterland, but also in recognition of the wider role it plays in the provision of leisure, education and employment facilities for other neighbouring market towns. At the same time, to recognise and work with the unique combination of circumstances that apply to the town, given the presence of the Sizewell nuclear facility. In the absence of a final decision with regard to new nuclear provision at Sizewell, the strategy for the town is to:-

(a) identify land for new housing provision, with priority being given to affordable housing to meet local needs;

(b) work within the nuclear safeguarding limits to maintain the vibrancy of the town, with efforts being concentrated on retaining and improving the quality and range of facilities available to local residents and an improved physical environment;

(c) retain, strengthen and expand its employment base, despite the detrimental effects of decommissioning Sizewell Station 'A';

(d) achieve social and community benefits from future investment at Sizewell;

(e) accept and embrace an incremental improvement in its tourism offer, building on its location and its industrial heritage; and

(f) protect and enhance the setting to the town.

The unique circumstances of nuclear safeguarding will influence the future expansion of the town. Opportunities exist for development within the physical limits of the town on previously developed land and also in part on greenfield sites on the edge of the town.

Given the availability of facilities such as a High School and leisure centre, which serve a wide rural catchment area, the Council will work with public transport providers to maintain and improve accessibility.

In the event that Sizewell is agreed by Government, the approach to future development is set out in Policy SP13.

3.5.2 Following a review of SCDC Core Strategy and Development Management Policies Development Plan Document, by the Secretary of State, published on 6th June 2013, the Core Strategy was found to be sound subject to a number of Main Modifications. Main Modification 25 – Leiston/Sizewell proposes that the scale of new housing in this Parish should be re-assessed within the 2015 Core Strategy review and this could result in an increase in housing. However, this review will require its own Appropriate Assessment. In conclusion, Main Modification 25 would not have a likely significant effect upon European sites as the modification itself will not result in changes to housing numbers.

3.5.3 Section Six of the Appropriate Assessment[4] of the SCDC Core Strategy and Development Management Policies assesses each policy. Policy SP2 – Housing numbers is assessed in combination with other housing distribution policies, including SP24 – Leiston. The SCDC Core Strategy Appropriate Assessment concludes that due to an increase in human population from new housing in the District and therefore an increase in visitor numbers to European sites in the District, in the absence of mitigation it cannot be ascertained that there will not be a Likely Significant Effect upon the integrity of the following European sites within Leiston Neighbourhood Plan area; Sandlings SPA, Minsmere-Walberswick SPA, Minsmere-Walberswick Heaths and Marshes SAC, and outside of Leiston Neighbourhood Plan but within 10km; Alde-Ore Estuary SPA, Alde-Ore and Butley SAC and Orfordness-Shingle Street SAC. The Appropriate Assessment of the

[3] Suffolk Coastal District Council *Core Strategy & Development Management Policies Development Plan Document* July 2013 http://www.suffolkcoastal.gov.uk/assets/Documents/LDF/SuffolkCoastalDistrictLocalPlanJuly2013.pdf

[4] The Landscape Partnership *Appropriate Assessment for Suffolk Coastal District Council Core Strategy and Development Management Policies* November 2011 http://www.suffolkcoastal.gov.uk/assets/Documents/LDF/D2b/AAReportNov2011.pdf

SCDC Core Strategy concludes that there will be little difference, at an insignificant level, in visitor pressure upon Dews Ponds SAC. The Outer Thames Estuary Offshore SPA is not considered in the SCDC Core Strategy Appropriate Assessment and so potential impacts upon this site are discussed in Section 3.6 below.

3.5.4 In order to ensure that there are no likely significant effects upon the aforementioned European sites, resulting from housing policy proposals in the SCDC Core Strategy document, the Appropriate Assessment describes mitigation measures that will be put in place. The principles of mitigation are 'to reduce demand for visits to European sites at risk from impact and to manage existing sites with a specific high risk to re-distribute visitors from sensitive areas'[5]. To summarise the mitigation objectives are

- To provide new locations for countryside recreation, especially dog walking, for residents or existing and proposed housing, as a preferred alternative to European sites
- To improve visitor infrastructure and management, including wardening, on existing European sites to reduce the impact of increased visitors
- To quantify reductions in visitor harm achieved by mitigation projects

3.5.5 The SCDC Core Strategy Appropriate Assessment explains that a visitor management plan which guides a co-ordinated approach to visitor management throughout the Suffolk Coast and Heaths AONB designated sites, which includes the Sandlings SPA, is required. Visitor management would include on-site wardening and other measures, which are reproduced below:

- identifying key sites where visitor pressure is currently, or close to, causing harm
- identifying the origin of visitors to those identified key sites
- writing and implementing a visitor management plan for key sites without such a plan, or revising existing plans, to reduce visitor impact. Reduction in visitor impact might mean changes to visitor infrastructure (e.g. car parks, paths), new or revised interpretation, wardening, provision of alternative recreation opportunities in less sensitive locations, etc, bylaws, identification of parts of sites where recreation will not be encouraged, etc.
- a monitoring programme, to determine visitor numbers and allow the impact of the visitor numbers to be identified, throughout time. The impact of visitor numbers may be difficult to determine and would rely on specialist studies as well as Natural England's programme of SSSI Condition assessment.

3.5.6 Capital works programmes are likely to be required as part of a visitor management strategy. It is probable that the funding required to implement these mitigation measures would need to come, at least in part, from new housing provision. The implementing body for a visitor management programme to cover the Suffolk Coast and Heaths AONB is unclear but is likely to include Suffolk County Council, Suffolk Coastal District Council Natural England, Suffolk Coast and Heaths Unit and the Suffolk Sandlings Living Landscape Project.

3.5.7 Section 5 in the SCDC Core Strategy Appropriate Assessment describes methods of assessing European site visitor increases from an increased human population. The methodology breaks visitors into three type categories: tourist, day trips or local greenspace users. Data from various visitor surveys and studies is then used to predict changes in visitors to European sites, based on changes to visitor numbers for each visitor category. This information is further used to predict how changes might have an adverse impact upon the integrity of European sites and what those impacts might be. Measures for mitigating adverse impacts upon European sites within the District, resulting from an increased population, are given in Section 7.

[5] The Landscape Partnership *Appropriate Assessment for Suffolk Coastal District Council Core Strategy and Development Management Policies* November 2011 http://www.suffolkcoastal.gov.uk/assets/Documents/LDF/D2b/AAReportNov2011.pdf

3.5.8 Section 5 also concludes that pressure upon the District's water resources and water quality resulting from an increased human population is not likely to have an adverse impact upon European sites.

3.5.9 The effects of boating activity upon European sites in Suffolk District is discussed in Section 5 of the SCDC Core Strategy Appropriate Assessment. It is concluded that there would be no likely significant effect upon European sites resulting from policies within the Core Strategy. New boatyard development is not encouraged through planning policy and it is known that disturbance from boating is minor and less important than disturbance from land-based recreational activities, although users will travel a greater distance to participate in water-based activities than they would for land-based activities.

Suffolk Coastal District Site Allocations & Area Specific Policies

3.5.10 Suffolk Coastal District Council has published a Preferred Options consultation for its Site Allocations & Area Specific Policies Local Plan document. Its consultation took place between 19 October and 30 November 2015. This will allocate land for development and contain policies for specific sites and areas. Leiston is not included within this document because site allocations are within the Liston Neighbourhood Plan. Suffolk Coastal District Council's Site Allocations & Area Specific Policies Local Plan document is consistent with its Core Strategy, and so adds no further in-combination effects to the Leiston Neighbourhood Plan than could derive from the Core Strategy.

Waveney District Council Core Strategy Development Plan Document

3.5.11 This document sets out the core strategic spatial planning policies that will guide development in Waveney District until 2021 and beyond. A Habitats Regulations Assessment of Waveney Core Strategy 2009[6] concluded that the policies and strategies within were not likely to have a significant effect upon European sites in or close to the District.

National Planning Policy Framework

3.5.12 The Suffolk Coastal District Core Strategy 2013 has been drawn up in accordance with guidance provided by the National Planning Policy Framework, and this provides the strategic context for Leiston Neighbourhood Plan.

3.6 Project to implement mitigation for Local Plan potential recreational impacts upon European sites

3.6.1 On 17th December 2015, Suffolk Coastal District Council planning staff provided information about the project to implement mitigation for Local Plan potential recreational impacts upon European sites.

> *Work is underway as a joint Natura 2000 sites, monitoring and mitigation strategy to set out in more detail how the mitigation measures required in association with the identified housing requirements for the local authorities will be carried out.*
>
> *Early indications from Natural England are that this monitoring and mitigation should be looked at an SPA rather than local authority boundary*

3.6.2 This provides confidence that Core Strategy potential impacts are being addressed, and will include in-combination effects with the Leiston Neighbourhood Plan.

3.7 Suffolk Coastal District Council's Leisure Strategy 2014 – 2024

3.7.1 Suffolk Coastal District Council's Leisure Strategy 2014 – 2024 will increase access and availability of leisure and recreation opportunities to the wider community, enhancing and communicating the current and future offer to meet the wants and needs of local communities over the next ten years. This strategy suggests that opportunities may come forward outside the scope of this Neighbourhood Plan for increased leisure and recreation in ways which would not impact upon

[6] Waveney District Council *Core Strategy Development Plan Document* 2009 http://www.waveney.gov.uk/site/scripts/download_info.php?fileID=94

the nature conservation interest of designated sites in and around Leiston. Although the Leisure Strategy is not a Local Plan document, or a statutory document, it remains relevant as a mechanism for further mitigating recreational impacts of the Leiston Neighbourhood Plan.

3.8 Screening of the Plan for likely significant effects upon Outer Thames Estuary SPA

3.8.1 The Outer Thames Estuary SPA is not considered within the SCDC Core Strategy and Development Management Policies document, therefore the impact of the policies within Leiston Neighbourhood Plan upon this Special Protection Area need to be assessed separately from the other European sites relevant to this Appropriate Assessment, which are dealt with in the SCDC Core Strategy.

3.8.2 The Outer Thames Estuary is an SPA that is entirely marine and is designated for supporting over-wintering populations of Red-throated Diver *Gavia stellata*. After breeding this species migrates to sheltered coasts and tends to stay within 12 miles of the coast. This makes it susceptible to disturbance from activities such as recreational boating and from construction and running of inshore-wind farms and construction of coastal development, as well as pollution from oil spillages and entanglement in fishing nets. The Outer Thames Estuary SPA is divided into three main parts, one of which falls within our study area; the section that abuts the Norfolk/Suffolk coastline from Caister-on-Sea, Norfolk to Woodbridge, Suffolk, lies directly adjacent to the Leiston Parish eastern boundary.

3.8.3 Appendix E of the Draft Conservation Objectives[7] document for the Outer Thames Estuary SPA (reproduced in Appendix 1) summarises operations which may cause deterioration or disturbance to Red-throated Diver populations. Damaging operations are categorised as:

- *Physical loss of supporting habitats* e.g. offshore development, harvesting, disposal of dredging spoil
- *Physical damage to habitats* e.g. dredging, anchoring, boating, siltation through run-off
- *Non-physical disturbance* e.g. noise from boating activities, visual from recreation activities
- *Toxic contamination* e.g. pesticides, PCBs, heavy metals, radionuclides
- *Non-toxic contamination* e.g. nutrient loading from agri run-off and outfalls, organic loading from mariculture, thermal changes from power stations, changes in turbidity from dredging, changes in salinity from water abstraction
- *Biological disturbance* e.g. introduction of non-native species, translocations, selective extraction of species through fishing, non-selective extraction of species through entanglement or wind-turbine strike, introduction of microbial pathogens

3.8.4 The policies within Leiston Neighbourhood Plan do not include offshore development or agricultural/mariculture practices which would cause loss or damage or contamination of habitats used by Red-throated Diver. Development policies within Leiston Neighbourhood Plan will be focussed upon Leiston town physical limits boundary which is centred upon the town centre. Although the development policies will result in an increase to the human population of Leiston, and there may be a greater use of the coast adjacent to the Outer Thames Estuary SPA for recreational activities, it is not anticipated that these activities would disturb Red-throated Diver, which does not typically use waters close to the shore. In addition, the SPA boundary follows the edge of the coast which indicates that these areas remain SPA quality despite the use of this area for recreation purposes.

[7] JNCC/Natural England *Outer Thames Estuary Special Protection Area: Draft advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 (as amended) and Regulation 18 of The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended)* Version 3.7 March 2013

3.8.5 In conclusion it is considered that the policies within Leiston Neighbourhood Plan do not pose a threat to the integrity of the Outer Thames Estuary SPA; there will be no likely significant effects upon this European site.

4 Conclusions

4.1 Conclusion of screening for likely significant effects of the Plan alone

4.1.1 In conclusion it is considered that the Leiston Neighbourhood Plan as a standalone document is likely to have a significant effect upon European sites, particularly with those policies promoting housing development and potentially by encouraging improvements to cycle and pedestrian routes that may lead towards European sites. A slight cumulative increase in recreational pressure upon European sites might result. However, the Leiston Neighbourhood Plan is set within the context of other plans, particularly the Suffolk Coastal District Local Plan with which the Neighbourhood Plan must be consistent. It is therefore relevant to consider the likely significant effect of the Neighbourhood Plan in combination with the SCDC Local Plan, because the mitigation associated with the SCDC Plan (see below) encompasses the Neighbourhood Plan too.

4.2 Conclusion of screening for likely significant effects of the Plan in-combination with other relevant plans

4.2.1 Leiston Neighbourhood Plan is intended as one part of the development plan for Leiston-cum-Sizewell Parish. The other part of the development plan is Suffolk Coastal District's Core Strategy 2013. Therefore, the strategy and policies of Leiston Neighbourhood Plan are entirely consistent with the adopted SCDC Core Strategy, which has its own Appropriate Assessment that addresses the potential impacts on European sites that might occur from increased visitor pressure, due to an increase in human population resulting from the development of new homes that are planned for the District.

4.2.2 Suffolk Coastal District's Core Strategy Appropriate Assessment provides in-depth methodology for mitigating the effects that increased visitors may have on European sites. The mitigation measures would be implemented through Policy SP17 – Green Space in the SCDC Core Strategy:

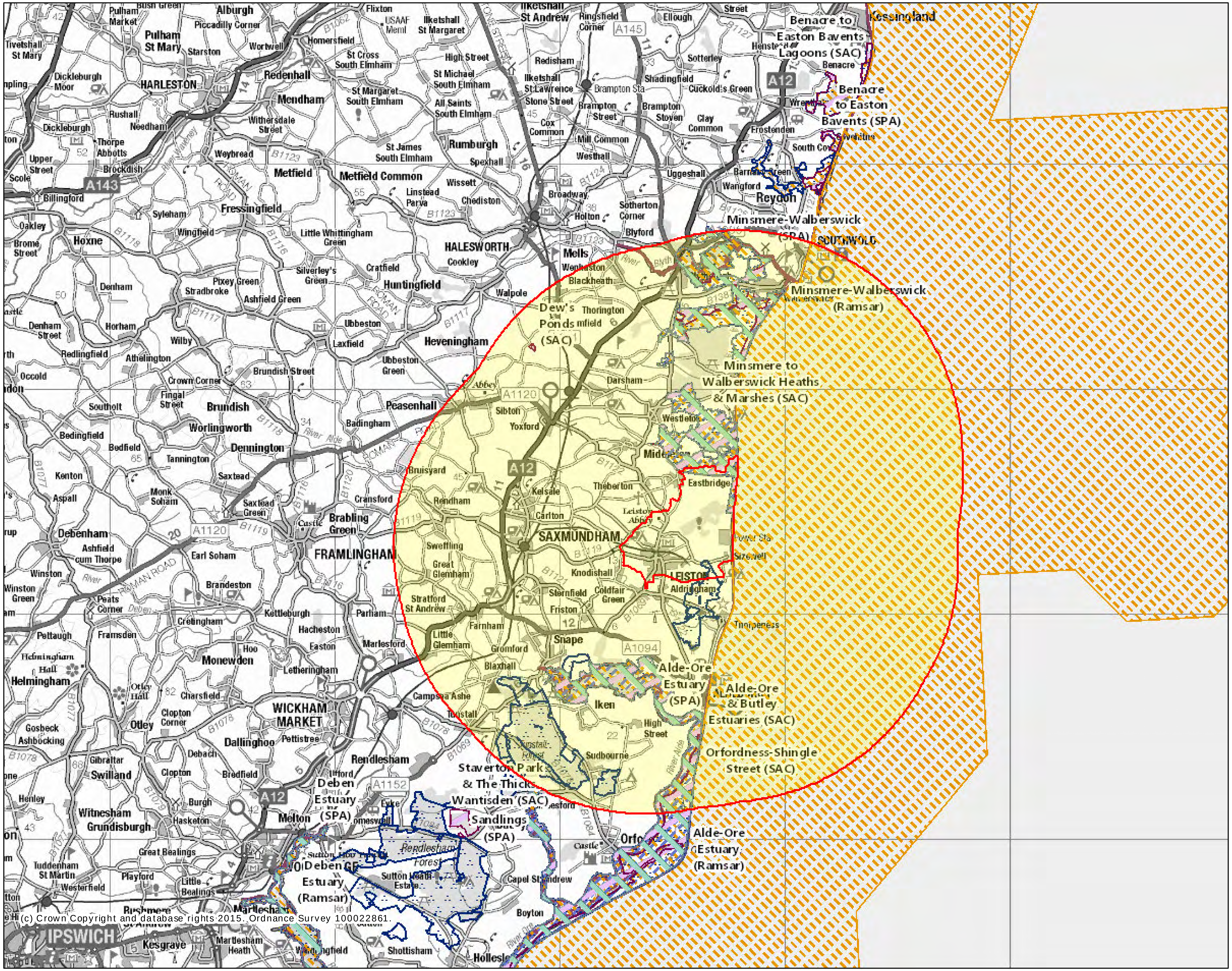
> *The Council will seek to ensure that communities have well-managed access to green space within settlements and in the countryside and coastal areas, in order to benefit health, community cohesion and greater understanding of the environment, without detriment to wildlife and landscape character. Where adequate green space is not provided as part of a development, developer contributions will be sought to fund the creation of appropriate green space and/ or management and improvement of access to green space. In particular, the Council will work on green infrastructure opportunities with partners in strategic housing growth areas in order to suitably complement development proposals. Developer contributions will be secured by means of conditions, legal agreements and/or through the Community Infrastructure Levy (CIL) (once a charging schedule has been adopted).*

4.2.3 The Appropriate Assessment of the Suffolk Coastal District Council Core Strategy and Development Management Policies Development Plan Document, concludes that with the implementation of the outlined mitigation measures, there would be no likely significant effect upon the integrity of any European site. In addition, on the basis of the information discussed in Section 3.6 above, it was considered that there would be no likely significant effect upon the qualifying features of the Outer Thames Estuary SPA (Red-throated Diver) which is not included within the SCDC core Strategy document.

4.2.4 As described previously, the policies of Leiston Neighbourhood Plan are intended to be used in conjunction with the policies of the SCDC Core Strategy and Development Management Policies Development Plan Document, to guide the development and growth of Leiston-cum-Sizewell Parish. As such the policies of Leiston Neighbourhood Plan are consistent with those of SCDC Core Strategy and its Appropriate Assessment. Overall, when in combination with the SCDC Core Strategy, the project in progress to implement the Core Strategy mitigation (section 3.6) and the SCDC Leisure Strategy (Section 3.7) and the information discussed in Section 3.8 for the potential impact upon the Outer Thames Estuary SPA, **the Leiston Neighbourhood Plan is unlikely to have a significant effect upon the integrity of any European site**.

Appendix 1

Leiston Neighbourhood Plan HRA April 2015



Legend

- Ramsar Sites (England)
- Special Areas of Conservation (England)
- Special Protection Areas (England)
- Inshore Special Area of Conservation with Marine Components (GB)
- Inshore Special Protection Area with Marine Components (GB)

Projection = OSGB36
xmin = 616200
ymin = 246400
xmax = 668800
ymax = 285000

Map produced by MAGIC on 29 April, 2015.

Appendix 2

European Site Conservation Objectives for Alde–Ore Estuary Special Protection Area Site Code: UK9009112

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **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 population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding)
A132 *Recurvirostra avosetta*; Pied avocet (Breeding)
A151 *Philomachus pugnax*; Ruff (Non-breeding)
A162 *Tringa totanus*; Common redshank (Non-breeding)
A183 *Larus fuscus*; Lesser black-backed gull (Breeding)
A191 *Sterna sandvicensis*; Sandwich tern (Breeding)
A195 *Sterna albifrons*; Little tern (Breeding)

This is a European Marine Site

This SPA is a part of the Alde Ore & Butley European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Regulation 35 Conservation Advice document for the EMS. For further details about this please visit the Natural England website at: http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx or contact Natural England's enquiry service at enquiries@naturalengland.org.uk or by phone on 0845 600 3078.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where this is available) will also provide a framework to inform the management of the European Site under the provisions of Articles 4(1) and 4(2) of the Wild Birds Directive, and the prevention of deterioration of habitats and significant disturbance of its qualifying features required under Article 6(2) of the Habitats Directive.

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 30 June 2014 (Version 2). This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014. Previous references to additional features identified in the 2001 UK SPA Review have also been removed.

European Site Conservation Objectives for Alde, Ore and Butley Estuaries Special Area of Conservation Site Code: UK0030076

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1130. Estuaries

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features as required by the provisions of Article 6(1) and 6(2) of the Directive.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in Article 1 of the Habitats Directive.

Publication date: 30 June 2014 – version 2. This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014.

Improvement Programme for England's Natura 2000 Sites (IPENS)

Planning for the Future

Site Improvement Plan

Alde-Ore Estuaries

Site Improvement Plans (SIPs) have been developed for each Natura 2000 site in England as part of the Improvement Programme for England's Natura 2000 sites (IPENS). Natura 2000 sites is the combined term for sites designated as Special Areas of Conservation (SAC) and Special Protected Areas (SPA). This work has been financially supported by LIFE, a financial instrument of the European Community.

The plan provides a high level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site(s) and outlines the priority measures required to improve the condition of the features. It does not cover issues where remedial actions are already in place or ongoing management activities which are required for maintenance.

The SIP consists of three parts: a Summary table, which sets out the priority Issues and Measures; a detailed Actions table, which sets out who needs to do what, when and how much it is estimated to cost; and a set of tables containing contextual information and links.

Once this current programme ends, it is anticipated that Natural England and others, working with landowners and managers, will all play a role in delivering the priority measures to improve the condition of the features on these sites.

The SIPs are based on Natural England's current evidence and knowledge. The SIPs are not legal documents, they are live documents that will be updated to reflect changes in our evidence/knowledge and as actions get underway. The information in the SIPs will be used to update England's contribution to the UK's Prioritised Action Framework (PAF).

The SIPs are not formal consultation documents, but if you have any comments about the SIP or would like more information please email us at IPENSLIFEProject@naturalengland.org.uk, or contact Natural England's Responsible Officer for the site via our enquiry service 0300 060 3900, or enquiries@naturalengland.org.uk

This Site Improvement Plan covers the following Natura 2000 site(s)

UK0030076	**Alde-Ore & Butley Estuaries SAC**
UK9009112	**Alde-Ore Estuary SPA**
UK0014780	**Orfordness-Shingle Street SAC**

Site description

The Alde-Ore Estuary SPA, Alde, Ore and Butley Estuaries SAC and Orfordness-Shingle Street SAC are overlapping/adjacent sites on the east coast of Suffolk, England.
Their scientific interests are outstanding and diverse. The sites contain a number of coastal formations and estuarine features including mud-flats, saltmarsh, vegetated shingle and coastal lagoons which are of special botanical and ornithological value.

Plan Summary

This table shows the prioritised issues for the site(s), the features they affect, the proposed measures to address the issues and the delivery bodies whose involvement is required to deliver the measures. The list of delivery bodies will include those who have agreed to the actions as well as those where discussions over their role in delivering the actions is on-going.

Priority & Issue	Pressure or Threat	Feature(s) affected	Measure	Delivery Bodies
1 Hydrological changes	Pressure	A081(B) Marsh Harrier, A132(B) Avocet, A183(B) Lesser Black-backed Gull, H1130 Estuaries, H1150 Coastal lagoons	Seek alternative habitat provision or habitat enhancement opportunities	National Trust, Natural England, Suffolk Wildlife Trust, Babcocks, Alde & Ore Estuary Partnership
2 Public Access/Disturbance	Pressure	A132(B) Avocet, A132(NB) Avocet, A162(NB) Common redshank, A183(B) Lesser Black-backed Gull, A195(B) Little Tern, H1210 Annual vegetation of drift lines, H1220 Coastal shingle vegetation outside the reach of waves, Waterbird assemblage	Reduce bird disturbance and trampling of shingle vegetation	Eastern Inshore Fisheries Conservation Authority (IFCA), Ministry of Defence (MoD), National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust, Marine Management Organisation (MMO), British Association for Shooting and Conservation (BASC), Joint Nature Conservation Committee (JNCC), Civil Aviation Authority (CAA), Suffolk Little Tern Group, EDF Energy, Shingle Street residents

3 Inappropriate coastal management	Pressure	H1210 Annual vegetation of drift lines, H1220 Coastal shingle vegetation outside the reach of waves	Seek long term sustainable solutions	Environment Agency, Natural England, Suffolk Coastal District Council, Suffolk County Council, Alde & Ore Estuary Partnership, Bawdsey-Shingle Street Partnership
4 Coastal squeeze	Threat	A132(B) Avocet, A132(NB) Avocet, A162(NB) Common redshank, H1130 Estuaries, H1140 Intertidal mudflats and sandflats, H1330 Atlantic salt meadows, Waterbird assemblage	Ensure there is scope for natural adapation or intertidal habitat creation to offset the impacts of sea level rise	Environment Agency, National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust, Crown Estate, Local partnership, Alde & Ore Estuary Partnership, Alde & Ore Association
5 Inappropriate pest control	Pressure	A081(B) Marsh Harrier, A132(B) Avocet, A183(B) Lesser Black-backed Gull, A191(B) Sandwich Tern, A195(B) Little Tern	Ensure adequate protection of nesting birds from predators	National Trust, Natural England, RSPB
6 Changes in species distributions	Threat	A081(B) Marsh Harrier, A132(B) Avocet, A132(NB) Avocet, A183(B) Lesser Black-backed Gull, A191(B) Sandwich Tern, A195(B) Little Tern	Understand population dynamics, and enable boundary flexibility/ better wider habitat provision	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk Wildlife Trust, British Trust for Ornithology (BTO), LIFE+ Little Tern Project, Suffolk Little Tern Group, Shingle Street residents
7 Invasive species	Pressure/ Threat	A132(B) Avocet, A132(NB) Avocet, A162(NB) Common redshank, H1130 Estuaries, H1140 Intertidal mudflats and sandflats, H1330 Atlantic salt meadows, Waterbird assemblage	Manage Spartina anglica encroachment	Natural England
8 Air Pollution: impact of atmospheric nitrogen deposition	Pressure	A132(B) Avocet, A132(NB) Avocet, A162(NB) Common redshank, H1130 Estuaries, H1140 Intertidal mudflats and sandflats, H1330 Atlantic salt meadows, Waterbird assemblage	Establish a Site Nitrogen Action Plan	Not yet determined

9 Fisheries: Commercial marine and estuarine	Pressure	A195(B) Little Tern	Revised approach to fisheries management	Eastern Inshore Fisheries Conservation Authority (IFCA), Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Issues and Actions

This table outlines the prioritised issues that are currently impacting or threatening the condition of the features, and the outstanding actions required to address them. It also shows, where possible, the estimated cost of the action and the delivery bodies whose involvement will be required to implement the action. Lead delivery bodies will be responsible for coordinating the implementation of the action, but not necessarily funding it. Delivery partners will need to support the lead delivery body in implementing the action. In the process of developing the SIPs Natural England has approached the delivery bodies to seek agreement on the actions and their roles in delivering them, although in some cases these discussions have not yet been concluded. Other interested parties, including landowners and managers, will be involved as the detailed actions are agreed and delivered. Funding options are indicated as potential (but not necessarily agreed or secured) sources to fund the actions.

1 Hydrological changes

Flood wall breaches in December 2013 (due to tidal surge) has lead to flooding of Hazelwood Marshes and Lantern Marshes south (both currently intertidal). This has lead to a loss of nesting habitat and saline lagoons.

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
1A	Investigate options in response to the flooding of Hazelwood Marshes and identify mitigation opportunities for breeding Avocet.	Not yet determined	2015	Investigation / Research / Monitoring	Not yet determined	Environment Agency	Suffolk Wildlife Trust

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
1B	Monitor breeding Avocet numbers on Hazelwood Marshes to see if the population has reduced from pre surge levels to inform mitigation.	Not yet determined	2014-15	Investigation / Research / Monitoring	Not yet determined	Environment Agency	Suffolk Wildlife Trust

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
1C	Implement mitigation for breeding Avocet on Hazelwood Marshes, eg island creation on existing lenses of higher ground within Hazelwood Marshes.	£50,000	2016	Habitat creation / restoration strategy: Creation of new habitat	Not yet determined	Environment Agency	Natural England, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1D	Investigate options in response to the flooding of Lantern Marshes south due to breach in American Wall following December 2013 tidal surge and identify any mitigation requirements (notably for Lesser black-backed gulls).	£45,000	2015	Investigation / Research / Monitoring	Not yet determined	National Trust	Environment Agency, Natural England, Babcocks, Alde & Ore Estuary Partnership

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1E	Depending on outcome of investigations and decisions on future of Lantern Marshes South, provide on/off site mitigation for breeding Lesser black-backed gull and possibly Marsh harrier and saline lagoons habitat loss.	Not yet determined	2016-18	Mechanism not identified / develop mechanism	Not yet determined	To be agreed	Environment Agency, National Trust, Natural England, RSPB, Suffolk Wildlife Trust, Alde & Ore Estuary Partnership

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1F	Implement options in response to the flooding of Havergate Island and identify mitigation requirements.	£30,000	2015-20	Non-Natural England funded site management plan	Not yet determined	RSPB	Environment Agency, Natural England, Alde & Ore Estuary Partnership

2 Public Access/Disturbance

Human disturbance to nesting birds on beaches, notably on Orfordness and Shingle Street, by people accessing the southern end of the ness by boat, plus walkers along beach from Aldeburgh, and recreational beach users at Shingle Street. Human trampling affects vegetated shingle habitat. Military and private aircraft (paramotors, helicopters and planes) regularly fly low over the site leading to disturbance of SPA features, wintering and breeding birds.

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2A	Informed by investigation into public access/disturbance, produce and implement a plan to improve users awareness of the sensitive areas on Alde-Ore Estuary (notably Orfordness and Shingle Street) and how they can minimise disturbance. Approaches could include wardening, working groups, codes of conduct for both recreational and commercial users, leaflets, Signage and interpretation provision.	£20,000	2015-20	Advice: Education & awareness raising	Developer Contributions Scheme (DCS), AONB, Touching the Tide Project	Suffolk Coast & Heaths AONB	Eastern Inshore Fisheries Conservation Authority (IFCA), National Trust, Natural England, RSPB, Suffolk Coastal District Council, Suffolk Wildlife Trust, Marine Management Organisation (MMO), Suffolk Little Tern Group, Shingle Street residents

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2B	Review the Orfordness NNR management plan to ensure shingle habitat is managed to minimise disturbance to SPA/SAC features through access management/zonation, wardening, awareness raising. Levels and resourcing to be informed by investigation into impacts of disturbance.	Not yet determined	2014-24	National Nature Reserve (NNR) management plan	NNR management funding	National Trust	Natural England, RSPB

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2C	Establish wardening on shingle areas outwith NNR, notably at Shingle Street, to improve users awareness and minimise impact on SPA/SAC Features. Levels/resourcing to be informed by investigation into impacts of disturbance and patterns of use.	Not yet determined	2016-20	Advice: Wardening	Developer Contributions Scheme (DCS)	Not yet determined	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2D	Investigate and monitor levels and impact of military and civilian aircraft on SPA features, evaluate significance of problem in relation to other factors, establish how to remedy impacts and where resource should be allocated to address factors with greatest effect. Incorporate existing research.	Not yet determined	2015-18	Investigation / Research / Monitoring	Not yet determined	Natural England	Ministry of Defence (MoD), Natural England, RSPB, Suffolk Wildlife Trust, Joint Nature Conservation Committee (JNCC), Civil Aviation Authority (CAA)

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2E	Reduce disturbance of SPA bird features from low flying military aircraft training flights through better recognition (and ideally avoidance) of sensitive locations.	Not yet determined	2015	Advice: Education & awareness raising	Ministry of Defence (MoD)	Not yet determined	Ministry of Defence (MoD), Natural England, Joint Nature Conservation Committee (JNCC)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2F	Minimise disturbance from military aircraft at the Alde-Ore Estuary through enhanced local liaison and consultation/communication.	Not yet determined	2015-25	Advice	Not yet determined	Natural England	Ministry of Defence (MoD)
2G	Reduce disturbance of designated bird features from low flying civilian aircraft through better recognition (and ideally avoidance) of sensitive locations.	Not yet determined	2015-16	Advice: Education & awareness raising	Not yet determined	Natural England	Civil Aviation Authority (CAA)
2H	Formalise reporting of incidents of all aircraft flying low over designated sites, disturbing wintering and breeding birds to allow Natural England to undertake appropriate enforcement action in relation to any breach of SSSI legislation.	Not yet determined	2015-25	Partnership agreement: Other	Not yet determined	Natural England	National Trust, RSPB, Suffolk Wildlife Trust
2I	Produce Aviation Code of conduct for Suffolk (and possibly include Norfolk) Coast to improve user awareness/behaviour.	Not yet determined	2015-16	Advice: Education & awareness raising	Not yet determined	Not yet determined	Natural England, Suffolk Coast & Heaths AONB, Civil Aviation Authority (CAA), Suffolk Little Tern Group

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2J	Investigate the scope for having sensitive bird locations/SPAs marked on Civil Aviation Authority air maps as low flying avoidance areas to reduce disturbance.	Not yet determined	2015	Advice: Negotiation	Not yet determined	Natural England	Joint Nature Conservation Committee (JNCC), Civil Aviation Authority (CAA)

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2K	Establishment of a Paramotor Working Group and Code of conduct to improve user awareness.	Not yet determined	2015	Advice: Education & awareness raising	Not yet determined	Natural England	Suffolk Coast & Heaths AONB, Civil Aviation Authority (CAA), Suffolk Little Tern Group

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
2L	Ensure impacts are assessed and that measures are in place to mitigate against impact from increased disturbance from proposed Sizewell C Development; through displacement of users away from Sizewell area and increased population during construction in the locality. Mitigation may include provision of recreational green space at robust locations (such as new country parks), etc.	Not yet determined	2015-25	Advice: Access Strategy	Developer Contributions Scheme (DCS)	Suffolk County Council	Natural England, Suffolk Coastal District Council, EDF Energy

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2M	Investigate disturbance impacts of offsite shooting activities on SPA features.	Not yet determined	2015-19	Investigation / Research / Monitoring	Not yet determined	Natural England	RSPB, Suffolk Wildlife Trust, British Association for Shooting and Conservation (BASC)

3 Inappropriate coastal management

Maintaining coastal defences at Bawdsey and Slaughden is leading to increased shingle recharge requirements at Slaughden, and loss of shingle beach at southern end of SAC at Bawdsey.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
3A	Investigate sustainability of coastal defence at Bawdsey, impacts on SAC/SPA features, requirements for mitigation/compensation and alternative approaches for the area.	Not yet determined	2015-20	Shoreline Management Plan and Strategies	Not yet determined	Environment Agency	Natural England, Suffolk Coastal District Council, Suffolk County Council, Bawdsey-Shingle Street Partnership

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
3B	Investigate the sustainability of shingle recharge of coastal defence Slaughden (shingle taken from Orfordness). Consider impact on SAC/SPA features, mitigation/compensation and alternative options for Slaughden flood defence.	Not yet determined	2015-16	Shoreline Management Plan and Strategies	Not yet determined	Environment Agency	Natural England, Suffolk Coastal District Council, Suffolk County Council, Alde & Ore Estuary Partnership

4 Coastal squeeze

Seawalls afford little scope for natural adaption of the estuary to sea level rise through roll back of habitat. Saltmarsh is at risk of being squeezed in the future (although currently the estuary is perceived as in balance) and limited areas of natural habitat transition within the site could be lost. The developing policy of the Alde and Ore Estuary Partnership should consider scope for natural adaption to sea level rise.

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
4A	Investigate and monitor coastal squeeze/ coastal change to provide a robust evidence base against which appropriate management requirements can be determined. This should examine the short/medium/long term, including how nature conservation interests are affected by coastal change, (e.g. freshwater to saline). Identify evidence gaps and undertake appropriate investigations.	£20,000	2015-25	Investigation / Research / Monitoring	Not yet determined	Environment Agency	Environment Agency, National Trust, Natural England, RSPB, Suffolk Wildlife Trust, Crown Estate, Alde & Ore Estuary Partnership

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
4B	Ensure the Shoreline Management Plan considers coastal squeeze and incorporates appropriate mitigation and compensation for any change that affects the integrity of the SAC/SPA.	Not yet determined	2015-20	Shoreline Management Plan and Strategies	Not yet determined	Environment Agency	National Trust, Natural England, RSPB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust, Alde & Ore Estuary Partnership

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
4C	Ensure the Alde-Ore Estuary Plan (in preparation) addresses coastal squeeze issues on the Alde-Ore and embodies opportunities for mitigation/compensation for any loss of saltmarsh, etc, through intertidal habitat creation, adaptive measures, etc.	Not yet determined	2014-16	Estuary Management Plan	Not yet determined	Alde & Ore Estuary Partnership	Environment Agency, Natural England, Suffolk County Council, Alde & Ore Association

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
4D	Develop an Alde-Ore adaptation plan that captures all the known issues. Opportunities for habitat creation where known should be included. Once produced the plan should be appropriately assessed to ensure that proposed actions will maintain the integrity of the designated site and the features for which it is designated.	Not yet determined	2015-20	Investigation / Research / Monitoring	Not yet determined	Environment Agency	Environment Agency, National Trust, RSPB, Suffolk Coastal District Council, Suffolk Wildlife Trust, Natural England (CSF), Alde & Ore Estuary Partnership, Alde & Ore Association

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
4E	Address impacts of coastal squeeze on SPA/SAC features through the Environment Agency Regional Habitat Creation Programme, as appropriate, including enabling adaptation to take place and creation of freshwater marsh elsewhere to mitigate/compensate against future loss of freshwater habitat.	Not yet determined	2016-50	Habitat creation / restoration strategy: Creation of new habitat	Habitat creation programme	Environment Agency	National Trust, Natural England, RSPB, Suffolk Coastal District Council, Suffolk Wildlife Trust, Alde & Ore Estuary Partnership, Alde & Ore Association

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
4F	Address impacts of coastal squeeze on SPA/SAC features through Land Manangement Schemes, as appropriate, including enabling adaptation to take place and creation of freshwater marsh elsewhere to mitigate/compensate against future loss of freshwater habitat.	Not yet determined	2018-50	Rural Development Programme for England (RDPE): Common Agricultural Policy 2014-20 (New Environmental Land Management Scheme)	Higher Level Stewardship (HLS)	Natural England	Environment Agency, National Trust, RSPB, Suffolk Coastal District Council, Alde & Ore Estuary Partnership, Alde & Ore Association

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
4G	Investigate saltmarsh adaptation methods to mitigate coastal squeeze and trial on site.	Not yet determined	2016	Investigation / Research / Monitoring	Not yet determined	Alde & Ore Estuary Partnership	Environment Agency, National Trust, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk Wildlife Trust, Crown Estate, Alde & Ore Estuary Partnership, Alde & Ore Association

5 Inappropriate pest control

Fox predation/disturbance is a key issue for breeding birds on Orfordness, particularly Lesser black backed gulls. Foxes can cause gulls and other breeding birds to abandon nesting sites, and predate adult birds and chicks.

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
5A	Investigate levels/impact of predation of breeding birds on Orfordness as a site specific cause of population declines.	Not yet determined	2015-16	Investigation / Research / Monitoring	Not yet determined	Natural England	National Trust, RSPB

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
5B	Informed by investigation produce an Orfordness predator control management plan (as part of next NNR Management Plan).	Not yet determined	2016-25	National Nature Reserve (NNR) management plan	Not yet determined	Not yet determined	National Trust, Natural England, RSPB

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
5C	Informed by investigation and predator control plan undertake enhanced predator control, notably foxes, on Orfordness - Shooting	£8,000 per year	2015-25	Rural Development Programme for England (RDPE): Common Agricultural Policy 2014-20 (New Environmental Land Management Scheme)	Not yet determined	Not yet determined	National Trust, Natural England

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
5D	Informed by investigation and predator control plan, undertake enhanced predator control, notably foxes, on Orfordness (fencing).	£35,000	2015	Rural Development Programme for England (RDPE): Common Agricultural Policy 2014-20 (New Environmental Land Management Scheme)	Not yet determined	Not yet determined	National Trust, Natural England

6 Changes in species distributions

There are negative population trends in bird species using the site. Breeding locations are moving within and away from the designated site, possibly due to habitat change on site, as a reaction to other species and due to draw of other adjacent hinterland habitat. This requires further investigation and possible mitigation.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
6A	Investigate causes of decline in Lesser black-backed gull (breeding) population on SPA (habitat suitability, predation, disturbance, food source, etc).	Not yet determined	2015	Investigation / Research / Monitoring	Not yet determined	Natural England	National Trust, RSPB, British Trust for Ornithology (BTO)

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
6B	Develop and implement Lesser black-backed gull recovery/management plan following investigation.	Not yet determined	2015-17	Mechanism not identified / develop mechanism	Not yet determined	Natural England	National Trust, RSPB, British Trust for Ornithology (BTO)
6C	Investigate the movement of breeding Avocet away from the SPA, particularly due to displacement by large gulls on Havergate.	Not yet determined	2015-20	Investigation / Research / Monitoring	Not yet determined	Natural England	National Trust, RSPB, Suffolk Wildlife Trust
6D	Mitigate against loss of breeding Avocet on SPA through active management of suitable nesting habitat/habitat creation within and/or adjacent to SPA, particularly on hinterland.	Not yet determined	2015-20	Rural Development Programme for England (RDPE): Environmental Stewardship Higher Level Scheme (HLS)	Not yet determined	Natural England	National Trust, RSPB, Suffolk Wildlife Trust
6E	Investigate downward trend in breeding numbers of Little tern using SPA including habitat decline, predation, disturbance, regional/wider trends, etc.	Not yet determined	2015-19	Investigation / Research / Monitoring	Not yet determined	Natural England	RSPB, Suffolk Wildlife Trust, LIFE+ Little Tern Project, Suffolk Little Tern Group

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
6F	Mitigate against recent Little tern breeding failure through active management of suitable nesting habitat at Orfordness, Shingle Street and possibly Havergate for benefit of Little terns through fencing, wardening, etc.	Not yet determined	2015-20	Existing Local Project	Not yet determined	Natural England	National Trust, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk Little Tern Group, Shingle Street residents

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
6G	Investigate any downward trends in breeding numbers of Sandwich tern using SPA including habitat decline, predation, disturbance, regional/wider trends, etc.	Not yet determined	2015-16	Investigation / Research / Monitoring	Not yet determined	Natural England	RSPB

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
6H	Mitigate against any Sandwich tern declines informed by investigation for benefit of Sandwich terns.	Not yet determined	2016	Investigation / Research / Monitoring	Not yet determined	Natural England	National Trust, RSPB

7 Invasive species

Spartina is encroaching on estuarine muds. With *Spartina* at the front, and reed encroaching at the back, saltmarsh could be squeezed out.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
7A	Investigation and monitoring of *Spartina anglica* encroachment onto estuarine muds.	Not yet determined	2018	Investigation / Research / Monitoring	Not yet determined	Natural England	n/a

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
7B	Develop and implement Spartina anglica management plan as appropriate following investigation.	Not yet determined	2018-20	Invasive Control Plan: Invasive Species Control Programme	Not yet determined	Natural England	

8 Air Pollution: impact of atmospheric nitrogen deposition

Air pollution impacts on vegetation diversity. Aerial deposits of nitrogen may exceed the site relevant critical load (20 – 30 kg N ha-1 yr-1) above which the diversity of saltmarsh vegetation begins to be altered (possibly to reed) and adversely impacted. Many land use practices contribute to this problem locally including land spreading, outdoor pigs, high nutrient inputs on fields.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
8A	Control, reduce and ameliorate atmospheric nitrogen.	Not yet determined	2015-20	Site Nitrogen Action Plan	Not yet determined	Not yet determined	Not yet determined

9 Fisheries: Commercial marine and estuarine

There are many different fishing pressures close to shore that may include bycatch of juvenile fish and disturbance of fish nursery areas that could potentially have an impact on Little tern *Sterna Albifrons* by reducing suitable feeding areas.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
9A	Where the assessments indicate management is required, introduce appropriate measures.	Not yet determined	2016	Regulation: Regulating Order (Public fishery)	Defra	Eastern Inshore Fisheries Conservation Authority (IFCA)	Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
9B	If management measures are established, ensure compliance with bye-law and provide an appropriate level of reporting to ensure sites are well managed and to enable Natural England to provide advice on the condition of features and potential condition threats. Ongoing action.	Not yet determined	2020	Enforcement: Byelaws	Not yet determined	Eastern Inshore Fisheries Conservation Authority (IFCA)	Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Site details

The tables in this section contain site-relevant contextual information and links

Qualifying features

#UK Special responsibility

Alde-Ore & Butley Estuaries SAC	H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
	H1130 Estuaries
	H1140 Mudflats and sandflats not covered by seawater at low tide
Alde-Ore Estuary SPA	A151(NB) *Philomachus pugnax*: Ruff
	A132(NB) *Recurvirostra avosetta*: Pied avocet
	A081(B) *Circus aeruginosus*: Eurasian marsh harrier
	A162(NB) *Tringa totanus*: Common redshank
	A132(B) *Recurvirostra avosetta*: Pied avocet
	A183(B) *Larus fuscus*: Lesser black-backed gull
	A191(B) *Sterna sandvicensis*: Sandwich tern
	A195(B) *Sterna albifrons*: Little tern
Orfordness-Shingle Street SAC	H1210 Annual vegetation of drift lines
	H1220 Perennial vegetation of stony banks
	H1150# Coastal lagoons

Site location and links

Alde-Ore & Butley Estuaries SAC

Area (ha) **1561.53** *Grid reference* **TM444509**	Map link
Local Authorities	Suffolk
Site Conservation Objectives	European Site Conservation Objectives for Alde-Ore & Butley Estuaries SAC
European Marine Site conservation advice	Conservation Advice for European Marine Sites

Regulation 33/35 Package	Regulation 33/35 package link
Marine Management Organisation site plan	n/a
Alde-Ore Estuary SPA	
Area (ha) **2416.87** *Grid reference* **TM433487**	Map link
Local Authorities	Suffolk
Site Conservation Objectives	European Site Conservation Objectives for Alde-Ore Estuary SPA
European Marine Site conservation advice	Conservation Advice for European Marine Sites
Regulation 33/35 Package	Regulation 33/35 package link
Marine Management Organisation site plan	n/a
Orfordness-Shingle Street SAC	
Area (ha) **901.19** *Grid reference* **TM440486**	Map link
Local Authorities	Suffolk
Site Conservation Objectives	European Site Conservation Objectives for Orfordness - Shingle Street SAC
European Marine Site conservation advice	Conservation Advice for European Marine Sites
Regulation 33/35 Package	Regulation 33/35 package link
Marine Management Organisation site plan	n/a

Water Framework Directive (WFD)

The Water Framework Directive (WFD) provides the main framework for managing the water environment throughout Europe. Under the WFD a management plan must be developed for each river basin district. The River Basin Management Plans (RMBP) include a summary of the measures needed for water dependent Natura 2000 sites to meet their conservation objectives. For the second round of RBMPs, SIPs are being used to capture the priorities and new measures required for water dependent habitats on Natura 2000 sites. SIP actions for non-water dependent sites/habitats do not form part of the RBMPs and associated consultation.

Alde-Ore & Butley Estuaries SAC

River basin	Anglian	Anglian RBMP
WFD Management catchment	East Suffolk	
WFD Waterbody ID (Cycle 2 draft)	GB105035040160, GB105035040190	

Alde-Ore Estuary SPA

River basin	Anglian	Anglian RBMP
WFD Management catchment	East Suffolk	
WFD Waterbody ID (Cycle 2 draft)	GB105035040160, GB105035040190	

Orfordness-Shingle Street SAC

River basin	Anglian	Anglian RBMP
WFD Management catchment	East Suffolk	
WFD Waterbody ID (Cycle 2 draft)	n/a	

Overlapping or adjacent protected sites

Site(s) of Special Scientific Interest (SSSI)	
Alde-Ore & Butley Estuaries SAC	Alde-Ore Estuary SSSI
Alde-Ore Estuary SPA	Alde-Ore Estuary SSSI
Orfordness-Shingle Street SAC	Alde-Ore Estuary SSSI

National Nature Reserve (NNR)	
Alde-Ore & Butley Estuaries SAC	Orfordness-Havergate NNR
Alde-Ore Estuary SPA	Orfordness-Havergate NNR
Orfordness-Shingle Street SAC	Orfordness-Havergate NNR

Ramsar	
Alde-Ore & Butley Estuaries SAC	Alde-Ore Estuary
Alde-Ore Estuary SPA	Alde-Ore Estuary
Orfordness-Shingle Street SAC	Alden-Ore Estuary

Special Areas of Conservation (SAC) and Special Protection Areas (SPA)	
Alde-Ore & Butley Estuaries SAC	Alde-Ore Estuary SPA
Alde-Ore Estuary SPA	Orfordness-Shingle Street SAC
	Alde-Ore & Butley Estuaries SAC
Orfordness-Shingle Street SAC	Alde-Ore Estuary SPA

Other relevant documents and links		
	Alde-Ore Future for Wildlife project	Web link
	Touching the Tide	Web link
	Alde & Ore Estuary Partnership	Web link
	Suffolk Local Biodiversity Action Plan (Little tern)	Biodiversity Action Plan: Little Tern
	Spartina anglica: a review of its status, dynamics and management (ENRR527)	2004 Anglica spartina Review

Version	*Date*	*Comment*
1.0	08/10/2014	

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Alde, Ore and Butley Estuaries
Unitary Authority/County:	Suffolk
SAC status:	Designated on 1 April 2005
Grid reference:	TM444509
SAC EU code:	UK0030076
Area (ha):	1561.53
Component SSSI:	Alde-Ore Estuary SSSI

Site description:
This estuary, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents.

The smaller Butley River has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats. It flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed.

The adjacent shingle and lagoon habitats are designated separately as the Orfordness-Shingle Street SAC.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030076
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

Alde Ore Estuary Special Protection Area: DRAFT Advice on Operations

This document provides advice on operations for the Alde Ore Estuary Special Protection Area (SPA), forming part of the conservation advice package.

The presentation of this advice is an interim solution. To make this information more accessible, Natural England is developing a searchable web platform which will allow stakeholders to see specific Advice on Operations and the evidence base behind the sensitivity scores.

1. Advice on Operations

This advice identifies pressures associated with the most commonly occurring marine activities in the site, and provides a broad scale assessment of the sensitivity of the designated features of the site to these pressures. For marine bird features, Advice on Operations is provided for their supporting habitats. Advice on Operations will only be provided for features within the site (i.e. not functionally linked land[1]) and not for seabird, waterbird or wildfowl assemblage. The component bird species within assemblages will have in some instances different sensitivities to operations while their composition may vary over time and therefore providing Advice on Operations would be too complex. Information regarding Advice on Operations for features outside the site will need to be sought in consultation with Natural England.

Some mobile species features (birds, mammals, fish) are able to move outside the site boundary where there may be direct impacts to those features, for example collision risk. In most cases it will be possible to use the advice on operations to assess impacts to features that move outside the site. Finally, activities operating at distance from the site may cause pressures that travel into the site which may affect features in the site. For example, subtidal chalk feature may be sensitive to a dredge plume, but because the dredging activity is not happening directly on this feature in the site it will not be assessed. Applicants will, therefore, need to use their discretion when assessing impacts to features from pressures that originate from outside the site.

[1] Habitat outside the site boundary, often called functionally linked land, may also support the site features. It is not included for consideration in this advice as it is outside the site. Impacts on functionally linked land could indirectly affect the sites ability to achieve its conservation objectives.

2. Changes to Natural England's Approach to Advice on Operations

This conservation advice package provides information on the sensitivity of features in relation to different activities. Up-to-date information about levels of activities within a site is held by the relevant authorities responsible for management, rather than Natural England. Therefore this advice should be used in conjunction with information from relevant authorities to assess current activity levels to inform the management of any activity impacting upon a site's features.

This Advice on Operations does not provide information on the vulnerability of the features (determined by a feature's sensitivity to an activity and its exposure to that activity) because activities are not static and therefore assessments are quickly out of date. Natural England will work in partnership with management authorities to undertake risk assessments as required, using feature sensitivity information from Natural England and up-to-date activity data from appropriate authorities. The risk assessments will be undertaken once the conservation advice for a site has been published.

3. How to interpret Advice on Operations

The Advice on Operations provides an initial assessment of whether a proposed plan or project (or ongoing activity) may have an impact on a feature in the site. These assessments are based on nationally available sensitivity evidence (APEM 2014, MarLIN 2014). The evidence used to underpin the sensitivity assessments is available from Natural England on request.

The sensitivity assessments should be used at an early stage of a plan or project when considering potential impacts of an activity. Advice on Operations should be used in conjunction with the specific details of a proposed plan or project (e.g. indirect and/or additive impacts, activity duration, time of year, scale etc.) and the site-specific Supplementary Advice in order to develop assessments of impacts to features within the site. For more information on how to use this Advice on Operations component together with the rest of our conservation advice during the application process, refer to How to use MPA Conservation Advice.

3.1 Operations and marine activities

Each operation theme is subdivided into associated marine activities relevant to the site. The sensitivity assessments table (Table 2) shows marine activities that occur (or could occur) at this site. They include legal, regulated and unregulated marine activities that cause pressures to which habitats and species may be sensitive. This advice does not include activities that occur outside the site-boundary which may also have an impact on the protected features and on site-integrity.

3.2 Marine activities and pressures

Marine activities are linked to the relevant, internationally standardised biological, chemical and physical pressures that they may cause (OSPAR Intersessional Correspondence Group on Cumulative Effects 2013). Links between activities and direct pressures are explained in Table 3. A feature's sensitivity is then assessed against these pressures. The assessment of sensitivity to these pressures is measured against a benchmark[2]. The benchmarks are representative of the likely intensity of a pressure caused by typical activities, and do not represent a threshold of an 'acceptable' intensity of a pressure. Find more information on the pressure categories used and the benchmarks of pressure used in the sensitivity assessments.

3.3 Pressures and features (sensitivity assessments)

The sensitivity of a feature to activity-derived pressures has been assessed using information collected on their resilience (an ability to recover) and resistance (the level of tolerance) to physical, chemical and biological pressures (APEM, 2014; Tillin et al. 2011).

3.3.1 Sensitivity scores

Advice on Operations only assesses direct impacts of pressures. However, you should include indirect pressures (e.g. siltation from a distant aggregate screening operation) on features when considering 'potential impacts'. The sensitivity scores are shown in Table 1, and sensitivity assessments of the features in this site to potential activities are shown in Table 2.

Table 1: Advice on Operations table legend

SENSITIVE: The evidence base suggests the feature is sensitive to the pressure at the benchmark and taken to further assessment.	S
INSUFFICENT EVIDENCE TO ASSESS: The evidence base is not considered to be developed enough for assessments to be made of sensitivity at the benchmark pressure level and should not be precluded from consideration. The best available evidence, relevant to that activity, at time of application must be sourced and taken to further assessment.	IE
NOT ASSESSED - A sensitivity assessment has not been made for this feature but should not be precluded from consideration. The best available evidence, relevant to that activity, at time of application must be sourced and taken to further assessment.	NA
NOT SENSITIVE AT THE BENCHMARK: The evidence base suggests the feature is not sensitive to the pressure at the benchmark but shouldn't be precluded from consideration (e.g. variations in pressure intensity and exposure, in-combination or indirect effects) and taken to further assessment.	NS
The evidence base suggests that there is no direct interaction between the pressure and the feature under assessment OR, the activity and the feature could not interact and taken to further assessment.	

[2] A benchmark is an activity-focused reference point. A benchmark is not a threshold and does not indicate a triggering of Likely Significant Effect (LSE) for Habitats Regulation Assessments (HRA). A benchmark is simply a common reference starting point against which all plans and projects can initially be assessed.

Table 2. Advice on Operations sensitivity assessments for features at Alde-Ore Estuary SPA.

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
AQUACULTURE	Shellfish aquaculture: bottom culture	Above water noise	29	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	353										S			S	S	S	S				
		Barrier to species movement	28	S	NS	S	NS	NS	S	S	S									S			
		Changes in suspended solids (water clarity)	539		S	S		S					S			S	S	NS	NS	S			
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	589	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	589		S	S		S															
		Deoxygenation	184										NS			NS	NS	NS	NS	S			
		Genetic modification & translocation of indigenous species	170													IE			IE	S			
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	165	IE	IE	IE		IE	IE	IE	IE		NS			NS	NS	NS	NS	S			
		Introduction of light	537	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of microbial pathogens	316	S	S	S	S	S	S	S	S					S	IE		S	NS			
		Introduction of other substances (solid, liquid or gas)	307	IE	IE	IE		IE	IE	IE	IE		IE			IE	IE	IE	IE	S			
		Introduction or spread of non-indigenous species	174	S	S	S	IE	S	NS	S			S			S	S	IE	S	S			
		Litter	16	IE	S	S		S	IE	IE	IE		IE			IE	IE	IE	IE	S			
		Nutrient enrichment	396										NS			NS	NS	NS	NS	S			
		Organic enrichment	181										S			IE	IE	NS	IE	S			
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	353										S			S	S	S	S				
		Physical change (to another seabed type)	265										S			S	S	S	S	S			
		Removal of non-target species	364	S	S	S	IE	S	S	S	S		S			S			S				
		Removal of target species	171										S			S	S	S	S				
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	356										S			S	S	S	S				
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	356										S			S	S	NS	S				
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	176	IE	IE	IE	IE	IE	IE	IE	IE		NS			NS	NS	NS	NS	S			

Operation	Activity	Pressure	Justification	Bird features: Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Supporting habitat: Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Saltmarsh: Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Saltmarsh: Salicornia and other annuals colonising mud and sand	Saltmarsh: Spartina swards (Spartinion maritimae)
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	163	S	IE	IE	S	IE	S	S	S		NS			NS	NS	NS	NS	S			
		Underwater noise changes	534		IE	IE		IE												S			
		Visual disturbance	407	S	S	S	S	S	S	S	S									S			
		Water flow (tidal current) changes – local, including sediment transport considerations	143		IE	IE		IE					IE			S	NS	NS	S	S			
		Wave exposure changes - local	337										IE			S	S	NS	S	S			
	Shellfish aquaculture: trestle culture	Above water noise	387	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	354										S			S	S	S	S				
		Barrier to species movement	28	S	NS	S	NS	NS	S	S	S									S			
		Changes in suspended solids (water clarity)	539		S	S		S					S			S	S	NS	NS	S			
		Deoxygenation	184										NS			NS	NS	NS	NS	S			
		Genetic modification & translocation of indigenous species	167													IE			IE	S			
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	165	IE	IE	IE		IE	IE	IE	IE		NS			NS	NS	NS	NS	S			
		Introduction of light	537	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of microbial pathogens	316	S	S	S	S	S	S	S	S					S	IE		S	NS			
		Introduction of other substances (solid, liquid or gas)	307	IE	IE	IE		IE	IE	IE	IE		IE			IE	IE	IE	IE	S			
		Introduction or spread of non-indigenous species	174	S	S	S	IE	S	NS	S			S			S	S	IE	S	S			
		Litter	16	IE	S	S		S	IE	IE	IE		IE			IE	IE	IE	IE	S			
		Nutrient enrichment	396										NS			NS	NS	NS	NS	S			
		Organic enrichment	181										S			IE	IE	NS	IE	S			
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	354										S			S	S	S	S				
		Physical change (to another seabed type)	709										S			S	S	S	S	S			
		Removal of non-target species	567													S							
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	359										S			S	S	S	S				
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	359										S			S	S	NS	S				
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	342	IE	IE	IE	IE	IE	IE	IE	IE		NS			NS	NS	NS	NS	S			

Operation	Activity	Pressure	Justification	Bird features: Breeding Avocet (Recurvirostra avosetta)	Bird features: Breeding Lesser black-backed gull (Larus fuscus)	Bird features: Breeding Little tern (Sternula albifrons)	Bird features: Breeding Marsh harrier (Circus aeruginosus)	Bird features: Breeding Sandwich tern (Sterna sandvicensis)	Bird features: Non-breeding Avocet (Recurvirostra avosetta)	Bird features: Non-breeding Redshank (Tringa totanus)	Bird features: Non-breeding Ruff (Philomachus pugnax)	Supporting habitat: Annual vegetation of drift lines	Supporting habitat: Coastal lagoons	Supporting habitat: Coastal reedbeds	Supporting habitat: Freshwater and coastal grazing marsh	Supporting habitat: Intertidal biogenic reef: mussel beds	Supporting habitat: Intertidal mixed sediments	Supporting habitat: Intertidal mud	Supporting habitat: Intertidal sand and muddy sand	Supporting habitat: Water column	Saltmarsh: Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Saltmarsh: Salicornia and other annuals colonising mud and sand	Saltmarsh: Spartina swards (Spartinion maritimae)
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	163	S	IE	IE	S	IE	S	S	S		NS			NS	NS	NS	NS	S			
		Visual disturbance	308	S	S	S	S	S	S	S	S									S			
		Water flow (tidal current) changes – local, including sediment transport considerations	143		IE	IE		IE					IE			S	NS	NS	S	S			
		Wave exposure changes - local	337										IE			S	S	NS	S	S			
COASTAL DEVELOPMENT AND FLOOD AND EROSION RISK MANAGEMENT SCHEMES (construction)	Construction and operation of offshore coastal defence structures (wave screens/breakwaters)	Above water noise	441	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	161													S	S	S	S			S	S
		Barrier to species movement	711	S	NS	S	NS	NS	S	S	S									S		S	S
		Changes in suspended solids (water clarity)	398		S	S		S								S	S	NS	NS	S		S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S															
		Emergence regime changes – local, including tidal level change considerations	160	S	IE	IE		IE	S	S	S					S	S	S	S			S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE					NS	NS	NS	NS	S		NS	NS
		Introduction of light	518	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	216	IE	IE	IE		IE	IE	IE	IE					IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	216	S	S	S	IE	S	NS	S						S	S	IE	S	S		S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	161													S	S	S	S			S	S
		Physical change (to another seabed type)	161													S	S	S	S	S		S	S
		Physical loss (to land or freshwater habitat)	161													S	S	S	S	S		S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	159													S	S	S	S			S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	397													S	S	NS	S			S	S

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE					NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	S	IE	IE	S	IE	S	S	S					NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	162		IE	IE		IE												S			
		Vibration	244													IE	IE	IE	IE	S		IE	IE
		Visual disturbance	441	S	S	S	S	S	S	S	S									S			
		Water flow (tidal current) changes – local, including sediment transport considerations	160		IE	IE		IE								S	NS	NS	S	S		NS	NS
		Wave exposure changes - local	160													S	S	NS	S	S		NS	NS
	Construction of coastal flood and erosion risk management schemes	Above water noise	441	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	711	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	374		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S				NA		NA	NA								
		Habitat structure changes - removal of substratum (extraction)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	518	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	246	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	216	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	159									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	159									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	441		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	441	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	160		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	374									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
	Construction works/plant	Above water noise	441	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	711	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	668		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S				NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	518	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	216	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	216	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	249									NA	S	NA	NA	S	S	S	S	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	441		IE	IE		IE				NA		NA	NA					S			
		Vibration	698									NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Visual disturbance	441	S	S	S	S	S	S	S	S	NA		NA	NA					S			
	Intertidal recharge	Above water noise	441	S	S	S	IE	S	S	S	S	NA		NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	161									NA	S	NA		S	S	S	S		S	S	S
		Barrier to species movement	711	S	NS	S	NS	NS	S	S	S	NA		NA						S	S	S	S
		Changes in suspended solids (water clarity)	240		S	S		S				NA	S	NA		S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108	S	S	S	S	S	S	S	S	NA		NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S				NA		NA									
		Deoxygenation	315									NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Emergence regime changes – local, including tidal level change considerations	160	S	IE	IE		IE	S	S	S	NA	S	NA		S	S	S	S		S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	518	S	IE	IE	IE	IE	S	S	S	NA		NA						S			
		Introduction of other substances (solid, liquid or gas)	216	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA		IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	216	S	S	S	IE	S	NS	S		NA	S	NA		S	S	IE	S	S	S	S	S
		Nutrient enrichment	23									NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Organic enrichment	22									NA	S	NA		IE	IE	NS	IE	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	667									NA	S	NA		S	S	S	S		S	S	S
		Physical change (to another seabed type)	161									NA	S	NA		S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	161									NA	S	NA		S	S	S	S	S	S	S	S

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	188									NA	S	NA		S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	188									NA	S	NA		S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	S	IE	IE	S	IE	S	S	S	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	441		IE	IE		IE				NA		NA						S			
		Visual disturbance	441	S	S	S	S	S	S	S	S	NA		NA						S			
		Water flow (tidal current) changes – local, including sediment transport considerations	160		IE	IE		IE				NA	IE	NA		S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	160									NA	IE	NA		S	S	NS	S	S	NS	NS	NS
	Managed realignment	Above water noise	441	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	696		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	374	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	374		S	S		S				NA		NA	NA								
		Deoxygenation	277									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Emergence regime changes – local, including tidal level change considerations	160	S	IE	IE		IE	S	S	S	NA	S	NA	NA	S	S	S	S	S	S	S	S
		Habitat structure changes - removal of substratum (extraction)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	216	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Nutrient enrichment	299									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Organic enrichment	298									NA	S	NA	NA	IE	IE	NS	IE	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Salinity changes - local	259									NA	S	NA	NA	S	S	NS	S	S	S	S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	697									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	697									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	250	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	374		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	441	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	160		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	160									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
	Piling	Above water noise	441	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	711	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	74		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S				NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Introduction of other substances (solid, liquid or gas)	216	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	216	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	75									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	441		IE	IE		IE				NA		NA	NA					S			
		Vibration	84									NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Visual disturbance	441	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	374		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	374									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
	Reclaim and land take (e.g. the footprint of coastal defences)	Above water noise	441	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	711	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	666		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108	S	S	S	S	S	S	S	S	NA		NA	NA								
		Deoxygenation	374									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	518	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	216	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	216	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	161									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	161									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	187									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	187									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	216	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	441		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	441	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	374		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
COASTAL DEVELOPMENT AND FLOOD AND EROSION RISK MANAGEMENT SCHEMES (maintenance)	Maintenance of hard coastal defences	Above water noise	57	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	344									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	374	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	374		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S				NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	215	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	524	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	215	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	215	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	344									NA	S	NA	NA	S	S	S	S		S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Physical change (to another seabed type)	344									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	344									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	215	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	215	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	57		IE	IE		IE				NA		NA	NA					S			
		Vibration	374									NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Visual disturbance	57	S	S	S	S	S	S	S	S	NA		NA	NA					S			
	Maintenance of soft coastal defences	Above water noise	57	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	344									NA	S	NA	NA	S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	281		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	108		S	S		S				NA		NA	NA								
		Deoxygenation	283									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	215	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	524	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	215	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	215	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Nutrient enrichment	284									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Organic enrichment	284									NA	S	NA	NA	IE	IE	NS	IE	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	344									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	344									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	344									NA	S	NA	NA	S	S	S	S	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	282									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	282									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	215	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	215	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	57		IE	IE		IE				NA		NA	NA					S			
		Vibration	651									NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Visual disturbance	56	S	S	S	S	S	S	S	S	NA		NA	NA					S			
COASTAL DEVELOPMENT AND FLOOD AND EROSION RISK MANAGEMENT SCHEMES (operation)	Operation of coastal flood and erosion risk management schemes	Above water noise	374	S	S		IE		S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	532									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	290	S	NS		NS		S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	274		S							NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	374	S	S		S		S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	374		S							NA		NA	NA								
		Emergence regime changes – local, including tidal level change considerations	146	S	IE				S	S	S	NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	374	IE	IE				IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	374	S	IE		IE		S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	374	IE	IE				IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Nutrient enrichment	274									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Organic enrichment	274									NA	S	NA	NA	IE	IE	NS	IE	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	532									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	532									NA	S	NA	NA	S	S	S	S	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Physical loss (to land or freshwater habitat)	532									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Salinity changes - local	291									NA	S	NA	NA	S	S	NS	S	S	S	S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	532									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	532									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	374	IE	IE		IE		IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	374	S	IE		S		S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	243		IE							NA		NA	NA					S			
		Visual disturbance	374	S	S		S		S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	147		IE							NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	145									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
COASTAL INFRASTRUCTURE	Outflow pipes (maintenance/construction/usage)	Above water noise	423	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	438									NA	S	NA	NA	S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	417		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	306	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	306		S	S		S				NA		NA	NA								
		Deoxygenation	252									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Habitat structure changes - removal of substratum (extraction)	426									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	420	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	414	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of microbial pathogens	419	S	S	S	S	S	S	S	S	NA		NA	NA	S	IE		S	NS			
		Introduction of other substances (solid, liquid or gas)	424	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Introduction or spread of non-indigenous species	600	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Litter	613	IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Nutrient enrichment	192									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Organic enrichment	193									NA	S	NA	NA	IE	IE	NS	IE	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	425									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	699									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	700									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Radionuclide contamination	422	IE	IE	IE	IE	IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE		IE	IE	IE
		Salinity changes - local	2									NA	S	NA	NA	S	S	NS	S	S	S	S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	415									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	436									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	191	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Temperature changes - local	416									NA	NS	NA	NA	S	S	NS	S	S	S	S	S
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	418	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	233		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	618	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	437		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	421									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
	Slipway (maintenance/construction/usage)	Above water noise	601	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	232									NA	S	NA	NA	S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	228		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	374		S	S		S				NA		NA	NA								
		Habitat structure changes - removal of substratum (extraction)	609									NA	S	NA	NA	S	S	S	S	S	S	S	S

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	607	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	604	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	608	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	636	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Litter	602	IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	611									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	345									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	610									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	230									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	229									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	606	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	605	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	612		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	603	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	406		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	578									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
COMMERCIAL SHIPPING (operation)	Navigation markers/lights	Above water noise	374	S	S	S	IE	S	S	S	S			NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	675											NA		S	S	S	S		S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676	S	S	S	S	S	S	S	S			NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676		S	S		S						NA									

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	374	IE	IE	IE		IE	IE	IE	IE			NA		NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	82	S	IE	IE	IE	IE	S	S	S			NA						S			
		Introduction of other substances (solid, liquid or gas)	374	IE	IE	IE		IE	IE	IE	IE			NA		IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	374	S	S	S	IE	S	NS	S				NA		S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	675											NA		S	S	S	S		S	S	S
		Physical change (to another seabed type)	675											NA		S	S	S	S	S	S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	374	IE	IE	IE	IE	IE	IE	IE	IE			NA		NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	374	S	IE	IE	S	IE	S	S	S			NA		NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	374		IE	IE		IE						NA						S			
		Visual disturbance	247	S	S	S	S	S	S	S	S			NA						S			
	Vessel anchorages	Above water noise	374	S	S	S		S	S	S	S			NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	675										S	NA		S	S	S	S			S	S
		Changes in suspended solids (water clarity)	374		S	S		S					S	NA		S	S	NS	NS	S		S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676	S	S	S		S	S	S	S			NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676		S	S		S						NA									
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	119	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	NS
		Introduction of light	367	S	IE	IE		IE	S	S	S			NA						S			
		Introduction of other substances (solid, liquid or gas)	119	IE	IE	IE		IE	IE	IE	IE		IE	NA		IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	119	S	S	S		S	NS	S			S	NA		S	S	IE	S	S		S	S

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	675										S	NA		S	S	S	S			S	S
		Physical change (to another seabed type)	675										S	NA		S	S	S	S	S		S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374										S	NA		S	S	NS	S			S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	119	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	119	S	IE	IE		IE	S	S	S		NS	NA		NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	374		IE	IE		IE						NA						S			
		Visual disturbance	120	S	S	S		S	S	S	S			NA						S			
	Vessel discharges/emissions	Above water noise	380	S	S	S	IE	S	S	S	S	NA		NA									
		Changes in suspended solids (water clarity)	665		S	S		S				NA	S	NA		S	S	NS	NS	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	568	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S	NA		NA						S			
		Introduction of other substances (solid, liquid or gas)	568	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA		IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	568	S	S	S	IE	S	NS	S		NA	S	NA		S	S	IE	S	S	S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	568	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	568	S	IE	IE	S	IE	S	S	S	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	380		IE	IE		IE				NA		NA						S			
		Visual disturbance	665	S	S	S	S	S	S	S	S	NA		NA						S			
	Vessel moorings	Above water noise	123	S	S	S		S	S	S	S			NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	675										S	NA		S	S	S	S			S	S
		Changes in suspended solids (water clarity)	269		S	S		S					S	NA		S	S	NS	NS	S		S	S

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676	S	S	S		S	S	S	S			NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676		S	S		S						NA									
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	119	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	NS
		Introduction of light	366	S	IE	IE		IE	S	S	S			NA						S			
		Introduction of other substances (solid, liquid or gas)	119	IE	IE	IE		IE	IE	IE	IE		IE	NA		IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	119	S	S	S		S	NS	S			S	NA		S	S	IE	S	S		S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	675										S	NA		S	S	S	S			S	S
		Physical change (to another seabed type)	675										S	NA		S	S	S	S	S		S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374										S	NA		S	S	NS	S			S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	119	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	119	S	IE	IE		IE	S	S	S		NS	NA		NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	122		IE	IE		IE						NA						S			
		Visual disturbance	121	S	S	S		S	S	S	S			NA						S			
	Vessel movements	Above water noise	381	S	S	S	IE	S	S	S	S			NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	675										S	NA		S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	394		S	S		S					S	NA		S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676	S	S	S	S	S	S	S	S			NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	676		S	S		S						NA									

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	568	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	367	S	IE	IE	IE	IE	S	S	S			NA						S			
		Introduction of other substances (solid, liquid or gas)	568	IE	IE	IE		IE	IE	IE	IE		IE	NA		IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	568	S	S	S	IE	S	NS	S			S	NA		S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	374										S	NA		S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374										S	NA		S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	568	IE	IE	IE	IE	IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	568	S	IE	IE	S	IE	S	S	S		NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	381		IE	IE		IE						NA						S			
		Visual disturbance	101	S	S	S	S	S	S	S	S			NA						S			
		Wave exposure changes - local	374										IE	NA		S	S	NS	S	S	NS	NS	NS
FISHING	Anchored nets/lines	Above water noise	706	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	559										S			S	S	S	S				
		Barrier to species movement	704	S	NS	S	NS	NS	S	S	S									S			
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150		S	S		S															
		Genetic modification & translocation of indigenous species	256													IE			IE	S			
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	258	IE	IE	IE		IE	IE	IE	IE		NS			NS	NS	NS	NS	S			
		Introduction of light	323	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	684	IE	IE	IE		IE	IE	IE	IE		IE			IE	IE	IE	IE	S			

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat									Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Introduction or spread of non-indigenous species	619	S	S	S	IE	S	NS	S			S			S	S	IE	S	S			
		Litter	190	IE	S	S		S	IE	IE	IE		IE			IE	IE	IE	IE	S			
		Organic enrichment	374										S			IE	IE	NS	IE	S			
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	550										S			S	S	S	S				
		Removal of non-target species	543	S	S	S	IE	S	S	S	S		S			S			S	S			
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	IE	IE	IE	IE	IE	IE	IE	IE		NS			NS	NS	NS	NS	S			
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	S	IE	IE	S	IE	S	S	S		NS			NS	NS	NS	NS	S			
		Underwater noise changes	536		IE	IE		IE												S			
		Visual disturbance	362	S	S	S	S	S	S	S	S									S			
	Diving	Above water noise	708	S	S	S	IE	S	S	S	S	NA											
		Abrasion/disturbance of the substrate on the surface of the seabed	363									NA	S			S	S	S	S		S		
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150	S	S	S	S	S	S	S	S	NA											
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150		S	S		S				NA											
		Genetic modification & translocation of indigenous species	256									NA				IE			IE	S	S		
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	679	IE	IE	IE		IE	IE	IE	IE	NA	NS			NS	NS	NS	NS	S	NS		
		Introduction of light	323	S	IE	IE	IE	IE	S	S	S	NA								S			
		Introduction of other substances (solid, liquid or gas)	684	IE	IE	IE		IE	IE	IE	IE	NA	IE			IE	IE	IE	IE	S	IE		
		Introduction or spread of non-indigenous species	619	S	S	S	IE	S	NS	S		NA	S			S	S	IE	S	S	S		
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	363									NA	S			S	S	S	S		S		
		Removal of target species	587									NA	S			S	S	S	S		S		

Operation	Activity	Pressure	Justification	Bird features: Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Supporting habitat: Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Saltmarsh: Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Saltmarsh: Salicornia and other annuals colonising mud and sand	Saltmarsh: Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS			NS	NS	NS	NS	S	NS		
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	S	IE	IE	S	IE	S	S	S	NA	NS			NS	NS	NS	NS	S	NS		
		Underwater noise changes	533		IE	IE		IE				NA								S			
		Visual disturbance	360	S	S	S	S	S	S	S	S	NA								S			
	Pelagic fishing (or fishing activities that do not interact with sea bed)	Above water noise	708	S	S	S	IE	S	S	S	S												
		Barrier to species movement	704	S	NS	S	NS	NS	S	S	S									S			
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150		S	S		S															
		Deoxygenation	303																	S			
		Genetic modification & translocation of indigenous species	256																	S			
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	258	IE	IE	IE		IE	IE	IE	IE									S			
		Introduction of light	323	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	684	IE	IE	IE		IE	IE	IE	IE									S			
		Introduction or spread of non-indigenous species	619	S	S	S	IE	S	NS	S										S			
		Litter	189	IE	S	S		S	IE	IE	IE									S			
		Organic enrichment	303																	S			
		Removal of non-target species	544	S	S	S	IE	S	S	S	S									S			
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	IE	IE	IE	IE	IE	IE	IE	IE									S			
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	S	IE	IE	S	IE	S	S	S									S			
		Underwater noise changes	536		IE	IE		IE												S			
		Visual disturbance	362	S	S	S	S	S	S	S	S									S			
	Shore-based activities	Above water noise	621	S	S	S	IE	S	S	S	S	NA		NA	NA								

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Abrasion/disturbance of the substrate on the surface of the seabed	558									NA	S	NA	NA	S	S	S	S		S	S	S
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150		S	S		S				NA		NA	NA								
		Deoxygenation	313									NA	NS	NA	NA	NS	NS	NS	NS		NS	NS	NS
		Genetic modification & translocation of indigenous species	376									NA		NA	NA	IE			IE		S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	25	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS		NS	NS	NS
		Introduction of light	323	S	IE	IE	IE	IE	S	S	S	NA		NA	NA								
		Litter	17	IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	557									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	705									NA	S	NA	NA	S	S	S	S		S	S	S
		Removal of non-target species	374	S	S	S	IE	S	S	S	S	NA	S	NA	NA	S			S				
		Removal of target species	587									NA		NA	NA	S	S	S	S		S	S	
		Visual disturbance	361	S	S	S	S	S	S	S	S	NA		NA	NA								
	Traps	Above water noise	707	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	560										S			S	S	S	S				
		Barrier to species movement	704	S	NS	S	NS	NS	S	S	S									S			
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	150		S	S		S															
		Genetic modification & translocation of indigenous species	256													IE			IE	S			
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	258	IE	IE	IE		IE	IE	IE	IE		NS			NS	NS	NS	NS	S			
		Introduction of light	323	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	684	IE	IE	IE		IE	IE	IE	IE		IE			IE	IE	IE	IE	S			
		Introduction or spread of non-indigenous species	619	S	S	S	IE	S	NS	S			S			S	S	IE	S	S			
		Litter	18	IE	S	S		S	IE	IE	IE		IE			IE	IE	IE	IE	S			

				Bird features								Supporting habitat									Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	549										S			S	S	S	S				
		Removal of non-target species	548	S	S	S	IE	S	S	S	S		S			S			S	S			
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	IE	IE	IE	IE	IE	IE	IE	IE		NS			NS	NS	NS	NS	S			
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	166	S	IE	IE	S	IE	S	S	S		NS			NS	NS	NS	NS	S			
		Underwater noise changes	535		IE	IE		IE												S			
		Visual disturbance	362	S	S	S	S	S	S	S	S									S			
LICENSED ACTIONS	Licensed disturbing (only) of highly protected species	Above water noise		S		S	IE																
		Abrasion/disturbance of the substrate on the surface of the seabed																					
		Introduction of light		S		IE	IE																
		Litter		IE		S																	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion																					
		Visual disturbance		S		S	S																
	Licensed intentional and unavoidable consequential taking/killing	Above water noise		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed										NA		NA	NA	S	S	S	S		S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)		S	S	S	S	S	S	S	S	NA		NA	NA								
		Habitat structure changes - removal of substratum (extraction)										NA		NA	NA							S	S
		Introduction of light		S	IE	IE	IE	IE	S	S	S	NA		NA	NA								
		Litter		IE	S	S		S	IE	IE	IE	NA		NA	NA	IE	IE	IE	IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion										NA		NA	NA	S	S	S	S			S	S
		Removal of non-target species		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Removal of target species		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.		S	IE	IE	S	IE	S	S	S	NA		NA	NA								
		Visual disturbance		S	S	S	S	S	S	S	S	NA		NA	NA								
	Licensed netting, fitting one-way excluders, fish-refuges	Above water noise		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed										NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement		S	NS	S	NS	NS	S	S	S	NA		NA	NA					S			

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)		S	S	S	S	S	S	S	S	NA		NA	NA								
		Litter		IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion										NA	S	NA	NA	S	S	S	S		S	S	S
		Visual disturbance		S	S	S	S	S	S	S	S	NA		NA	NA								
	Licensed scientific sampling	Above water noise		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed										NA	S	NA	NA	S	S	S	S		S	S	S
		Litter		IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion										NA	S	NA	NA	S	S	S	S		S	S	S
		Removal of non-target species		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Removal of target species		S	S	S	IE	S	S	S	S	NA	S	NA	NA	S	S	S	S	S	S	S	S
		Visual disturbance		S	S	S	S	S	S	S	S	NA		NA	NA					S			
	Licensed taking and immediate releasing or minor scale relocating within same site	Above water noise		S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed																					
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)		S	S	S	S	S	S	S	S												
		Litter		IE	S	S		S	IE	IE	IE												
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion																					
		Removal of non-target species		S	S	S	IE	S	S	S	S												
		Removal of target species		S	S	S	IE	S	S	S	S												
		Visual disturbance		S	S	S	S	S	S	S	S												
	Licensed taking for translocation and introductions and major scale relocations	Above water noise		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed										NA	S	NA	NA	S	S	S	S		S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)		S	S	S	S	S	S	S	S	NA		NA	NA								
		Genetic modification & translocation of indigenous species										NA		NA	NA	IE					S	S	S
		Introduction or spread of non-indigenous species		S	S	S	IE	S	NS	S		NA	S	NA	NA	S		IE	S		S	S	S
		Litter		IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion										NA	S	NA	NA	S	S	S	S		S	S	S
		Removal of non-target species		S	S	S	IE	S	S	S	S	NA		NA	NA								

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat									Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Removal of target species		S	S	S	IE	S	S	S	S	NA		NA	NA								
		Visual disturbance		S	S	S	S	S	S	S	S	NA		NA	NA								
MILITARY ACTIVITIES	Air	Above water noise	701	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	701																				
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	703	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	703		S	S		S															
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	IE	IE	IE		IE	IE	IE	IE												
		Introduction of other substances (solid, liquid or gas)	701	IE	IE	IE		IE	IE	IE	IE												
		Introduction or spread of non-indigenous species	701	S	S	S	IE	S	NS	S													
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	IE	IE	IE	IE	IE	IE	IE	IE												
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	S	IE	IE	S	IE	S	S	S												
		Underwater noise changes	701		IE	IE		IE															
		Visual disturbance	701	S	S	S	S	S	S	S	S												
	Beach	Above water noise	701	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	701																				
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	703	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	703		S	S		S															
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	IE	IE	IE		IE	IE	IE	IE												
		Introduction of other substances (solid, liquid or gas)	701	IE	IE	IE		IE	IE	IE	IE												

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Introduction or spread of non-indigenous species	701	S	S	S	IE	S	NS	S													
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	701																				
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	IE	IE	IE	IE	IE	IE	IE	IE												
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	S	IE	IE	S	IE	S	S	S												
		Underwater noise changes	701		IE	IE		IE															
		Visual disturbance	701	S	S	S	S	S	S	S	S												
	MCM and EOD	Above water noise	701	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	701																				
		Barrier to species movement	701	S	NS	S	NS	NS	S	S	S												
		Changes in suspended solids (water clarity)	703		S	S		S															
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	703	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	703		S	S		S															
		Electromagnetic changes	701																				
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	IE	IE	IE		IE	IE	IE	IE												
		Introduction of other substances (solid, liquid or gas)	701	IE	IE	IE		IE	IE	IE	IE												
		Introduction or spread of non-indigenous species	701	S	S	S	IE	S	NS	S													
		Litter	701	IE	S	S		S	IE	IE	IE												
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	701																				
		Physical change (to another seabed type)	703																				

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat									Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	IE	IE	IE	IE	IE	IE	IE	IE												
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	701	S	IE	IE	S	IE	S	S	S												
		Underwater noise changes	701		IE	IE		IE															
		Vibration	701																				
		Visual disturbance	701	S	S	S	S	S	S	S	S												
PORTS AND HARBOURS (construction)	Anchorages/moorings	Above water noise	442	S	S	S	IE	S	S	S	S	NA		NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	158									NA	S	NA		S	S	S	S			S	
		Changes in suspended solids (water clarity)	374		S	S		S				NA	S	NA		S	S	NS	NS	S		S	
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA		NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA									
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S		NS	
		Introduction of light	517	S	IE	IE	IE	IE	S	S	S	NA		NA						S			
		Introduction of other substances (solid, liquid or gas)	124	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA		IE	IE	IE	IE	S		IE	
		Introduction or spread of non-indigenous species	124	S	S	S	IE	S	NS	S		NA	S	NA		S	S	IE	S	S		S	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	158									NA	S	NA		S	S	S	S			S	
		Physical change (to another seabed type)	91									NA	S	NA		S	S	S	S	S		S	
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	63									NA	S	NA		S	S	NS	S			S	
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S		NS	

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	S	IE	IE	S	IE	S	S	S	NA	NS	NA		NS	NS	NS	NS	S		NS	
		Underwater noise changes	442		IE	IE		IE				NA		NA						S			
		Visual disturbance	118	S	S	S	S	S	S	S	S	NA		NA						S			
		Water flow (tidal current) changes – local, including sediment transport considerations	319		IE	IE		IE				NA	IE	NA		S	NS	NS	S	S		NS	
	Capital dredging disposal	Above water noise	442	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	197													S	S	S	S			S	S
		Barrier to species movement	71	S	NS	S	NS	NS	S	S	S									S		S	S
		Changes in suspended solids (water clarity)	60		S	S		S								S	S	NS	NS	S		S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S												
		Deoxygenation	58													NS	NS	NS	NS	S		NS	NS
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	IE	IE	IE		IE	IE	IE	IE					NS	NS	NS	NS	S		NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	124	IE	IE	IE		IE	IE	IE	IE					IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	124	S	S	S	IE	S	NS	S						S	S	IE	S	S		S	S
		Nutrient enrichment	59													NS	NS	NS	NS	S		NS	NS
		Organic enrichment	59													IE	IE	NS	IE	S		S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	374													S	S	S	S			S	S
		Physical change (to another seabed type)	69													S	S	S	S	S		S	S
		Physical loss (to land or freshwater habitat)	374													S	S	S	S	S		S	S
		Radionuclide contamination	374	IE	IE	IE	IE	IE	IE	IE	IE					IE	IE	IE	IE			IE	IE
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	63													S	S	S	S			S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	63													S	S	NS	S			S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	IE	IE	IE	IE	IE	IE	IE	IE					NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	S	IE	IE	S	IE	S	S	S					NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	442		IE	IE		IE												S			
		Visual disturbance	118	S	S	S	S	S	S	S	S									S			
		Water flow (tidal current) changes – local, including sediment transport considerations	292		IE	IE		IE								S	NS	NS	S	S		NS	NS
		Wave exposure changes - local	275													S	S	NS	S	S		NS	NS
	Construction of port and harbour structures	Above water noise	442	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	158									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	80	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	66		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA	NA								
		Emergence regime changes – local, including tidal level change considerations	89	S	IE	IE		IE	S	S	S	NA	S	NA	NA	S	S	S	S	S	S	S	S
		Habitat structure changes - removal of substratum (extraction)	158									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	517	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	217	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	124	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	158									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	91									NA	S	NA	NA	S	S	S	S	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Physical loss (to land or freshwater habitat)	72									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Removal of non-target species	529	S	S	S	IE	S	S	S	S	NA	S	NA	NA	S			S	S			
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	63									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	63									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	442		IE	IE		IE				NA		NA	NA					S			
		Vibration	64									NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Visual disturbance	67	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	89		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	89									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
	Land reclaim	Above water noise	442	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	157									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	65	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	66		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA	NA								
		Deoxygenation	66									NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Emergence regime changes – local, including tidal level change considerations	89	S	IE	IE		IE	S	S	S	NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	517	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat									Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Introduction of other substances (solid, liquid or gas)	217	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	124	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	158									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	90									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	91									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Removal of non-target species	528	S	S	S	IE	S	S	S	S	NA	S	NA	NA	S			S	S			
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	63									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	63									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	217	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	442		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	67	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	89		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
		Wave exposure changes - local	89									NA	IE	NA	NA	S	S	NS	S	S	NS	NS	NS
	Piling	Above water noise	442	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	158									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	83	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S
		Changes in suspended solids (water clarity)	435		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	251	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Introduction of other substances (solid, liquid or gas)	124	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	124	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	158									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	85									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	91									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	442		IE	IE		IE				NA		NA	NA					S			
		Vibration	64									NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Visual disturbance	67	S	S	S	S	S	S	S	S	NA		NA	NA					S			
		Water flow (tidal current) changes – local, including sediment transport considerations	369		IE	IE		IE				NA	IE	NA	NA	S	NS	NS	S	S	NS	NS	NS
	Vessel movements and transport of materials	Above water noise	442	S	S	S		S	S	S	S	NA		NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	158									NA	S	NA		S	S	S	S		S	S	S
		Barrier to species movement	304	S	NS	S		NS	S	S	S	NA		NA						S	S	S	S
		Changes in suspended solids (water clarity)	305		S	S		S				NA	S	NA		S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S		S	S	S	S	NA		NA									
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	517	S	IE	IE		IE	S	S	S	NA		NA						S			
		Introduction of other substances (solid, liquid or gas)	124	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA		IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	124	S	S	S		S	NS	S		NA	S	NA		S	S	IE	S	S	S	S	S

				Bird features								Supporting habitat									Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	158									NA	S	NA		S	S	S	S		S	S	S
		Physical change (to another seabed type)	675									NA	S	NA		S	S	S	S	S	S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	63									NA	S	NA		S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	124	S	IE	IE		IE	S	S	S	NA	NS	NA		NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	442		IE	IE		IE				NA		NA						S			
		Visual disturbance	61	S	S	S		S	S	S	S	NA		NA						S			
PORTS AND HARBOURS (maintenance)	Clearance slipways, similar structures and water ways	Above water noise	443	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	340									NA	S	NA	NA	S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	374		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	516	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	516	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	374									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	443		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	104	S	S	S	S	S	S	S	S	NA		NA	NA					S			
	Maintenance dredging	Above water noise	443	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	340										S			S	S	S	S			S	S
		Barrier to species movement	523	S	NS	S	NS	NS	S	S	S									S		S	S
		Changes in suspended solids (water clarity)	77		S	S		S					S			S	S	NS	NS	S		S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S															
		Deoxygenation	77										NS			NS	NS	NS	NS	S		NS	NS
		Emergence regime changes – local, including tidal level change considerations	339	S	IE	IE		IE	S	S	S		S			S	S	S	S	S		S	S
		Habitat structure changes - removal of substratum (extraction)	340										S			S	S	S	S	S		S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE		IE	IE	IE	IE		NS			NS	NS	NS	NS	S		NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	516	IE	IE	IE		IE	IE	IE	IE		IE			IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	516	S	S	S	IE	S	NS	S			S			S	S	IE	S	S		S	S
		Nutrient enrichment	59										NS			NS	NS	NS	NS	S		NS	NS
		Organic enrichment	59										S			IE	IE	NS	IE	S		S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	340										S			S	S	S	S			S	S
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	77										S			S	S	S	S			S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	77										S			S	S	NS	S			S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE	IE	IE	IE	IE	IE		NS			NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	S	IE	IE	S	IE	S	S	S		NS			NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	443		IE	IE		IE												S			
		Vibration	374										IE			IE	IE	IE	IE	S		IE	IE
		Visual disturbance	104	S	S	S	S	S	S	S	S									S			
		Water flow (tidal current) changes – local, including sediment transport considerations	339		IE	IE		IE					IE			S	NS	NS	S	S		NS	NS
	Maintenance dredging disposal	Above water noise	443	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	183													S	S	S	S			S	S
		Barrier to species movement	519	S	NS	S	NS	NS	S	S	S									S		S	S
		Changes in suspended solids (water clarity)	77		S	S		S								S	S	NS	NS	S		S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S												
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S															
		Deoxygenation	77													NS	NS	NS	NS	S		NS	NS
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE		IE	IE	IE	IE					NS	NS	NS	NS	S		NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S									S			
		Introduction of other substances (solid, liquid or gas)	516	IE	IE	IE		IE	IE	IE	IE					IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	516	S	S	S	IE	S	NS	S						S	S	IE	S	S		S	S
		Nutrient enrichment	59													NS	NS	NS	NS	S		NS	NS
		Organic enrichment	59													IE	IE	NS	IE	S		S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	374													S	S	S	S			S	S
		Physical change (to another seabed type)	374													S	S	S	S	S		S	S
		Physical loss (to land or freshwater habitat)	374													S	S	S	S	S		S	S
		Radionuclide contamination	374	IE	IE	IE	IE	IE	IE	IE	IE					IE	IE	IE	IE			IE	IE

				Bird features								Supporting habitat											
																					Saltmarsh		
Operation	Activity	Pressure	Justification	Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	77													S	S	S	S			S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	77													S	S	NS	S			S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE	IE	IE	IE	IE	IE					NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	S	IE	IE	S	IE	S	S	S					NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	443		IE	IE		IE												S			
		Visual disturbance	104	S	S	S	S	S	S	S	S									S			
	Maintenance of port and harbour structures	Above water noise	443	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	340									NA	S	NA	NA	S	S	S	S		S	S	S
		Changes in suspended solids (water clarity)	77		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA	NA								
		Habitat structure changes - removal of substratum (extraction)	340									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	516	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	516	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	340									NA	S	NA	NA	S	S	S	S		S	S	S
		Physical change (to another seabed type)	340									NA	S	NA	NA	S	S	S	S	S	S	S	S
		Physical loss (to land or freshwater habitat)	73									NA	S	NA	NA	S	S	S	S	S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Siltation rate changes (High), including smothering (depth of vertical sediment overburden)	77									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	77									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	516	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	443		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	104	S	S	S	S	S	S	S	S	NA		NA	NA					S			
PORTS AND HARBOURS (operation)	Berths/moorings/anchorages	Above water noise	444	S	S	S		S	S	S	S	NA		NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	110									NA	S	NA		S	S	S	S			S	S
		Barrier to species movement	129	S	NS	S		NS	S	S	S	NA		NA						S		S	S
		Changes in suspended solids (water clarity)	116		S	S		S				NA	S	NA		S	S	NS	NS	S		S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S		S	S	S	S	NA		NA									
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA									
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S		NS	NS
		Introduction of light	522	S	IE	IE		IE	S	S	S	NA		NA						S			
		Introduction of other substances (solid, liquid or gas)	526	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA		IE	IE	IE	IE	S		IE	IE
		Introduction or spread of non-indigenous species	526	S	S	S		S	NS	S		NA	S	NA		S	S	IE	S	S		S	S
		Litter	526	IE	S	S		S	IE	IE	IE	NA	IE	NA		IE	IE	IE	IE	S		IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	110									NA	S	NA		S	S	S	S			S	S
		Physical change (to another seabed type)	287									NA	S	NA		S	S	S	S	S		S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374									NA	S	NA		S	S	NS	S			S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA		NS	NS	NS	NS	S		NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	S	IE	IE		IE	S	S	S	NA	NS	NA		NS	NS	NS	NS	S		NS	NS
		Underwater noise changes	444		IE	IE		IE				NA		NA						S			
		Visual disturbance	117	S	S	S		S	S	S	S	NA		NA						S			
		Water flow (tidal current) changes – local, including sediment transport considerations	320		IE	IE		IE				NA	IE	NA		S	NS	NS	S	S		NS	NS
	Cargo operations and landward transportation	Above water noise	444	S	S	S	IE	S	S	S	S	NA			NA								
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA			NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA			NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE		IE	IE	IE	IE	NA			NA						NS		
		Introduction of light	522	S	IE	IE	IE	IE	S	S	S	NA			NA								
		Introduction of other substances (solid, liquid or gas)	526	IE	IE	IE		IE	IE	IE	IE	NA			NA						IE		
		Introduction or spread of non-indigenous species	526	S	S	S	IE	S	NS	S		NA			NA						S		
		Litter	526	IE	S	S		S	IE	IE	IE	NA			NA						IE		
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE	IE	IE	IE	IE	IE	NA			NA						NS		
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	S	IE	IE	S	IE	S	S	S	NA			NA						NS		
		Underwater noise changes	444		IE	IE		IE				NA			NA								
		Visual disturbance	92	S	S	S	S	S	S	S	S	NA			NA								
	Operation of port and harbour structures	Above water noise	444	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	110									NA	S	NA	NA	S	S	S	S		S	S	S
		Barrier to species movement	105	S	NS	S	NS	NS	S	S	S	NA		NA	NA					S	S	S	S

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Changes in suspended solids (water clarity)	106		S	S		S				NA	S	NA	NA	S	S	NS	NS	S	S	S	S
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125	S	S	S	S	S	S	S	S	NA		NA	NA								
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Introduction of light	522	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	526	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE	S	IE	IE	IE
		Introduction or spread of non-indigenous species	526	S	S	S	IE	S	NS	S		NA	S	NA	NA	S	S	IE	S	S	S	S	S
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	110									NA	S	NA	NA	S	S	S	S		S	S	S
		Siltation rate changes (Low), including smothering (depth of vertical sediment overburden)	374									NA	S	NA	NA	S	S	NS	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA	NS	NS	NS	NS	S	NS	NS	NS
		Underwater noise changes	444		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	107	S	S	S	S	S	S	S	S	NA		NA	NA					S			
	Shoreside industry and operations	Above water noise	444	S	S	S	IE	S	S	S	S	NA			NA								
		Changes in suspended solids (water clarity)	279		S	S		S				NA			NA						S		
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE		IE	IE	IE	IE	NA			NA						NS		
		Introduction of light	522	S	IE	IE	IE	IE	S	S	S	NA			NA								
		Introduction of other substances (solid, liquid or gas)	526	IE	IE	IE		IE	IE	IE	IE	NA			NA						IE		
		Litter	526	IE	S	S		S	IE	IE	IE	NA			NA						IE		
		Nutrient enrichment	527									NA			NA						NS		
		Organic enrichment	527									NA			NA						S		

Operation	Activity	Pressure	Justification	Bird features: Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Supporting habitat: Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Saltmarsh: Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Saltmarsh: Salicornia and other annuals colonising mud and sand	Saltmarsh: Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE	IE	IE	IE	IE	IE	NA			NA						NS		
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	S	IE	IE	S	IE	S	S	S	NA			NA						NS		
		Visual disturbance	577	S	S	S	S	S	S	S	S	NA			NA								
	Vessel maintenance	Above water noise	444	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	110									NA	S	NA	NA		S	S	S				
		Changes in suspended solids (water clarity)	94		S	S		S				NA	S	NA	NA		S	NS	NS	S			
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	125		S	S		S				NA		NA	NA								
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA	NA		NS	NS	NS	S			
		Introduction of light	522	S	IE	IE	IE	IE	S	S	S	NA		NA	NA					S			
		Introduction of other substances (solid, liquid or gas)	526	IE	IE	IE		IE	IE	IE	IE	NA	IE	NA	NA		IE	IE	IE	S			
		Introduction or spread of non-indigenous species	526	S	S	S	IE	S	NS	S		NA	S	NA	NA		S	IE	S	S			
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	110									NA	S	NA	NA		S	S	S				
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA		NS	NS	NS	S			
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	526	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA		NS	NS	NS	S			
		Underwater noise changes	444		IE	IE		IE				NA		NA	NA					S			
		Visual disturbance	109	S	S	S	S	S	S	S	S	NA		NA	NA					S			
RECREATION	Firework displays	Above water noise	385	S	S	S	IE	S	S	S	S												
		Introduction of light	156	S	IE	IE	IE	IE	S	S	S												
		Litter	331	IE	S	S		S	IE	IE	IE												
		Visual disturbance	386	S	S	S	S	S	S	S	S												
	Horse riding & dog walking	Above water noise	561	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	660									NA	S	NA	NA	S	S	S	S		S	S	

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Litter	333	IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE		IE	IE	
		Organic enrichment	200									NA	S	NA	NA	IE	IE	NS	IE		S	S	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	268									NA	S	NA	NA	S	S	S	S		S	S	
		Removal of non-target species	202	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Visual disturbance	271	S	S	S	S	S	S	S	S	NA		NA	NA								
	Leisure (e.g. swimming, rock pooling)	Above water noise	270	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	659									NA	S	NA	NA	S	S	S	S		S	S	S
		Litter	332	IE	S	S		S	IE	IE	IE	NA	IE	NA	NA	IE	IE	IE	IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	254									NA	S	NA	NA	S	S	S	S		S	S	S
		Visual disturbance	273	S	S	S	S	S	S	S	S	NA		NA	NA								
	Light aircraft	Above water noise	616	S	S	S	IE	S	S	S	S												
		Collision ABOVE water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	154	S	S	S	S	S	S	S	S												
		Introduction of light	374	S	IE	IE	IE	IE	S	S	S												
		Visual disturbance	617	S	S	S	S	S	S	S	S												
	Non-motorised water craft (e.g. kayaks, canoes)	Above water noise	391	S	S	S	IE	S	S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	348									NA	S	NA	NA		S	S	S		S	S	S
		Introduction or spread of non-indigenous species	585	S	S	S	IE	S	NS	S		NA	S	NA	NA		S	IE	S		S	S	S
		Litter	330	IE	S	S		S	IE	IE	IE	NA	IE	NA	NA		IE	IE	IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	643									NA	S	NA	NA		S	S	S		S	S	S
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	640	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA	NA		NS	NS	NS		NS	NS	NS
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	640	S	IE	IE	S	IE	S	S	S	NA	NS	NA	NA		NS	NS	NS		NS	NS	NS
		Visual disturbance	9	S	S	S	S	S	S	S	S	NA		NA	NA								
	Powerboating: launching and recovery, participation	Above water noise	384	S	S	S	IE	S	S	S	S	NA		NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	680									NA	S	NA			S	S	S			S	
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	153		S	S		S				NA		NA									

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	653	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA			NS	NS	NS	S		NS	
		Introduction of light	520	S	IE	IE	IE	IE	S	S	S	NA		NA						S			
		Introduction or spread of non-indigenous species	683	S	S	S	IE	S	NS	S		NA	S	NA			S	IE	S	S		S	
		Litter	329	IE	S	S		S	IE	IE	IE	NA	IE	NA			IE	IE	IE	S		IE	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	646									NA	S	NA			S	S	S			S	
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	641	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA			NS	NS	NS	S		NS	
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	639	S	IE	IE	S	IE	S	S	S	NA	NS	NA			NS	NS	NS	S		NS	
		Underwater noise changes	388		IE	IE		IE				NA		NA						S			
		Visual disturbance	8	S	S	S	S	S	S	S	S	NA		NA						S			
		Wave exposure changes - local	690									NA	IE	NA			S	NS	S	S		NS	
	Powerboating: mooring	Above water noise	384	S	S	S	IE	S	S	S	S			NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	614										S	NA		S	S	S	S			S	
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	653	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	
		Introduction of light	520	S	IE	IE	IE	IE	S	S	S			NA						S			
		Introduction or spread of non-indigenous species	492	S	S	S	IE	S	NS	S			S	NA		S	S	IE	S	S		S	
		Litter	346	IE	S	S		S	IE	IE	IE		IE	NA		IE	IE	IE	IE	S		IE	
		Organic enrichment	235										S	NA		IE	IE	NS	IE	S		S	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	644										S	NA		S	S	S	S			S	
		Physical change (to another seabed type)	465										S	NA		S	S	S	S	S		S	
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	638	IE	IE	IE	IE	IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	639	S	IE	IE	S	IE	S	S	S		NS	NA		NS	NS	NS	NS	S		NS	

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Underwater noise changes	694		IE	IE		IE						NA						S			
		Visual disturbance	8	S	S	S	S	S	S	S	S			NA						S			
	Sailing: launching and recovery, participation	Above water noise	384	S	S	S	IE	S	S	S	S	NA		NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	681									NA	S	NA			S	S	S			S	
		Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	152		S	S		S				NA		NA									
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	653	IE	IE	IE		IE	IE	IE	IE	NA	NS	NA			NS	NS	NS	S		NS	
		Introduction of light	520	S	IE	IE	IE	IE	S	S	S	NA		NA						S			
		Introduction or spread of non-indigenous species	683	S	S	S	IE	S	NS	S		NA	S	NA			S	IE	S	S		S	
		Litter	329	IE	S	S		S	IE	IE	IE	NA	IE	NA			IE	IE	IE	S		IE	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	646									NA	S	NA			S	S	S			S	
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	639	IE	IE	IE	IE	IE	IE	IE	IE	NA	NS	NA			NS	NS	NS	S		NS	
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	639	S	IE	IE	S	IE	S	S	S	NA	NS	NA			NS	NS	NS	S		NS	
		Underwater noise changes	388		IE	IE		IE				NA		NA						S			
		Visual disturbance	8	S	S	S	S	S	S	S	S	NA		NA						S			
	Sailing: mooring	Above water noise	384	S	S	S	IE	S	S	S	S			NA									
		Abrasion/disturbance of the substrate on the surface of the seabed	614										S	NA		S	S	S	S			S	
		Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	653	IE	IE	IE		IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	
		Introduction of light	520	S	IE	IE	IE	IE	S	S	S			NA						S			
		Introduction or spread of non-indigenous species	492	S	S	S	IE	S	NS	S			S	NA		S	S	IE	S	S		S	
		Litter	346	IE	S	S		S	IE	IE	IE		IE	NA		IE	IE	IE	IE	S		IE	
		Organic enrichment	235										S	NA		IE	IE	NS	IE	S		S	
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	644										S	NA		S	S	S	S			S	
		Physical change (to another seabed type)	465										S	NA		S	S	S	S	S		S	

Operation	Activity	Pressure	Justification	Bird features								Supporting habitat											
																					Saltmarsh		
				Breeding Avocet (Recurvirostra avosetta)	Breeding Lesser black-backed gull (Larus fuscus)	Breeding Little tern (Sternula albifrons)	Breeding Marsh harrier (Circus aeruginosus)	Breeding Sandwich tern (Sterna sandvicensis)	Non-breeding Avocet (Recurvirostra avosetta)	Non-breeding Redshank (Tringa totanus)	Non-breeding Ruff (Philomachus pugnax)	Annual vegetation of drift lines	Coastal lagoons	Coastal reedbeds	Freshwater and coastal grazing marsh	Intertidal biogenic reef: mussel beds	Intertidal mixed sediments	Intertidal mud	Intertidal sand and muddy sand	Water column	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	Salicornia and other annuals colonising mud and sand	Spartina swards (Spartinion maritimae)
		Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC.	639	IE	IE	IE	IE	IE	IE	IE	IE		NS	NA		NS	NS	NS	NS	S		NS	
		Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC.	639	S	IE	IE	S	IE	S	S	S		NS	NA		NS	NS	NS	NS	S		NS	
		Underwater noise changes	694		IE	IE		IE						NA						S			
		Visual disturbance	8	S	S	S	S	S	S	S	S			NA						S			
	Wildfowling	Above water noise	635						S	S	S	NA		NA	NA								
		Abrasion/disturbance of the substrate on the surface of the seabed	656									NA	S	NA	NA		S	S	S		S	S	S
		Introduction or spread of non-indigenous species	682						NS	S		NA	S	NA	NA		S	IE	S		S	S	S
		Litter	654						IE	IE	IE	NA	IE	NA	NA		IE	IE	IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	645									NA	S	NA	NA		S	S	S		S	S	S
		Removal of target species	576						S	S	S	NA	S	NA	NA		S	S	S				
		Visual disturbance	272						S	S	S	NA		NA	NA								
	Wind surfing/kite surfing	Above water noise	382	S	S	S	IE	S	S	S	S												
		Abrasion/disturbance of the substrate on the surface of the seabed	657																S		S	S	S
		Litter	334	IE	S	S		S	IE	IE	IE								IE		IE	IE	IE
		Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	374																S		S	S	S
		Visual disturbance	632	S	S	S	S	S	S	S	S												

Table 3. Activity – Pressure Justifications

Activity-Pressure Justification Code	Activity-Pressure Justification	References
1	A change in flow rate will be induced by elevated structures i.e. rock armouring, exposed cable, creating scour pits and deposition tails. The size of this flow change will vary on the strength of the ambient current the size of the exposed structure.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
2	A range of substances are discharged from outfalls. These can include super saline brines which increase local salinity levels. They can also include fresh water outputs which may decrease salinity levels.	(Cole et al., 1999)
3	A small but not insignificant risk of contamination and spillage does exist however current statutory marine and environmental legislation should negate this risk as far as is possible.	(Ware, 2009)
4	Abrasion can be caused by the skirt of the hovercraft or by the hovercrafts hull when the craft is grounded on exposed seabed/intertidal ground.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
5	Abrasion can be caused by the wheels of the buggy, sand yacht.	(Saunders et al., 2000; Pienkowski, 1992)
6	Abrasion from the hovercraft skirt or the hull of the vessel when not in lift mode.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
7	Abrasion from the hovercraft skirt or the hull of the vessel when not in lift mode.	No reference(s)
8	Activities conducted on vessels and the vessels themselves can be a source of visual disturbance for seabirds. Disturbance can also be caused be vessels arriving and leaving a mooring.	(Saunders et al., 2000; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; BirdLife International, 2012a; Rodgers and Schwikert, 2002)
9	Activities conducted on vessels and the vessels themselves can be a source of visual disturbance for seabirds. Disturbance can also be caused be vessels arriving and leaving a mooring.	No reference(s)
10	Activities involving vessels may introduce harmful compounds to marine environments.	(E&P Forum and UNEP, 1997; UK Government, 2007)
11	Activity (e.g. bait digging) may result in loss of substrate.	(Roberts et al., 2010)
12	Activity can cause nutrient depletion which may have wider ecosystem impacts.	(Philips, 1991)
13	Activity considered unlikely to exert pressure at benchmark level.	No reference(s)
14	Activity could result in changes in average particle size through sediment disturbance/removal . However, uncertain whether would reach benchmark; would depend on scale/intensity of activity, substrate type and local hydrographic conditions.	No reference(s)
15	Activity could result in changes in average particle size through sediment removal and/or suspension. However, uncertain whether benchmark would be reached; would depend on scale/intensity of activity, substrate type and local hydrographic conditions.	No reference(s)
16	Activity may result in litter but unlikely to be at level that would cause concern.	(Bowmer and Kershaw, 2010)
17	Activity may result in litter but unlikely to be at level that would cause concern.	(Bowmer and Kershaw, 2010; Lozano and Mouat, 2009; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
18	Activity may result in litter but unlikely to be at level that would cause concern.	No reference(s)
19	Activity may result in litter including the loss of fishing gear but unlikely to be at level that would cause concern.	(Bowmer and Kershaw, 2010; Lozano and Mouat, 2009)
20	Aggregate extraction will create a plume suspended sediment increasing the turbidity of the surrounding areas. However, licences are only given for areas where the proportion of silts and clays is less than 5% of the total dredged material.	(Newell and Woodcock, 2013)
21	Aggregate screening will create a plume suspended sediment increasing the turbidity of the surrounding areas.	(Newell and Woodcock, 2013)
22	All sediments used for intertidal recharge can only be used if considered clean and uncontaminated. However material used could act as a source of nutrients and organic material e.g. intertidal muds.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008)(ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
23	All sediments used for intertidal recharge can only be used if considered clean and uncontaminated. However material used could act as a source of nutrients and organic material e.g. intertidal muds.	No reference(s)
24	All sediments used for intertidal recharge can only be used if considered clean and uncontaminated. Only likely through accidental release.	No reference(s)
25	Although considered unlikely this pressure could arise as a result of vehicles associated with shore based harvesting activities.	No reference(s)
26	Although rock pooling may involve picking up species - these are returned to the rock pools. This 'leisure' category does not include angling which is picked up under recreational fishing.	No reference(s)
27	Anchors can cause removal of seagrass which when pulled up.	No reference(s)
28	Aquaculture infrastructure could cause low scale barriers to migration. Note: entanglement is included under Removal of non-target species pressure.	No reference(s)
29	Aquaculture noise can be generated below or above the water. This may be associated with the actual activities or vessels used to service the facilities.	(European Commission, 2012; Olesiuk et al., 2012)
30	As a result of construction methods used.	(ABPmer, 2013)
31	As a result of devices/ arrays being deployed to extract energy.	No reference(s)
32	As a result of electricity generation although see cabling activity for more info - significance of effect unclear and likely to be localised.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Wilhelmsson et al., 2010; ABPmer, 2011)
33	As a result of electricity generation although see cabling activity for more info but significance of effect unclear and likely to be localised.	No reference(s)
34	As a result of electricity generation although see cabling activity for more info.	No reference(s)
35	As a result of foundations and scour protection installed.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; ABPmer Ltd., 2006; ABPmer, 2011; ABPmer, 2013; Wilson, 2003)
36	As a result of installation of devices, foundations and cables and scour protection.	(DECC, 2011)
37	As a result of installation of devices, foundations and cables and scour protection.	(ABPmer, 2013)
38	As a result of installation of foundations including use of jackup barges.	(DECC, 2011)
39	As a result of installation of foundations or burial of cables.	(ABPmer, 2011; Hooper and Austen, 2013)
40	As a result of installation of foundations or burial of cables.	(ABPmer, 2011; ABPmer, 2013)
41	As a result of installation of foundations or burial of cables.	(ABPmer, 2013)
42	As a result of installation of piles, foundations and scour protection.	(Wilhelmsson et al., 2010; ABPmer, 2011)
43	As a result of installation of structure and scour protection.	(Hooper and Austen, 2013)
44	As a result of maintenance/ repair of foundations, devices or cables and scour protection.	No reference(s)
45	As a result of removal of foundations or scour protection.	(Wilhelmsson et al., 2010; ABPmer, 2011)
46	As a result of removal of foundations or scour protection.	No reference(s)
47	As a result of vessels associated with this activity.	No reference(s)
48	As fishing gears disturb soft sediment they produce sediment plumes and re-mobilize previously buried organic and inorganic matter.	(Kaiser et al., 2001; Polet and Depestele, 2010)
49	As fishing gears disturb soft sediment they produce sediment plumes and re-mobilize previously buried organic and inorganic matter.	No reference(s)
50	As structures are installed there could be a risk of this occurring due to vessel movements.	No reference(s)
51	As structures are installed there could be an increased risk of this occurring.	(Mcluskie et al., 2012; ABPmer Ltd., 2006; ABPmer, 2011; ABPmer, 2013; Wilson, 2003)
52	As structures are installed there could be an increased risk of this occurring.	(Mcluskie et al., 2012; ABPmer, 2013)
53	As structures are installed there could be an increased risk of this occurring.	No reference(s)
54	As structures are installed there could be an increased risk of this occurring.	(Hooper and Austen, 2013)
55	Associated to vessel movement.	(Ware, 2009)
56	Associated vessel movements, plus: Though will depend on type of works potential to cause noise, vibration or disturbance e.g. via access of works plant, type of plant used or other disturbing activities such as intertidal recharge.	(Paganelli et al., 2013) (Rogers et al., 2010; Bray, 2008; Cutts et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; ICES (International Council for Exploration of the Sea), 2009)
57	Associated vessel movements. Although it will depend on type of works potential to cause noise, vibration or disturbance e.g. via access of works plant, type of plant used or other disturbing activities such as intertidal recharge.	(Paganelli et al., 2013) (Rogers et al., 2010; Bray, 2008); (Cutts et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; ICES (International Council for Exploration of the Sea), 2009)

58	Associated with an increase in suspended sediment during disposal, and disposal of organic/nutrient rich material e.g. muds.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
59	Associated with an increase in suspended sediment during disposal, and disposal of organic/nutrient rich material e.g. muds.	(European Commission, 2011) (European Commission, 2009; Bray, 2008; ABP Research and Consultancy Ltd., 1999)
60	Associated with an increase in suspended sediment during disposal.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
61	Associated with an increase in vessel movements, or large vessels associated with construction. Introduction of vessel movement, noise, light etc..	(Defra and UK MMAS, 2010))(Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Govarets and Lauwaert, 2009; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; OSPAR Commission, 2008c)
62	Associated with changes in emergence regime.	No reference(s)
63	Associated with construction activity, dredging, dredgings disposal, alternative use of sediment, causing mobilisation of sediment and increased suspended sediment and plumes.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
64	Associated with construction activity, piling and vessel/plant activity.	(Associated British Ports, 2011; Hawkins and Popper, 2012)
65	Associated with construction activity, piling and vessel/plant activity. Also potentially sediment plumes and changes to water quality associated with construction.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
66	Associated with construction activity, potentially causing sediment mobilisation and sediment plumes.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011) (European Commission, 2009; Bray, 2008; Liley et al., 2012)
67	Associated with construction works, plus vessel and plant movements and presence of work force.	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Govarets and Lauwaert, 2009; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; OSPAR Commission, 2008c)
68	Associated with creation of new fresh water or coastal habitats, managed realignment schemes.	(Paganelli et al., 2013; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; Bray, 2008; Liley et al., 2012)
69	Associated with deposition of sediment on sea bed, altering seabed characteristics.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Bray, 2008; Liley et al., 2012; OSPAR Commission, 2008c)
70	Associated with direct removal of bed material and changes in physical conditions in dredge pocket e.g. deposition of finer sediment.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Bray, 2008; Liley et al., 2012; OSPAR, 2009)
71	Associated with disposal sediment plume & if associated with alternative use disposal.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
72	Associated with footprint of new structures, loss of habitat through reclaim or changes in habitat associated with habitat creation/managed realignment.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Govarets and Lauwaert, 2009; OSPAR Commission, 2008c)
73	Associated with footprint of structure should maintenance works encroach on marine environment e.g. new quay wall constructed in front of original.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b; Royal Haskoning DHV, 2012)
74	Associated with increased suspended sediment from piling activity.	(Paganelli et al., 2013; Harwood, 1999; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
75	Associated with increased suspended sediment from piling activity.	(Rogers et al., 2010; Bray, 2008; Pontee et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
76	Associated with maintenance activity, piling and vessel/ plant activity.	(Associated British Ports, 2011; Hawkins and Popper, 2012)
77	Associated with mobilisation of sediments and increased suspended material, linked to dredging, dredge disposal. Also potential increased siltation associated.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR, 2009)
78	Associated with mobilisation of sediments and increased suspended sediment and plumes, increased noise and visual disturbance. Only likely to be associated with large scale maintenance and piling operations.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Gill et al., 2001; Hawkins and Popper, 2012)
79	Associated with mobilisation of sediments and increased suspended sediment, if associated with organic/nutrient rich material e.g. muds.	(European Commission, 2011; European Commission, 2009; Bray, 2008; ABP Research and Consultancy Ltd., 1999)
80	Associated with mobilisation of sediments and increased suspended sediment, noise and visual disturbance.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
81	Associated with mobilisation of sediments and increased suspended sediment.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
82	Associated with navigation lights. Lighting can cause disorientation or displace bird species.	(OPSAR, 2008; Shell Offshore Inc., 2011; European Commission, 2009)
83	Associated with pile driving noise, resulting in displacement or deterrent of species e.g. migratory fish, waders waterfowl and seabirds, marine mammals of sediment or acting as a deterrent.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
84	Associated with piling activity and piling plant in particular from vibro piling techniques. .	(Associated British Ports, 2011; Hawkins and Popper, 2012; Govarets and Lauwaert, 2009)
85	Associated with scour around piles and where any additional material/foundations required.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Govarets and Lauwaert, 2009; OSPAR Commission, 2008c)
86	Associated with shipping and the dredging process. The noise levels will vary in relation to the particle size composition of the aggregate.	(Newell and Woodcock, 2013; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; Ware, 2009)
87	Associated with shipping and the screening process.	(Newell and Woodcock, 2013; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; Ware, 2009)
88	Associated with shipping and vessels used during decommissioning.	(Ware, 2009)
89	Associated with significant areas of land reclaim and capital dredging altering tidal regime and currents.	(Paganelli et al., 2013; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; Bray, 2008; Liley et al., 2012)
90	Associated with the footprint of new structures, loss of habitat through reclaim or changes in habitat associated with habitat creation/managed realignment.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
91	Associated with the footprint of new structures, loss of habitat through reclaim or changes in habitat associated with habitat creation/managed realignment.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Govarets and Lauwaert, 2009; OSPAR Commission, 2008c)
92	Associated with the ports and landside operations, vessels, vehicles and machinery.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Cutts et al., 2008; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999)
93	Associated with vehicle use and movement.	(Defeo et al., 2009)
94	Associated with vessel maintenance, cleaning, operational and accidental releases into environment.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; ABP Research and Consultancy Ltd., 1999)
95	Associated with vessel movement and use.	(Ware, 2009)
96	Associated with vessel movement and use. Aggregate screening will result in sediment deposition.	(Newell and Woodcock, 2013; Tillin et al., 2011)
97	Associated with vessel movement and use. Also cable decommissioning will result in sediment plumes and deposition.	(Merck and Wasserthal, 2009; Ware, 2009)
98	Associated with vessel movement and use. Also cable laying will result in sediment plumes and deposition.	(Merck and Wasserthal, 2009; Ware, 2009)
99	Associated with vessel movement and use. Also, when reburial is required a sediment plume and deposition can occur.	(Merck and Wasserthal, 2009; Ware, 2009)
100	Associated with vessel movement and when reburial is needed.	(Department for Business Enterprise and Regulatory Reform, 2008; Ware, 2009)
101	Associated with vessel movement, noise and introduction of light.	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Stillman et al., 2007)
102	Associated with vessel movement.	(Ware, 2009)

103	Associated with vessel movement. Also turbidity increase.	(Stelzenmüller et al., 2010; Tillin et al., 2011; Ware, 2009)
104	Associated with vessel movements and maintenance activity, introducing movement, noise, light etc. Impacts associated with maintenance likely to be less than construction.	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Cutts et al., 2008; Cutts et al., 2013; Govarets and Lauwaert, 2009)
105	Associated with vessel movements and port operations increasing disturbance to sensitive species causing displacement or changing movement patterns.	(Ruddock and Whitfield, 2007; BirdLife International, 2012a; European Commission, 2011; Schwemmer et al., 2011; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999)
106	Associated with vessel movements and port operations, mobilising and re-suspending sediment.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; ABP Research and Consultancy Ltd., 1999)
107	Associated with vessel movements and port operations.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Cutts et al., 2008; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999)
108	Associated with vessel movements, increase risk of collision which may kill or injure animals, (including those associated corkscrew injuries).	No reference(s)
109	Associated with vessel movements, port operations activities introducing movement, noise, light etc. causing disturbance to sensitive species e.g. some shore bird species.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Cutts et al., 2008; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999)
110	Associated with vessel movements, use of berths/ mooring/anchoring's, and vessel maintenance, where interaction with seabed occurs potentially e.g. intertidal or shallow subtidal resulting in abrasion/disturbance to seabed.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008b)
111	Associated with vessel movements.	(Newell and Woodcock, 2013; Ware, 2009)
112	Associated with vessel movements.	No reference(s)
113	Associated with vessel movements.	(Ware, 2009)
114	Associated with vessel movements. Also noise arising from screening process.	(Newell and Woodcock, 2013; Tillin et al., 2011; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; Ware, 2009)
115	Associated with vessel use and movements. Will occur during hopper clean-up.	(Newell and Woodcock, 2013; Ware, 2009)
116	Associated with vessel using mooring, anchorage, berth mobilising and re-suspending sediment.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; ABP Research and Consultancy Ltd., 1999)
117	Associated with vessel using mooring, anchorage, berth.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Cutts et al., 2008; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999)
118	Associated with vessel, introduction of vessel movement, noise, light etc..	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Govarets and Lauwaert, 2009; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; OSPAR Commission, 2008c)
119	Associated with vessel, result of accidental, operational, incidental discharges (water and airborne). Discharges can be associated with ballast water, antifoulants, hull contamination, waste water and other wastes, much of which is restricted/regulated.	(ICES (International Council for Exploration of the Sea), 2009; Lauwaert, 2009; Lozano and Mouat, 2009; Ware, 2009)
120	Associated with vessels using anchorages - introduction of vessel movement, noise, light etc..	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Stillman et al., 2007)
121	Associated with vessels using moorings - introduction of vessel movement, noise, light etc..	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001; Liley et al., 2012; Stillman et al., 2007)
122	Associated with vessels using moorings and movement of chains on seabed.	(Defra and UK MMAS, 2010; European Commission, 2011; Liley et al., 2012; Ware, 2009)
123	Associated with vessels using moorings.	(Defra and UK MMAS, 2010; European Commission, 2011; Liley et al., 2012; Van der Graaf et al., 2012; Ware, 2009)
124	Associated with vessels, accidental, operational, incidental discharges (water and airborne). Discharges can be associated with ballast water, antifoulants, hull contamination, waste water and other wastes, much of which is restricted/regulated.	(Defra and UK MMAS, 2010; ICES (International Council for Exploration of the Sea), 2009; OSPAR Commission, 2011; Lauwaert, 2009; Lozano and Mouat, 2009; Ware, 2009)
125	Associated with vessels. Vessel movements increase risk of collision which may kill or injure animals, (including those associated corkscrew injuries).	No reference(s)
126	Ballast water discharge may introduce non indigenous species.	(Maritime and Coastguard Agency, 2012; E&P Forum and UNEP, 1997; UK Government, 2007)
127	Ballast water discharge may introduce non indigenous species.	(E&P Forum and UNEP, 1997; UK Government, 2007)
128	Ballast water discharges are unlikely to introduce indigenous species.	(Maritime and Coastguard Agency, 2012; E&P Forum and UNEP, 1997; UK Government, 2007)
129	Barrier affects from clusters, groups of mooring, berths e.g. affecting bird sightlines on the intertidal, also use of moorings and vessel movement acting as barrier through disturbance.	(Ruddock and Whitfield, 2007; BirdLife International, 2012a; Cutts et al., 2008; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999; PIANC - Working Group 2 EnviCom, 2005)
130	Besides the physical impact, bottom trawling may trigger considerable productivity pulses due to the rate of dissolved and particulate nutrient releases from seabed disturbance. This can have consequences for biogeochemical cycling.	(Kaiser et al., 2001; Polet and Depestele, 2010)
131	Bottom towed gear may have direct impacts on seabed and produce significant amounts of re-suspension which may trigger off considerable productivity pulses due to the rate of dissolved and particulate nutrient releases from seabed disturbance.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Linnane et al., 2000; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005)
132	Bottom towed gear may have direct impacts on seabed and produce significant amounts of re-suspension which may trigger off considerable productivity pulses due to the rate of dissolved and particulate nutrient releases from seabed disturbance.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005)
133	Buried cable are usually left in situ after cessation of use - i.e. Not re excavated. If de-buried noise can be produced. Also associated with shipping.	(Department for Business Enterprise and Regulatory Reform, 2008; Ware, 2009)
134	But could result in physical loss of terrestrial or freshwater habitats to marine.	No reference(s)
135	Cabling laying will induce noise. Also shipping noise.	(Department for Business Enterprise and Regulatory Reform, 2008; Ware, 2009)
136	Capital dredging is the extraction of the seabed and therefore will directly result in penetration of seabed, abrasion and disturbance.	(European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
137	Cargo can be potential source/pathway for pathogens.	No reference(s)
138	Changes in bathymetry have the potential of producing changes in wave transformation. It is unlikely to affect nearshore, but offshore there could be a change in wave height.	(Newell and Woodcock, 2013; BMAPA, 2013)
139	Changes in bathymetry have the potential of producing localised tidal level changes. It is unlikely, as marine aggregate dredging will not generally occur nearshore.	(Newell and Woodcock, 2013; BMAPA, 2013)
140	Changes in beach morphology may lead to localised changes in water flow.	(BMAPA, 2013)
141	Changes in beach topography can result in changes in wave transformation.	(BMAPA, 2013)
142	Changes in beach topography can temporal increase in suspended sediments.	(Newell and Woodcock, 2013; Smith, 2008)
143	Changes may occur but would be dependant on scale but would need to be considered on case-by-case basis (e.g. scale of activity) to determine relevance to given feature/site.	(European Commission, 2012)
144	Chemical agents may be used in feeds and dips to control pests including as antifouling. Infrastructure could result the introduction of other substances but considered unlikely to generally occur at level that would cause concern.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
145	Coastal defence structure maybe specially designed to result in this type of change to wave height, the operation of structures will maintain this change.	(Paganelli et al., 2013; Rogers et al., 2010; Defra and UK MMAS, 2010; Pontee et al., 2013; Govarets and Lauwaert, 2009; Adnitt et al., 2007)
146	Coastal defence structures can result in changing coastal regime, and substantial schemes especially in estuaries could result in changes to tidal regime, and intertidal exposure, especially where associated with reclaim or dredging.	(Paganelli et al., 2013; Rogers et al., 2010; Defra and UK MMAS, 2010; Pontee et al., 2013; Govarets and Lauwaert, 2009; Adnitt et al., 2007)
147	Coastal defence structures can result in changing coastal regime, and substantial schemes especially in estuaries could result in changes to tides/water flow, especially where associated with reclaim or dredging.	(Paganelli et al., 2013; Rogers et al., 2010; Defra and UK MMAS, 2010; Pontee et al., 2013; Govarets and Lauwaert, 2009; Environment Agency, 2006)
148	Coastal structures can result in changes to wave height.	No reference(s)
149	Collection of strandline material can be conducted by hand or through the use of vehicles. Trampling of the seabed surface can occur.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Schlacher and Thompson, 2012; Defra and UK MMAS, 2010; Nordstrom et al., 2012; Houser et al., 2013)

150	Collision could occur due to vessels associated with this activity.	No reference(s)
151	Collision with ship and dredge pipe can occur but mainly death or injury by entrainment through a draghead.	No reference(s)
152	Collisions can cause mortalities of marine mammals, birds and benthic fauna and flora.	No reference(s)
153	Collisions can cause mortalities of birds marine mammals, birds and benthic fauna and flora.	No reference(s)
154	Collisions can cause mortalities of birds.	No reference(s)
155	Collisions can cause mortalities of marine mammals, birds and benthic fauna and flora.	No reference(s)
156	Considered de-minimis.	No reference(s)
157	Construction activities including land reclaim, vessel movements, habitat creation, piling, laying of moorings, construction works can result in abrasion/disturbance and excavation of the seabed.	(European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR Commission, 2008a; OSPAR, 2009; OSPAR Commission, 2008b)
158	Construction activities including land reclaim, vessel movements, habitat creation, piling, laying of moorings, construction works can result in abrasion/disturbance and excavation of the seabed.	(European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
159	Construction activity may result in mobilisation and resuspension of sediment, maybe also be associated with intertidal recharge/reprofiling, and new structure may alter energy exposure of shore increasing siltation rates.	(Rogers et al., 2010; Bray, 2008; Pontee et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
160	Construction of both hard and soft coastal defences, including managed realignment, intertidal recharge, offshore structures can result in changes to wave climate, tidal currents and regime. The scale of impact will vary with scale of activity.	(Paganelli et al., 2013; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; EUROSION Project, 2004; Stillman et al., 2012; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
161	Construction works can result in dredging/extraction, abrasion/disturbance to seabed, losses to land through reclaim or footprint of structures and physical changes to seabed through presence of new or additional materials/sediment.	(Paganelli et al., 2013; Rogers et al., 2010; Defra and UK MMAS, 2010; EUROSION Project, 2004; Stillman et al., 2012; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
162	Construction works can result in increased noise and disturbance associated with vessel/plant movements, construction activity especially intensive noise such as piling. This has potential to disturb sensitive species (fish, mammals, birds).	(Ruddock and Whitfield, 2007; Paganelli et al., 2013; BirdLife International, 2012a; Hill, 1992; Gill et al., 2001; Hawkins and Popper, 2012)
163	Could occur as a result of vessels associated with this activity. Generally considered unlikely to occur at level that would cause concern (with exception of large scale pollution event).	(European Commission, 2012; Bouwman et al., 2013)
164	Could occur as a result of vessels associated with this activity. Generally considered unlikely to occur at level that would cause concern (with exception of large scale pollution event).	(European Commission, 2012; Bouwman et al., 2013; Wilding and Hughes, 2010)
165	Could occur as a result of vessels associated with this activity. Generally considered unlikely to occur at level that would cause concern (with exception of large scale pollution event).	No reference(s)
166	Could occur as a result of vessels associated with this activity. Generally considered unlikely to occur at level that would cause concern (with exception of large scale pollution event).	(OSPAR Commission, 2011)
167	Cultivation of native clam or oyster species (inc. hatchery reared).	(European Commission, 2012; Svåsand et al., 2007; Shellfish Association of Great Britain, 2008)
168	Cultivation of native clam or oyster species e.g. collection of wild spat/seed.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
169	Cultivation of native finfish species (inc. hatchery reared).	(European Commission, 2012; Svåsand et al., 2007)
170	Cultivation of native shellfish species (inc. hatchery reared).	(European Commission, 2012; Svåsand et al., 2007; Shellfish Association of Great Britain, 2008)
171	Cultivation of native shellfish species e.g. collection of wild spat/seed.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
172	Cultivation of non-native fish species and introduction of alien species associated with the cultivated species/stock.	(European Commission, 2012; Svåsand et al., 2007)
173	Cultivation of non-native seaweed species and introduction of alien species associated with the cultivated species/stock.	(Philips, 1991; Largo, 2002)
174	Cultivation of non-native shellfish species and introduction of alien species associated with the cultivated species/stock.	(European Commission, 2012; Svåsand et al., 2007; Shellfish Association of Great Britain, 2008)
175	Cultivation of non-native shellfish species and introduction of alien species associated with the cultivated species/stock.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
176	Culture system could involve use of pharmaceuticals etc. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
177	De-minimis - localised and short-lived churning of sediment can occur during launch and recovery as a result of prop wash.	No reference(s)
178	De-minimis - localised scouring around slipways as a result of prop wash entering leaving the water can occur.	No reference(s)
179	Depending on burial success and methodology seabed habitats could range from full recovery to permanent change or loss of habitat.	(Department for Business Enterprise and Regulatory Reform, 2008; OSPAR Commission, 2012; Merck and Wasserthal, 2009)
180	Deposit of sediment on seabed from plumes smothering benthic habitats.	(Newell and Woodcock, 2013; Tillin et al., 2011)
181	Deposition of faeces and pseudo-faeces may lead to organic enrichment of seabed. However, magnitude of pressure would depend on intensity/scale of activity and hydrographic conditions.	(European Commission, 2012; Bouwman et al., 2013; Shellfish Association of Great Britain, 2008; Wilding and Hughes, 2010)
182	Deposition of faeces and pseudo-faeces may lead to organic enrichment of seabed. However, magnitude of pressure would depend on intensity/scale of activity and hydrographic conditions.	(European Commission, 2012; Bouwman et al., 2013; Wilding and Hughes, 2010)
183	Deposition of maintenance dredged sediment onto the seabed can result in abrasion/disturbance.	(European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
184	Deposition of particulate waste (faecal material, waste feed), may lead to hypoxic or anoxic conditions on the seafloor and reduced dissolved oxygen in the water column as it decays.	(European Commission, 2012)
185	Deposition of particulate waste (faecal material, waste feed), may lead to hypoxic or anoxic conditions on the seafloor and reduced dissolved oxygen in the water column as it decays.	(European Commission, 2012; Wilding and Hughes, 2010)
186	Diggers extracting sand will result in visual disturbance.	(Defra and UK MMAS, 2010)
187	Directly associated with deposition of material associated with reclaim, scale of siltation will depend on technique and material used and whether dewatering etc. occurs. Not all techniques will cause this pressure.	(Rogers et al., 2010; Bray, 2008; Pontee et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
188	Directly associated with deposition of material on intertidal during recharge event. Scale of siltation will depend on type of recharge used, not all techniques will cause this pressure e.g. trickle charging.	(Rogers et al., 2010; Bray, 2008; Pontee et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
189	Discarded/lost lines, hooks and nets which could be problematic for mobile species. Other types of litter generated by activity generally not considered to occur at level that would cause concern.	(Bowmer and Kershaw, 2010; Lozano and Mouat, 2009; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
190	Discarded/lost lines, hooks and nets which could be problematic for mobile species. Other types of litter generated by activity generally not considered to occur at level that would cause concern.	(Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
191	Discharge from industrial outflow pipes can contain anti foulants and a range of synthetic compounds. Whilst heavily regulated there is a risk of damaging concentrations being released were issues to arise.	(Cole et al., 1999)
192	Discharge from outfalls can have significantly increased levels of nutrient, specifically nitrates and phosphorus can be high in drainage and sewerage outflow.	(Cole et al., 1999)
193	Discharge from outfalls can have significantly increased levels of organic enrichment.	(Cole et al., 1999)
194	Discharges of waste substances are banned under MARPOL.	(E&P Forum and UNEP, 1997; International Maritime Organisation, 1983 - 2005; UK Government, 2007)
195	Discharges of waste substances that may introduce significant levels of nutrients or organic enrichment are banned under MARPOL.	(E&P Forum and UNEP, 1997; International Maritime Organisation, 1983 - 2005; UK Government, 2007)
196	Discharges of waste substances that may introduce significant levels of nutrients or organic enrichment are banned under MARPOL.	(E&P Forum and UNEP, 1997; UK Government, 2007)
197	Disposal activity may result in a deposition of material on the seabed causing abrasion and disturbance. The degree of the pressure will depend on type and volume of material deposited, and characteristics of disposal site.	(European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
198	Disposal of litter to the marine environment is prohibited under the MARPOL regulations.	(E&P Forum and UNEP, 1997; International Maritime Organisation, 1983 - 2005; UK Government, 2007)
199	Disturbance from the vessel engaged in fishing operations.	(Defra and UK MMAS, 2010; Velando and Munilla, 2011; Smit and Visser, 1993; Burger, 1998)
200	Dog excrement and urine can lead to localised nutrient enrichment. Levels of enrichment are clustered around coastal access points and along paths (corridors of enrichment).	(Saunders et al., 2000; Taylor et al., 2005; Newsome et al., 2004)
201	Dog faeces and urine can lead to localised nutrient enrichment. Levels of enrichment are clustered around coastal access points and along paths (corridors of enrichment).	(Saunders et al., 2000; Taylor et al., 2005; Newsome et al., 2004)
202	Dogs can prey on birds, chicks and eggs resulting in direct or indirect mortality (when birds flee from the predator and expend energy/respond negatively to the stress).	(Saunders et al., 2000; Taylor et al., 2005)
203	Dredging (e.g. spat collection) may result in removal of sediment but would need to be considered on case-by-	(European Commission, 2012)

	case basis to determine relevance to given feature/site.	
204	Dredging (e.g. spat collection) may result in removal of sediment but would need to be considered on case-by-case basis to determine relevance to given feature/site. Installation of infrastructure may also result in habitat loss.	(European Commission, 2012)
205	Due mainly to vessels used, small potential for spill from turbine gear boxes or other parts using lubricants.	(Ware, 2009)
206	Due mainly to vessels used.	No reference(s)
207	Due to accidental discharge from vessels, spill of grout during construction, installation of bases, scour protection, drill arisings.	(OPSAR, 2008; ABPmer, 2011; Ware, 2009)
208	Due to deployment of devices but significance of effect unknown.	No reference(s)
209	Due to method of decommissioning/ vessels used.	(Mcluskie et al., 2012; ABPmer, 2013)
210	Due to method of decommissioning/ vessels used.	No reference(s)
211	Due to operation of devices.	(ABPmer, 2013)
212	Due to physical presence of devices in operation.	(ABPmer Ltd., 2006; ABPmer, 2013)
213	Due to physical presence of devices in operation.	No reference(s)
214	Due to physical presence of structures.	No reference(s)
215	Due to potential mobilisation of contaminants during maintenance activities, plus accidental, operational, incidental vessel/plant discharges (ballast water, antifoulants, hull contamination, wastes, non natives), much of which is restricted/regulated.	(Paganelli et al., 2013; Defra and UK MMAS, 2010; ICES (International Council for Exploration of the Sea), 2009; ABP Research and Consultancy Ltd., 1999; Royal Yacht Association (RYA) and British Marine Federation, 2010; OSPAR Commission, 2008a)
216	Due to potential mobilisation of contaminated during construction or from sediments, plus accidental, operational, incidental vessel discharges (ballast water, antifoulants, hull contamination, wastes), much of which is restricted/regulated.	(Paganelli et al., 2013; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; ICES (International Council for Exploration of the Sea), 2009; ABP Research and Consultancy Ltd., 1999; Eno et al., 1997)
217	Due to potential mobilisation of contaminated during construction or from sediments, plus accidental, operational, incidental vessel discharges (ballast water, antifoulants, hull contamination, wastes), much of which is restricted/regulated.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; ICES (International Council for Exploration of the Sea), 2009)
218	Due to presence of turbines.	No reference(s)
219	Due to underwater noise from turbines and maintenance vessels although unlikely to be significant.	(Wilhelmsson et al., 2010)
220	Due to vessel movement, antifoulants, hull contamination.	(Ware, 2009)
221	Due to vessel movement.	(DECC, 2011)
222	Due to vessel movements, antifoulants, hull contamination.	(Ware, 2009)
223	Due to vessel movements.	No reference(s)
224	Due to vessels used.	No reference(s)
225	Due to vessels, installation of bases, scour protection.	(DECC, 2011)
226	Due to vessels, installation of bases, scour protection.	(ABPmer, 2013)
227	Due to vessels/ methods used.	No reference(s)
228	During construction sediment will be disturbed through seabed excavation and abrasion, creating plumes of increased suspended sediment and turbidity.	(OSPAR Commission, 2008b)
229	During construction significant sedimentation may occur. During operation changes in hydrodynamics, current flow and sediment dynamics around the slipway may result in changes in nearby sedimentation rates.	(OSPAR Commission, 2008b)
230	During construction the excavated material will be deposited on the seabed surface and heavy deposition of suspended sediment plumes may occur in the immediate vicinity.	(OSPAR Commission, 2008b)
231	During decommissioning substratum will be removed.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
232	During slipway construction vehicles and machinery will be moved across the seabed/habitat surface causing abrasion. During operation the movement of vessels and vehicles onto, off and around the slipway may cause abrasion, trampling and erosion.	(ABP Research and Consultancy Ltd., 1999; Saunders et al., 2000)
233	During the construction phase shipping and the use of underwater machinery will increase ambient noise levels. Usage of the slipway will increase vessel movements in the area increasing noise levels.	(Department for Business Enterprise and Regulatory Reform, 2008; Ware, 2009)
234	Effects of sediment re-suspended as a result of bottom fishing include increased oxygen demand. In fisheries where discards are spatially concentrated, and in areas of low current flow, discards may cause localized hypoxia or anoxia of the seabed.	(Gilman et al., 2012; Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005)
235	Effluent discharged directly from a vessel can in areas of poor natural flushing such as marinas, pontoons, inlets can lead to localised nutrient enrichment, oxygen depletion and/or disease transmission.	(Saunders et al., 2000; Milliken and Lee, 1990; Geertz-Hansen, 2002; The Green Blue, 2006; Pienkowski, 1992)
236	either due to maintenance vessels or collision with turbines.	No reference(s)
237	Electricity cables induce a small heat increase but this is insignificant.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
238	Electro-Magnetic-Field effects occur once generating energy/ operational.	No reference(s)
239	Electronic fields and pulses created by the gear. Different frequencies/pulses are used to target different species.	(Murray et al., 2014; ICES (International Council for Exploration of the Sea), 2011; Polet and Depestele, 2010; Soetaert et al., 2013; Woolmer et al., 2011)
240	Elevated suspended sediment levels expected during recharge event and after while material redistributes itself by tide and wave action.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
241	Except associated with accidental discharges.	No reference(s)
242	except by accidental release.	No reference(s)
243	Except during construction of defence scheme.	No reference(s)
244	Except during construction of schemes.	No reference(s)
245	Except vessel and plant lights.	No reference(s)
246	Except via accidental discharge.	No reference(s)
247	Except when relaying/removing or moving.	No reference(s)
248	Except where associated with beneficial use of sediments or similar, which can result in elevated suspended sediment and introduction of organic material, nutrient enrichment and/or impact on dissolved oxygen.	No reference(s)
249	Except where exceptional types of plant required, e.g. if new roadways/tracks could be required to allow plant access, which could result in loss.	No reference(s)
250	Except where realignment results in mobilisation of contaminated sediments.	No reference(s)
251	Except works and vessel lighting.	No reference(s)
252	Excessive nutrient and organic enrichment in the water column due to outfall discharge can result in reduce oxygen levels in surrounding habitats.	(Cole et al., 1999)
253	Extraction of sand would lead to physical loss of habitat.	(Defeo et al., 2009)
254	Feet penetrating soft sediment, moving of rocks during rock pooling.	(Saunders et al., 2000; Schlacher and Thompson, 2012)
255	Fish, mammals and birds can all be impacted by underwater noise.	(Saunders et al., 2000; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; Codarin et al., 2009)
256	Fishing can lead to genetic selection for different body and reproductive traits, result in changes in the genetic makeup of populations and can extirpate distinct local stocks.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005)
257	Fishing gears may disturb sediment and remobilise buried organic and inorganic matter. In fisheries where discards are spatially concentrated, and especially in areas of low current flow, discards may cause localized hypoxia or anoxia of the seabed.	(Gilman et al., 2012; Kaiser et al., 2001; Polet and Depestele, 2010)
258	Fishing vessels could result in hydrocarbon contamination but considered unlikely to generally occur at level that would cause concern (with exception of large scale pollution event).	(Ware, 2009)
259	freshwater, brackish and estuarine will become more saline, where managed realignment of the coast occurs.	(Rogers et al., 2010; Pontee et al., 2013; Adnitt et al., 2007; Scott et al., 2011)
260	From the shipping used to repair the cable - the frequency of this being required is rare.	(Ware, 2009)
261	Gear interactions between electrodes, trawl doors, beam shoes, Sumwing, warps, lines and gear attachments cause suspension of sediment as gear moves through the water.	(Defra and UK MMAS, 2010; Murray et al., 2014; ICES (International Council for Exploration of the Sea), 2011; Kaiser et al., 2001; Lart, 2012; Polet and Depestele, 2010; Soetaert et al., 2013)
262	Gear interactions between electrodes, trawl doors, beam shoes, Sumwing, warps, lines and gear attachments.	(Defra and UK MMAS, 2010; Murray et al., 2014; ICES (International Council

		for Exploration of the Sea), 2011; Kaiser et al., 2001; Lart, 2012; Polet and Depestele, 2010; Soetaert et al., 2013; Sewell et al., 2007)
263	Generally buried cables are left in-situ after cessation of use - i.e. Not re excavated.	(Department for Business Enterprise and Regulatory Reform, 2008)
264	Habitat loss or physical change to habitat types may occur as a result of these activities including from infrastructure, site preparation, shading, trampling etc..	(Philips, 1991)
265	Habitat loss or physical change to habitat types may occur as a result of these activities.	(European Commission, 2012)
266	Habitat loss or physical change to habitat types may occur as a result of these activities.	(European Commission, 2012; Wilding and Hughes, 2010)
267	Herbicide spraying/vegetation removal can led to loss of habitat and concomitant loss of soil/sediment cohesion that could lead to erosion and a change in seabed type.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; Houser et al., 2013; Pienkowski, 1992)
268	Hoof/feet can penetrate soft sediment and/or abrade substrates.	(Saunders et al., 2000; Taylor et al., 2005; Newsome et al., 2004; Pienkowski, 1992)
269	However moorings can cause the localised resuspension of material from the seabed.	No reference(s)
270	Human noises created from leisure activities.	(Saunders et al., 2000)
271	Humans can cause birds to take flight on approach leading to additional energy being spent by the bird as it flees an area.	(Saunders et al., 2000; Taylor et al., 2005; Fitzpatrick and Bouchez, 1998; Newsome et al., 2004)
272	Humans can cause birds to take flight on approach leading to additional energy being spent by the bird as it flees an area.	(Saunders et al., 2000; Madsen, 1995)
273	Humans can cause mobile species disturbance e.g. birds to take flight on approach leading to additional energy being spent by the bird as it flees an area.	(Saunders et al., 2000; Smit and Visser, 1993; Fitzpatrick and Bouchez, 1998)
274	If associated ongoing beneficial use of sediments, resulting in elevated suspended sediment and introduction of organic material, nutrient enrichment and/or impact on dissolved oxygen. Or schemes resulting in accretion of organic/nutrient rich material.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; Govarets and Lauwaert, 2009)
275	If associated with alternative or beneficial use as type of disposal for dredge material.	(Bray, 2008; Liley et al., 2012; Adnitt et al., 2007)
276	If associated with alternative or beneficial use.	(Paganelli et al., 2013; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; Bray, 2008; Liley et al., 2012)
277	If associated with beneficial use of sediments to profile area, result in elevated suspended sediment and introduction of organic material which impacts on dissolved oxygen. Covered under intertidal recharge.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
278	If associated with discharges, outfalls causing increase in suspended sediment, changes in salinity or temperature. Only likely to be significant if discharge large or into small water body. Also possibly noise, visual disturbance from industry.	(Ruddock and Whitfield, 2007; BirdLife International, 2012a; Hill, 1992; Hawkins and Popper, 2012; Cutts et al., 2008; Cutts et al., 2013)
279	If associated with discharges, outfalls linked to shoreside operations.	(Defra and UK MMAS, 2010; European Commission, 2011; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2010; Scottish Environment Protection Agency, 2008)
280	If associated with discharges, outfalls. If pressure only likely to be significant if discharge is into small constrained water body or discharge is very large.	(British Energy Estuarine & Marine Studies Expert Panel, 2011; OSPAR Commission, 2010; Scottish Environment Protection Agency, 2008; Royal Haskoning DHV, 2012)
281	If associated with input of additional material/sediment e.g. intertidal recharge which is likely to cause elevations in suspended sediment and sediment plumes.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
282	If associated with input of additional material/sediment e.g. intertidal recharge.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
283	If associated with input of additional material/sediment, causing increased suspended sediment or organic material leading to reduction in dissolved oxygen in water column or in seabed material due to smothering.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
284	If associated with input of additional organic/nutrient rich material/sediment e.g. muds.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
285	If associated with intertidal recharge or alternative use of sediment to create habitat, causing mobilisation of sediment and increased suspended sediment.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
286	If associated with intertidal recharge or alternative use of sediment to create habitat, using organic/nutrient rich material e.g. muds.	(European Commission, 2011; European Commission, 2009; Bray, 2008; ABP Research and Consultancy Ltd., 1999)
287	If associated with scour from vessels using mooring, anchorage, berth.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Latham et al., 2012; Liley et al., 2012)
288	If associated with sediment plumes, noise, visual disturbance or new structures with restrict species movement. Will depend on habitat creation type.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
289	If cable structure is left buried and when using elevated structures i.e. Rock armouring, exposed cable, creating scour pits and deposition tails. The size of this flow change will vary on the strength of the ambient current the size of the exposed.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
290	If coastal defence structures act barrier restricting access to rivers/streams/estuaries e.g. affecting migratory fish etc. Also as barrier to species adapted to sea level rise and coastal change.	(Paganelli et al., 2013; Defra and UK MMAS, 2010; Govarets and Lauwaert, 2009)
291	If coastal structure inhibits/restrict/regulates sea water intrusion or percolation of seawater through sand/shingle to lagoons or seeps e.g. tidal barrage, lock gates, weirs, sluices.	(Paganelli et al., 2013; Govarets and Lauwaert, 2009; Adnitt et al., 2007)
292	If depositing large volume of material on seabed or is disposal is associated with alternative/beneficial use.	(Paganelli et al., 2013; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; Bray, 2008; Liley et al., 2012)
293	If maintenance/ repair needed - impacts will include use of jack up barges, anchoring vessels as well as possible repair works themselves.	(DECC, 2011)
294	If maintenance/ repair needed.	No reference(s)
295	If repair/maintenance required.	No reference(s)
296	If rock armouring is used to cover areas of exposed cable.	(Department for Business Enterprise and Regulatory Reform, 2008)
297	If scour, foundations and cables removed.	No reference(s)
298	If sediment recharge required to profile realignment site, could act as source of nutrient and organic enrichment e.g. intertidal mud. All sediment used for intertidal recharge can only be used it considered clean and uncontaminated.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
299	If sediment recharge required to profile realignment site, which could act as source of nutrient and organic enrichment e.g. intertidal mud. All sediment used for intertidal recharge can only be used it considered clean and uncontaminated.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
300	if vessels on site lighting of structures will be required, also light from decommissioning vessels.	No reference(s)
301	If vessels on site will require lighting.	No reference(s)
302	Impacts of predator control around fish farms are disturbance, displacement and killing both directly and indirectly. Tangling in nets including is reported for at large number of sites for species including birds, marine mammals, sharks etc..	No reference(s)
303	In fisheries where discards are spatially concentrated, and especially in areas of low current flow, discards may cause localized hypoxia or anoxia of the seabed.	(Gilman et al., 2012)
304	Increased vessel movement or larger vessels associated with construction could increase disruption to species movement.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
305	Increased vessel movement or larger vessels associated with construction could increase suspended sediments.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
306	Inflow and intake pipes from the marine environment can result in the entrainment or impingement of fish, birds and marine mammals.	No reference(s)
307	Infrastructure associated with activity. Activity could result in e.g. oil slicks but considered unlikely to generally occur at level that would cause concern (with exception of large scale pollution event).	(European Commission, 2012)
308	Installation and maintenance of infrastructure and operation of culture system may lead to disturbance.	(European Commission, 2012; Wildfowl and Wetlands Trust (WWT) Consulting,

		2012)
309	Installation and maintenance of infrastructure and operation of culture system may lead to disturbance.	(Philips, 1991)
310	Installation of infrastructure may result in habitat loss.	(European Commission, 2012; Philips, 1991)
311	Installation of permanent moorings can lead to removal of the seabed. Use of the mooring can also led to habitat type alterations as a result of ground tackle (chains, anchors, lines) scouring the area around the mooring.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
312	Installation of pipeline through trenching will lead to disturbance and loss of sediment.	(E&P Forum and UNEP, 1997; UK Government, 2007)
313	Intensive bait digging can result in exposure of anoxic sediment layers, leading to reduced oxygen availability in surface sediments.	(Fowler, 1999)
314	Interactions between vessel propellers and marine mammals.	(Defra and UK MMAS, 2010; Thompson et al., 2013)
315	Intertidal recharge can result in temporal changes in suspended sediment and turbidity which will result in reduced dissolved oxygen levels, the effect is most pronounced in the warmer summer months.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
316	Introduction of pathogens associated with the cultured species/stock.	(European Commission, 2012)
317	Introduction of pathogens associated with the cultured species/stock.	(Largo, 2002)
318	It is expected that complete burial >2m should prevent any changes at or above the seabed surface. However often burial is incomplete meaning changes will be noticeable.	(Department for Business Enterprise and Regulatory Reform, 2008; OSPAR Commission, 2012; Merck and Wasserthal, 2009)
319	Large areas of moorings associated pontoons and vessels along side can cause localised changes to tidal currents/ water flow in estuaries.	(Van der Graaf et al., 2012)
320	Large dense areas of moorings/berths e.g. Marinas, rafts of pontoons can change, deflection or tidal currents locally. As per other marine structures.	(ABP Marine Environment Research Ltd, 2011; European Commission, 2011; European Commission, 2009; OSPAR Commission, 2008b)
321	Lighted vessels pose a collision risk to many species of birds. Birds drawn to light often become disoriented and collide with these structures, resulting in injury and death.	(Shell Offshore Inc., 2011)
322	Lighted vessels pose a collision risk to many species of birds. Birds drawn to light often become disoriented and collide with these structures, resulting in injury and death.	(Shell Offshore Inc., 2011; BirdLife International, 2012a)
323	Lighted vessels pose a collision risk to many species of birds. Birds drawn to light often become disoriented and collide with these structures, resulting in injury and death.	(BirdLife International, 2012b)
324	Lighting of offshore windfarm, plus maintenance vessels.	(DECC, 2011)
325	Lighting on drilling rigs and support vessels may lead to disturbance of birds.	(E&P Forum and UNEP, 1997; UK Government, 2007)
326	Lighting originating from the vessel.	(Shell Offshore Inc., 2011; Hill, 1992; Defra and UK MMAS, 2010; Dwyer et al., 2013; Miles et al., 2010; Tillin et al., 2010; Marine and Coastguard Agency, 2004)
327	Lighting, other visual disturbance and noise from drilling rigs and support vessels may lead to disturbance of birds.	(E&P Forum and UNEP, 1997; UK Government, 2007)
328	Likely to be spatially and temporally limited in scale. Associated water quality changes of very large dredges and/or small constrained estuaries.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Hunt et al., 1999; Gill et al., 2001)
329	Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	(Saunders et al., 2000; Gregory, 2009; Lozano and Mouat, 2009)
330	Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	No reference(s)
331	Litter generated by general public when attending organised events. Minimal litter/debris originating from the actual fireworks. Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	(Gregory, 2009; Pienkowski, 1992; Derraik, 2002)
332	Litter is discarded by individuals e.g. using beaches. Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	(Saunders et al., 2000; Derraik, 2002)
333	Litter is discarded by individuals. Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	(Saunders et al., 2000; Taylor et al., 2005; Newsome et al., 2004; Pienkowski, 1992)
334	Litter is likely to be associated with access/egress points to suitable locations for the activity to occur. Litter is more likely to be associated with activities before/after, rather than during participation of the activity.	(Saunders et al., 2000; Gregory, 2009; Pienkowski, 1992)
335	Litter originates from vessels engaged in fishing.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; International Maritime Organisation, 1983 - 2005; ABP Research and Consultancy Ltd., 1999; Lozano and Mouat, 2009; Derraik, 2002)
336	Local changes where associated with water intakes and outfalls e.g. Power stations, refineries.	(British Energy Estuarine & Marine Studies Expert Panel, 2011; OSPAR Commission, 2010; Scottish Environment Protection Agency, 2008; Royal Haskoning DHV, 2012)
337	Localised changes may occur and would be dependant on scale but would need to be considered on case-by-case basis (e.g. scale of activity) to determine relevance to given feature/site.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
338	Localised temperature increase, electromagnetic fields and sediment plumes can cause a barrier to species movement.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
339	Maintains changes associated with capital dredging, in frequent maintenance dredging with result in more marked changes and continuous/frequent dredge campaigns.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
340	Maintenance activities including maintenance works or clearance of structures, maintenance dredging can result in abrasion/disturbance and excavation of the seabed.	(European Commission, 2011; European Commission, 2009; Bray, 2008; OSPAR, 2009; OSPAR Commission, 2008b; OSPAR Commission, 2008c)
341	Maintenance and operation of facilities could involve use of pesticides, antifoulants etc. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale.	(European Commission, 2012)
342	Maintenance and operation of facilities could involve use of pesticides, antifoulants etc. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
343	Maintenance and operation of facilities could involve use of pesticides, antifoulants etc. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale.	(Bouwman et al., 2013)
344	Maintenance works can result in dredging/extraction, abrasion/disturbance to seabed, losses to land through increased reclaim or footprint of structures and physical changes to seabed through presence of new or additional materials/sediment.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; EUROSION Project, 2004; Stillman et al., 2012; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
345	Marine habitats which were excavated or disturbed during construction may be permanently changed if not reinstated properly. Also areas subject to a change in hydrodynamics i.e. subject to deposition or sheltering may be altered permanently.	(ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008b; Saunders et al., 2000)
346	Marine litter generation and seabed deposition of the litter resulting from this sector is often concentrated around moorings. Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	(Saunders et al., 2000; Gregory, 2009; Lozano and Mouat, 2009)
347	Material originating from a vessel.	(Defra and UK MMAS, 2010; International Maritime Organisation, 1983 - 2005; The Green Blue, 2006)
348	May be caused by anchoring or mooring of small craft and through launching on exposed seabed.	No reference(s)
349	May result from anchoring of the pens/other infrastructure; pressure magnitude will depend on the spatial scale of the activity.	(European Commission, 2012)
350	May result from anchoring of the suspension structures and/or spat collection; pressure magnitude will depend on methods used and spatial scale of activity.	(European Commission, 2012)
351	May result from anchoring of the suspension structures and/or spat collection; pressure magnitude will depend on methods used and spatial scale of activity.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
352	May result from anchoring of the suspension structures; pressure magnitude will depend on methods used and spatial scale of activity.	(European Commission, 2012)
353	May result from dredges used to harvest the shellfish or collect spat; pressure magnitude will depend on methods used and spatial scale of activity.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
354	May result from installation of the infrastructure and/or spat collection; pressure magnitude will depend on methods used and spatial scale of activity.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
355	May result from sediment mobilisation in wake behind gear components. The extent of the changes would depend on intensity/scale, substratum type (particle size) and hydrographic conditions.	(Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
356	May result from sediment resuspension associated with harvesting with dredges and/or sedimentation. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale and hydrographic conditions.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
357	May result from sediment resuspension associated with harvesting with dredges and/or sedimentation. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on	(Bouwman et al., 2013)

	intensity/scale and hydrographic conditions.	
358	May result from sedimentation in localized area. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale and hydrographic conditions.	(European Commission, 2012)
359	May result from sedimentation in localized area. However, uncertain whether activity would exert pressure at benchmark level; likely to depend on intensity/scale and hydrographic conditions.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
360	May result from the presence of divers on shore, at surface and underwater, and from presence/movement of any vessel(s). Magnitude of pressure would depend on nature and scale/intensity of activity.	(Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
361	May result from the presence/movement of people (and vehicles) on the shore. Magnitude of pressure would depend on nature and scale/intensity of activity.	(Fowler, 1999; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
362	May result from the presence/movement of the vessel and potentially also the presence/movement of the gear. Magnitude of pressure would depend on nature and scale/intensity of activity.	(Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
363	May result from the removal of target species. Spatial scale and degree of damage/disturbance likely to be relatively low though.	No reference(s)
364	Mortality of non-target species may result from use of dredges (inc. hydraulic) during harvesting.	(Marine Work Group Ireland, 2007; European Commission, 2012)
365	Movement of support vessels may lead to injury to cetaceans or pinnipeds.	No reference(s)
366	Navigation and operational lighting on vessels. Lighting can cause disorientation or displace bird species.	(OPSAR, 2008; Shell Offshore Inc., 2011; European Commission, 2009)
367	Navigation and operational lighting on vessels. Lighting can cause disorientation or displace bird species.	(OPSAR, 2008; Shell Offshore Inc., 2011; European Commission, 2009)
368	New associated with new piled structures e.g. wave breaks, groynes, breakwaters etc..	(European Commission, 2011; European Commission, 2009; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
369	New piled structures could cause changes to water flow but will be localised, also covered under construction of port and harbour structures.	(European Commission, 2011; European Commission, 2009; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
370	No comment	(Associated British Ports, 2011; Hawkins and Popper, 2012; Govarets and Lauwaert, 2009)
371	No comment	(Van der Graaf et al., 2012)
372	No comment	(Department for Business Enterprise and Regulatory Reform, 2008)
373	No comment	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
374	No comment	No reference(s)
375	No comment	(DECC, 2011)
376	No comment	(Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
377	No comment	(Polet and Depestele, 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
378	No comment	(Hooper and Austen, 2013)
379	Noise and turbidity can create a barrier to migration on sensitive species.	(Newell and Woodcock, 2013; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; Henkel, 2006)
380	Noise generated by vessel movement and engines etc. (treating noise as an emission).	(Defra and UK MMAS, 2010; European Commission, 2011; Liley et al., 2012; Van der Graaf et al., 2012; Ware, 2009)
381	Noise generated by vessel movement and engines etc..	(Defra and UK MMAS, 2010; European Commission, 2011; Liley et al., 2012; Van der Graaf et al., 2012; Ware, 2009)
382	Noise is generated by those participating in the activity and from the sails/kite.	(Saunders et al., 2000; Rodgers and Schwikert, 2002; Burger, 1998)
383	Noise is generated by those participating in the activity and from the sails/kite.	(Saunders et al., 2000; Cutts et al., 2013; Smith, 2004; Pienkowski, 1992)
384	Noise is generated from participation in the activity itself or from equipment in use on the vessel such as generators and engines. Noise primarily disturbs bird species with individual and colony effects.	(Saunders et al., 2000; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; BirdLife International, 2012a; Rodgers and Schwikert, 2002)
385	Noise is likely to be of short duration (30 mins) restricted to November, December and Diwali. Firework displays are unlikely to be in the same location on more than one night (excluding Diwali).	(BirdLife International, 2012a; Shamoun-Baranes et al., 2011; Stillman et al., 2007; Hill, 1992)
386	Noise is likely to be of short duration (30 mins) restricted to November, December and Diwali. Firework displays are unlikely to be in the same location on more than one night (excluding Diwali).	(Shamoun-Baranes et al., 2011)
387	Noise may be associated with activity but considered unlikely to cause concern.	(European Commission, 2012; Olesiuk et al., 2012)
388	Noise originates from engines/generators/vessel equipment. Fish, mammals and birds can all be impacted by underwater noise.	(Saunders et al., 2000; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; Codarin et al., 2009)
389	Noise originating from the a vessel engaged in fishing and from the gear towed by the vessel.	(Wilson et al., 2008; Defra and UK MMAS, 2010; Thompson et al., 2013; Hawkins and Popper, 2012; Kaiser et al., 2001; Tillin et al., 2010)
390	Noise originating from the vessel and from gear during operation.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; BirdLife International, 2012a; Hill, 1992; Rodgers and Schwikert, 2002)
391	Non motorised but noise may be generated by those participating in the activity. Dogs may be on board.	No reference(s)
392	Non motorised craft unlikely to be travelling fast enough.	No reference(s)
393	Non motorised so underwater noise not generated.	No reference(s)
394	Not to benchmark but vessel movement through coastal and estuarine environments can result in propeller-induced turbidity.	No reference(s)
395	Note: Dogs cause this pressure but should be considered in the dog walking category.	No reference(s)
396	Nutrient waste may be generated through excretion by reared organisms or direct enrichment by or remineralisation of feed inputs. However, magnitude of pressure would depend on intensity/scale of activity and hydrographic conditions.	(European Commission, 2012; Bouwman et al., 2013; Wilding and Hughes, 2010)
397	Offshore structure will result in changes to physical energy, therefore sediment mobility and suspended sediment either side of the structure, causing scour on exposed side of breakwater and accretion on leeward/sheltered side.	(Rogers et al., 2010; Bray, 2008; Pontee et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
398	Offshore structure will result in changes to physical energy, therefore sediment mobility and suspended sediment either side of the structure, water maybe more turbid on exposure side of a breakwater and less turbid on leeward/sheltered side.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
399	Oil and Gas drilling can lead to loss of benthic habitats through direct impact or through smothering with drilling muds or arisings.	(E&P Forum and UNEP, 1997; UK Government, 2007)
400	Oil and Gas exploration and production do not involve use or transport of these pathogens.	(E&P Forum and UNEP, 1997; UK Government, 2007)
401	Oil and Gas Exploration does not include use of radioactive elements.	(E&P Forum and UNEP, 1997{UK Government, 2007 #3149)
402	Oil and Gas Exploration drilling can lead to loss of benthic habitats through direct impact or through smothering with drilling muds or arisings.	(E&P Forum and UNEP, 1997; UK Government, 2007)
403	Oil and Gas Exploration involves both seismic exploration and drilling. Both activities involve vessels which may introduce harmful compounds to marine environments.	(Udoinyang and Igboekwe, 2011; E&P Forum and UNEP, 1997; UK Government, 2007)
404	Oil and Gas Exploration involves both seismic exploration and drilling. Both activities involve vessels which may introduce harmful compounds to marine environments.	(E&P Forum and UNEP, 1997{UK Government, 2007 #3149)
405	Oil and Gas production does not lead to significant levels of this form of habitat loss and the industry is non-extractive (substratum).	(E&P Forum and UNEP, 1997; UK Government, 2007)
406	Once constructed the slipway structure will effect tidal flow and water movements in the local vicinity creating areas of acceleration, deceleration and shelter.	(OSPAR Commission, 2008b)
407	Operation of culture system may lead to disturbance.	(European Commission, 2012; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
408	Organisms can be removed along with sand.	(Smith, 2008)
409	Originating from disturbed seabed.	(Defra and UK MMAS, 2010; Kaiser et al., 2001; Tillin et al., 2010; Lart, 2012; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Soetaert et al., 2013)
410	Originating from the vessel and also resulting from disturbed seabed contaminants.	(International Petroleum Industry Environmental Conservation Association (IPIECA), 1999; Defra and UK MMAS, 2010; Clark, 1984; Zieman et al., 1984; Tillin et al., 2010; ABP Research and Consultancy Ltd., 1999; The Green Blue, 2006)
411	Originating from the vessel and also resulting from disturbed seabed contaminants.	(Defra and UK MMAS, 2010; Taylor et al., 2006; Tillin et al., 2010; ABP Research and Consultancy Ltd., 1999; Risebrough, 1986; Fry, 1995)
412	Originating from the vessel and also resulting from disturbed seabed contaminants.	(Defra and UK MMAS, 2010; Turner, 2010; Tillin et al., 2010; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2011; The Green Blue, 2006)

413	Originating from the vessel as a result of waste discharges.	(Defra and UK MMAS, 2010; Kaiser et al., 2001; International Maritime Organisation, 1983 - 2005; Tillin et al., 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Soetaert et al., 2013; The Green Blue, 2006)
414	Outfall construction and repair often requires the use of vessels, vehicles and man made structures such as jack up rigs. The lighting of these in marine and coastal environments can change behaviour, cause disorientation and increase bird collisions.	(Shell Offshore Inc., 2011)
415	Outfall construction requires the excavation, movement and storage of marine sediment all which could result in localised heavy siltation. Outflow discharge can have high suspended sediment concentrations causing locally increased sedimentation.	(Burton and Goddard, 2007; Ludwig, 1988)
416	Outfall discharges can enter the marine environment at a range of elevated temperatures and persistently increase local environmental temperatures to damaging levels.	(Cole et al., 1999)
417	Outfall discharges can have significantly higher suspended sediment levels than the receiving environment. This is especially the case with outflow from storm overflow or surface drainage. Pipeline construction can also induce suspended sediment plumes.	(Cole et al., 1999)
418	Outfall discharges can include a range of agricultural and industrial chemicals including organic and metal contaminants.	(Cole et al., 1999)
419	Outfall discharges from industrial, sewerage and agricultural sources can introduce a range of pathogens and parasites into the marine environment which could be deemed damaging.	(Magill et al., 2008)
420	Outfall discharges have the potential to introduce hydrocarbons into the marine environment through industrial effluent and run off/drainage sources.	(Cole et al., 1999)
421	Outfall structures may effect local wave conditions by causing reflection, refraction and breaking of waves. This could increase or decrease wave energy in nearby areas.	(OSPAR Commission, 2008b)
422	Outflow from power plants or industrial areas may represent a source of radionuclide contamination.	(Cole et al., 1999)
423	Outflow pipe construction and repair require the use of vehicles and shipping all of which emit above water noise.	(Ware, 2009)
424	Outflow pipes discharge a range of substances into the marine environment from industrial effluent, treated sewerage, storm overflow and drainage.	(Cole et al., 1999)
425	Outflow pipes/outfalls are either buried or surface laid across coastal and seabed habitats. Either method will require the movement of vehicles and machinery across the surface causing heavy abrasion and at least small levels of excavation.	(Ludwig, 1988)
426	Outflow pipes/outfalls are either buried or surface laid across coastal and seabed habitats. Where they are buried trench excavation into the sediment will be required.	(Ludwig, 1988)
427	Particularly as a result of installation of devices and foundations if drilling or piling required.	No reference(s)
428	Particularly if cutting/ explosives used.	(DECC, 2011)
429	Particularly if seabed levelling is required for foundations to support devices e.g. gravity bases.	(ABPmer Ltd., 2006; ABPmer, 2011; ABPmer, 2013)
430	Particularly if seabed levelling is required for foundations to support devices e.g. gravity bases.	(ABPmer, 2013)
431	Particularly if seabed preparation is needed e.g. for gravity base foundations.	(DECC, 2011)
432	Particularly significant if pile driving used as a construction method.	(Wilhelmsson et al., 2010; ABPmer, 2011)
433	Pathogens could be relocated through bio-fouling on vessels and gear.	(West et al., 2007; Dafforn et al., 2011; Rothlisberger et al., 2010)
434	Physical disturbance to seabed is associated with the nature of the activity.	(Smith, 2008; Defeo et al., 2009)
435	Piling can result in resuspension of seabed sediments.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012)
436	Pipeline structures on the seabed surface can induce changes in hydrodynamics which can cause increased siltation. Outflow discharge can have high suspended sediment concentrations causing locally increased sedimentation.	(Burton and Goddard, 2007; Ludwig, 1988)
437	Pipeline structures siting proud of the seabed surface can induce changes in hydrodynamics specifically altering tidal flow direction and velocity.	(Burton and Clark, 2000)
438	Pipelines are installed onto or into the seabed. This requires the movement of heavy machinery and vehicles across the surface of the surface of the seabed or coastal habitat.	(Ludwig, 1988)
439	Plumes will be created during cable decommissioning but these will be temporary and will dissipate quickly.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
440	Plumes will be created during cable laying but these will be temporary and will dissipate quickly.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
441	Port construction works can result in increased noise associated with vessel movements, construction noise especially intensive noise such as piling. This has potential to disturb sensitive species (fish, mammals, birds).	(Ruddock and Whitfield, 2007; Paganelli et al., 2013; BirdLife International, 2012a; Hill, 1992; Gill et al., 2001; Hawkins and Popper, 2012)
442	Port construction works can result in increased noise associated with vessel movements, construction noise especially intensive noise such as piling. This has potential to disturb sensitive species (fish, mammals, birds).	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Gill et al., 2001)
443	Port maintenance works can result in increased noise associated with vessel movements, plant/works noise especially intensive noise such as piling. This has potential to disturb sensitive species (fish, mammals, birds).	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Gill et al., 2001)
444	Port operations can result in increased noise associated with vessels, plant/works, shoreside operations and industry. This has potential to disturb sensitive species (fish, mammals, birds).	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Gill et al., 2001)
445	Possible - but deminimus as a result of prop wash.	No reference(s)
446	Possible as a result of accidents involving vessels.	No reference(s)
447	Possible as a result of construction vessels used.	(Defra and UK MMAS, 2010; ICES (International Council for Exploration of the Sea), 2009)
448	Possible as a result of construction vessels used.	No reference(s)
449	Possible as a result of construction vessels.	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001)
450	Possible as a result of installation plant.	(ABPmer, 2011; Hooper and Austen, 2013)
451	Possible as a result of installation plant.	(ABPmer, 2011; ABPmer, 2013)
452	Possible as a result of lubricants, antifouling etc..	No reference(s)
453	Possible as a result of physical presence of structures.	(DECC, 2011)
454	Possible as a result of removal of structures/ materials.	No reference(s)
455	Possible as a result of removal of structures/ materials.	(DECC, 2011)
456	Possible as a result of vessels used, esp. if adjacent to coastal areas.	No reference(s)
457	Possible as a result of vessels used, esp. if adjacent to coastal areas.	(ABPmer, 2013)
458	Possible as a result of vessels used, especially if adjacent to coastal areas.	No reference(s)
459	Possible as result of accidental discharge from construction vessels used or from turbine gear boxes and other devices with lubricants.	(Ware, 2009)
460	Possible as result of accidental discharges from construction vessels used, use of lubricants in turbines and antifoulants.	(Ware, 2009)
461	Possible but likely to be localised. Most likely to be due to ground preparation for gravity bases, deposition of drill arisings or cable installation.	(OPSAR, 2008; Wilhelmsson et al., 2010; ABPmer, 2011)
462	Possible but likely to be temporary and localised.	(Wilhelmsson et al., 2010; ABPmer, 2011)
463	Possible but likely to be temporary.	No reference(s)
464	Possible but likely to be temporary.	(DECC, 2011)
465	Possible change of seabed type as a result of scouring of sea floor - this depends on mooring design and the substrate type.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
466	Possible cutting below seabed, removal of foundations, scour and cables, use of jackup barges.	(DECC, 2011)
467	Possible depending on decommissioning methods used.	No reference(s)
468	Possible depending on methods used or vessels.	(Defra and UK MMAS, 2010; Schwemmer et al., 2011; Gill et al., 2001)
469	Possible depending on methods used.	(Wilhelmsson et al., 2010)
470	Possible depending on methods used.	No reference(s)
471	Possible due to accidents with vessels.	No reference(s)
472	Possible due to installation of foundations and scour protection.	No reference(s)

473	Possible due to location of devices and foundations or anchors/tethers.	(Mcluskie et al., 2012; ABPmer, 2013)
474	Possible due to methods of construction e.g. piling, cable installation.	No reference(s)
475	Possible due to methods of construction.	(Wilhelmsson et al., 2010)
476	Possible due to methods of construction.	No reference(s)
477	Possible due to need for safety.	No reference(s)
478	Possible due to operation of devices but significance of effect not yet known.	No reference(s)
479	Possible due to operation of devices but significance of effect not yet known.	(ABPmer, 2013)
480	Possible due to physical presence of devices or maintenance vessels.	No reference(s)
481	Possible due to presence of devices and maintenance vessels.	No reference(s)
482	Possible due to transmission of electricity generated but significance of effect unclear and likely to be localised.	No reference(s)
483	Possible due to use of installation plant.	No reference(s)
484	Possible due to vessel movement but impacts unlikely to be significant given open and exposed nature of sites for tidal stream.	No reference(s)
485	Possible due to vessels used during construction.	No reference(s)
486	Possible due to vessels used during construction.	(DECC, 2011)
487	Possible due to vessels used.	No reference(s)
488	Possible especially if cutting/ explosives used.	No reference(s)
489	Possible especially if cutting/ explosives used.	(DECC, 2011)
490	Possible especially if cutting/ explosives used.	(ABPmer, 2013)
491	Possible if cables become exposed and as result of maintenance/ repair of foundations, devices or cables and scour protection.	(DECC, 2011)
492	Possible introduction of Non-Invasive-Species from the vessel. Moorings can provide "stepping stones" allowing the spread of Non-Invasive-Species.	(Saunders et al., 2000; West et al., 2007; Rothlisberger et al., 2010)
493	Possible temporary effect as result of removal of foundations, cables and scour protection.	(Wilhelmsson et al., 2010; ABPmer, 2011)
494	Possible temporary effect as result of removal of foundations, cables and scour protection.	No reference(s)
495	Possible temporary effect as result of removal of foundations, cables and scour protection.	(DECC, 2011)
496	Possible transport of Non-Invasive-Species from the vessel or those embarking/disembarking from the vessel particularly if the vessel accesses different water bodies.	(Saunders et al., 2000; West et al., 2007; Rothlisberger et al., 2010)
497	Possible, depending on decommissioning methods used and due to accidental discharge from vessels.	(Ware, 2009)
498	Possible, depending on decommissioning methods used.	No reference(s)
499	Possibly as a result of construction methods used.	(Mcluskie et al., 2012; ABPmer, 2013)
500	Possibly as a result of construction methods used.	(ABPmer, 2013)
501	Possibly as a result of construction vessels used.	No reference(s)
502	Possibly as result of construction methods used.	(Mcluskie et al., 2012; ABPmer Ltd., 2006; ABPmer, 2013)
503	Possibly as result of construction methods used.	No reference(s)
504	Possibly as result of construction methods/ vessels used.	(Mcluskie et al., 2012; ABPmer, 2013)
505	Possibly as result of construction vessels used.	No reference(s)
506	Possibly as result of decommissioning methods used.	No reference(s)
507	Possibly as result of entanglement with devices/ anchors/ tethers.	No reference(s)
508	Possibly as result of installation of devices, placement of drill arisings and scour protection.	No reference(s)
509	Possibly as result of installation of devices, placement of drill arisings and scour protection.	(DECC, 2011)
510	Possibly as result of installation of devices, placement of drill arisings and scour protection.	(ABPmer, 2013)
511	Possibly as result of maintenance methods/ vessels used and presence of new structure for colonisation.	(Defra and UK MMAS, 2010; Wilhelmsson et al., 2010; ABPmer, 2011)
512	Possibly as result of maintenance methods/ vessels used and presence of new structure for colonisation.	No reference(s)
513	Possibly due to lubricants, antifoulants.	(DECC, 2011)
514	Possibly due to operation of devices.	No reference(s)
515	Potential barrier to mobile species both above (birds) and below water.	(Wilhelmsson et al., 2010; ABPmer, 2011)
516	Potential mobilisation of contaminants during maintenance activity or from accidental, operational, incidental vessel/works plant discharges (ballast water, antifoulants, hull contamination, wastes, non-natives), much of which is restricted/regulated.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; ICES (International Council for Exploration of the Sea), 2009)
517	Potentially associated with construction works lights, plus navigation and operational lighting on vessels. Lighting can cause disorientation or displace sensitive species includes some bird.	(OPSAR, 2008; Shell Offshore Inc., 2011; Hill, 1992; Dwyer et al., 2013; European Commission, 2009)
518	Potentially associated with construction works lights, plus navigation and operational lighting on vessels. Lighting can cause disorientation or displace sensitive species includes some bird.	(Shell Offshore Inc., 2011; Hill, 1992; Dwyer et al., 2013; Miles et al., 2010; ABP Research and Consultancy Ltd., 1999; Percival, 2001; OSPAR Commission, 2008b)
519	Potentially associated with dredge disposal plume and increased suspended sediment and impacts to water quality.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Gill et al., 2001; Hawkins and Popper, 2012)
520	Potentially associated with navigation lights and shore side lighting. Lit vessels pose a collision risk to many species of birds. Birds drawn to light can become disoriented and collide with these vessel, resulting in injury and death.	(Saunders et al., 2000; Shell Offshore Inc., 2011; Miles et al., 2010; Dwyer et al., 2013)
521	Potentially associated with navigation lights and shore side lighting. Lit vessels pose a collision risk to many species of birds. Birds drawn to light can become disoriented and collide with these vessel, resulting in injury and death.	No reference(s)
522	Potentially associated with port estate and landside operational lighting, plus navigation and operational lighting on vessels. Lighting can cause disorientation or displace sensitive species includes some birds.	(OPSAR, 2008; Shell Offshore Inc., 2011; Hill, 1992; Dwyer et al., 2013; European Commission, 2011; Cutts et al., 2013)
523	Potentially associated with sediment plumes and increased suspended sediment and impacts to water quality. Associated water quality changes of very large dredges and/or constrained points in estuaries. Could also be associated with vessel movements.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Bray, 2008; Gill et al., 2001; Hawkins and Popper, 2012)
524	Potentially associated with works lights, plus navigation and operational lighting on vessels/plant. Lighting can cause disorientation or displace sensitive species includes some bird.	(Shell Offshore Inc., 2011; Hill, 1992; Dwyer et al., 2013; Govarets and Lauwaert, 2009)
525	Potentially by unintentional extraction of individuals via dredger.	(European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012; ABP Research and Consultancy Ltd., 1999)
526	Potentially during port operations and vessels via accidental, operational, incidental releases (ballast water, antifoulants, hull contamination, wastes, non-natives, litter), much of which is restricted/regulated.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; ICES (International Council for Exploration of the Sea), 2009; Royal Yacht Association (RYA) and British Marine Federation, 2010)
527	Potentially if associated with discharges, outfalls.	(ABP Research and Consultancy Ltd., 1999; Govarets and Lauwaert, 2009; OSPAR Commission, 2010; Scottish Environment Protection Agency, 2008)
528	Potentially if trenching, dredging, extraction of seabed required as part of construction, or individuals lost through land reclaim.	(European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012; ABP Research and Consultancy Ltd., 1999)
529	Potentially if trenching, dredging, extraction of seabed required as part of construction.	(European Commission, 2011; European Commission, 2009; Bray, 2008; Liley et al., 2012; ABP Research and Consultancy Ltd., 1999)
530	Potentially through construction works, piling and vessel/ plant activity.	(Associated British Ports, 2011; Hawkins and Popper, 2012; Govarets and Lauwaert, 2009)
531	Potentially through increase disturbance, noise, lighting, presence of structures, changes to water quality and suspended sediments. Scale will depend on scale of activity, works can affect sensitive species (birds, fish).	(Ruddock and Whitfield, 2007; Paganelli et al., 2013; Rogers et al., 2010; Hill, 1992; Hawkins and Popper, 2012; Cutts et al., 2008)
532	Presence and operation of schemes/structures may result in areas of scour/erosion or alternatively areas of siltation/accretion of sediment. Causing disturbance, changes to seabed or siltation.	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; EUROSION Project, 2004; Stillman et al., 2012; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
533	Pressure (e.g. increase in noise above ambient level) could be exerted via vessel movement associated with this activity.	(Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009)
534	Pressure (e.g. increase in noise above ambient level) would be exerted via vessel movement and gear deployment/towing/hauling. Whether pressure was exerted at benchmark level would depend on nature and scale/intensity of the activity.	No reference(s)
535	Pressure (e.g. increase in noise above ambient level) would be exerted via vessel movement and gear deployment/towing/hauling. Whether pressure was exerted at benchmark level would depend on nature and scale/intensity of the activity.	(Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009)

536	Pressure (e.g. increase in noise above ambient level) would be exerted via vessel movement, gear deployment/towing/hauling and the use of fish finding sonars.	(Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009)
537	Pressure can arise from construction and operation and may also be exerted by use of navigation lighting, but would need to be considered on case-by-case basis (e.g. scale of activity) to determine relevance to given feature/site.	(European Commission, 2012)
538	Pressure could be exerted through sedimentation. The extent would depend on intensity/scale of activity and local hydrographic conditions.	(European Commission, 2012)
539	Pressure could be exerted through sedimentation. The extent would depend on intensity/scale of activity and local hydrographic conditions.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
540	Pressure may be exerted by by-catch associated with dredging activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005)
541	Pressure may be exerted by by-catch associated with dredging activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell and Hiscock, 2005)
542	Pressure may be exerted by by-catch associated with fishing activities. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005)
543	Pressure may be exerted by by-catch associated with fixed nets and lines. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis.	(Gubbay and Knapman, 1999; ICES (International Council for Exploration of the Sea), 2013; Kaiser et al., 2001; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
544	Pressure may be exerted by by-catch associated with pelagic logline's and nets. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis.	(Gubbay and Knapman, 1999; ICES (International Council for Exploration of the Sea), 2013; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
545	Pressure may be exerted by the use of sea scarers or other deterrent devices associated with some aquaculture activities, but would need to be considered on case-by-case basis to determine relevance to given feature/site.	(European Commission, 2012; Olesiuk et al., 2012)
546	Pressure may be exerted by use of bird/seal scarers as well as vessels used to service the site, but would need to be considered on case-by-case basis to determine relevance to given feature/site.	(Marine Work Group Ireland, 2007; European Commission, 2012; Olesiuk et al., 2012)
547	Pressure may be exerted by use of seal scarers, but would need to be considered on case-by-case basis to determine relevance to given feature/site, including whether benchmark would be met.	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
548	Pressure may be exerted by, for example, by-catch associated with fish traps. However, vulnerability of feature to pressure will need to be considered on a case-by-case basis.	(Gubbay and Knapman, 1999; ICES (International Council for Exploration of the Sea), 2013; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
549	Pressure would be caused by anchors; magnitude of pressure will depend on spatial scale/intensity of activity.	(Gubbay and Knapman, 1999; Polet and Depestele, 2010; Sewell et al., 2007; Sewell and Hiscock, 2005)
550	Pressure would be caused by anchors; magnitude of pressure will depend on spatial scale/intensity of activity.	(Gubbay and Knapman, 1999; Polet and Depestele, 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
551	Pressure would be exerted by movement of gear components over, and hydraulic penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
552	Pressure would be exerted by movement of gear components over, and hydraulic penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.	(Gubbay and Knapman, 1999; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
553	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
554	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.	(Gubbay and Knapman, 1999; Linnane et al., 2000; Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
555	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.	(Gubbay and Knapman, 1999; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
556	Pressure would be exerted by movement of gear components over, and penetration into, seabed. Magnitude of pressure would depend on gear type and scale/intensity of activity, substrate type and local hydrographic conditions.	(Linnane et al., 2000; Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
557	Pressure would be exerted on intertidal habitats, through harvesting of target species by digging by hand or with apparatus such as forks. Magnitude of pressure will depend on spatial scale/intensity of activity.	(Fowler, 1999; Roberts et al., 2010)
558	Pressure would be exerted on intertidal habitats, through harvesting of target species by hand or with apparatus such as rakes/forks. Magnitude of pressure will depend on spatial scale/intensity of activity.	(Fowler, 1999; Roberts et al., 2010)
559	Pressure would result from contact between anchor and potentially footrope and seabed; magnitude of pressure will depend on spatial scale/intensity of activity and extent to which gear moves around.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Polet and Depestele, 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
560	Pressure would result from contact between gear and seabed; magnitude of pressure will depend on spatial scale/intensity of activity and extent to which gear moves around.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Polet and Depestele, 2010; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
561	Primarily barking dogs are the source of the above water noise which can lead to disturbance of birds.	(Saunders et al., 2000; Taylor et al., 2005; Newsome et al., 2004; Cutts et al., 2013; Stillman et al., 2007)
562	Probably only temporarily and localised during construction.	(ABPmer, 2013)
563	Probably only temporary and localised during construction.	No reference(s)
564	Probably only temporary and localised during construction.	(ABPmer, 2013)
565	Related to changes to beach profile, likely to be very localised.	(BMAPA, 2013; Bray, 2008; Smith, 2008; Defeo et al., 2009)
566	Removal of foundations, cables and scour protection.	No reference(s)
567	Removal of non-target species could result from activities/dredging if used to collect spat. Birds, seals and other wild predators may be directly removed through shooting, entanglement in nets (incl. anti-predator nets) or lines.	(Marine Work Group Ireland, 2007; European Commission, 2012)
568	Result of accidental, operational, incidental discharges (water and airborne). Discharges can be associated with ballast water, antifoulants, hull contamination, waste water and other wastes, much of which is restricted/regulated.	(ICES (International Council for Exploration of the Sea), 2009; Lauwaert, 2009; Lozano and Mouat, 2009; Ware, 2009)
569	Rocks moved around during rock pooling are generally replaced so no significant changes.	No reference(s)
570	Sand raking can be conducted by hand or through the use of vehicles. Trampling of the seabed surface can occur. The tines of the rakes will penetrate the surface (unlikely to be greater than 10cm).	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Schlacher and Thompson, 2012; Defra and UK MMAS, 2010; Nordstrom et al., 2012; Houser et al., 2013)
571	Sediment deposition will occur within the area. Extent of the deposition will depend on the particle size and currents.	(Newell and Woodcock, 2013)
572	Sediment plumes created will be deposited back on the seabed with the possibility of smothering nearby habitats.	(Newell and Woodcock, 2013)
573	Sediment re-suspended as a result of bottom fishing will have a variety of effects which may include increased oxygen demand and exposure of anoxic layers.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005)
574	Sedimentation of organic matter from off-bottom culture units may also result in changes in benthic communities, particularly where water current velocity has been decreasing.	(Philips, 1991)
575	Several non-target species are susceptible to removal by suction.	(Newell and Woodcock, 2013; Stelzenmüller et al., 2010; Tillin et al., 2011)
576	Shooting of bird increases mortalities rates. Birds that are not shot but are exposed to shooting and are disturbed expend energy fleeing an area. This can lead to increased mortalities.	(Saunders et al., 2000; Madsen, 1995)
577	Shoreside industry can cause additional disturbance, noise and light pollution.	(Defra and UK MMAS, 2010; European Commission, 2011; European Commission, 2009; Cutts et al., 2008; Cutts et al., 2013; ABP Research and Consultancy Ltd., 1999)
578	Slipway structure may effect local wave conditions by causing reflection, refraction and breaking of waves. This could increase or decrease wave energy in nearby areas.	(OSPAR Commission, 2008b)
579	Small but not insignificant risk of contamination from installation and support vessels during cable laying process.	(Ware, 2009)
580	Small possibility of this occurring at a very localised scale.	(ABPmer, 2013)

581	Small possibility of this occurring at very localised scale.	No reference(s)
582	Small potential for this to occur as result of new structures changing flow regime and reduction of energy through removal.	No reference(s)
583	Small potential for this to occur as result of new structures changing flow regime and reduction of energy through removal.	(ABPmer, 2013)
584	Small potential for this to occur as result of new structures changing flow regime or through maintenance activities.	(Wilhelmsson et al., 2010; ABPmer, 2011)
585	Small water craft can spread NIS through biofouling. Trailers used to move craft and the craft themselves can act as vectors for NIS introduction/spread.	No reference(s)
586	Specie can be removed as bycatch.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; Murray et al., 2014; ICES (International Council for Exploration of the Sea), 2011; Kaiser et al., 2001; Tillin et al., 2010; Polet and Depestele, 2010; Soetaert et al., 2013)
587	Species can be directly removed as a result of a targeted fishery.	(Gubbay and Knapman, 1999; Kaiser et al., 2001; Sewell et al., 2007; Sewell and Hiscock, 2005)
588	Species could be relocated through bio-fouling on vessels and gear.	(West et al., 2007; Dafforn et al., 2011; Rothlisberger et al., 2010)
589	Species including marine mammals, sharks etc. may become tangled in nets, ropes or lines associated with these activities resulting in death or injury but would need to be considered on case-by-case basis to determine relevance to given feature/site.	No reference(s)
590	Spraying of herbicides can have an adverse impact upon flora and fauna other than the target plants.	(Defra and UK MMAS, 2010; Islam and Tanaka, 2004; Taylor et al., 2006; Risebrough, 1986)
591	Spraying/vegetation removal can be conducted by hand or through the use of vehicles. Trampling of the seabed surface can occur.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; Nordstrom et al., 2012; Houser et al., 2013)
592	Spraying/vegetation removal can be conducted by hand or through the use of vehicles. Trampling of the seabed surface can occur.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; Houser et al., 2013; Pienkowski, 1992)
593	Substrate may be removed or displaced through movement of gear components over, and penetration into, seabed causing habitat structure to be altered (e.g. flattening of wave forms, removal of rock, removal of structural organisms).	(Kaiser et al., 2001; Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
594	Substrate may be removed or displaced through movement of gear components over, and penetration into, seabed causing habitat structure to be altered (e.g. flattening of wave forms, removal of rock, removal of structural organisms).	(Kaiser et al., 2001; Lart, 2012; Roberts et al., 2010)
595	Targeted removal of vegetation.	No reference(s)
596	The activity results in a direct extraction of the seabed. There is also abrasion at the edges of the dredge trails.	(Newell and Woodcock, 2013)
597	The amounts of material produced in Oil and Gas Exploratory drilling are not enough to cause this impact.	(E&P Forum and UNEP, 1997; UK Government, 2007)
598	The amounts of material produced in Oil and Gas Exploratory drilling may be enough to cause this impact.	(E&P Forum and UNEP, 1997; UK Government, 2007)
599	The burial and laying of the cable will result in disturbance and/or abrasion.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
600	The construction and maintenance of outfalls will bring vessels and vehicles to the site from a number of other locations. The surfaces and ballast water of these vessels/vehicles could transport Non-Invasive-Species.	(Royal Yacht Association (RYA) and British Marine Federation, 2010; Ware, 2009)
601	The construction and subsequent usage of the slipway will result in an increase in the number of vessels, vehicles and people in the area which in turn increases the level of noise being introduced to the surrounding environment.	(Van der Graaf et al., 2012; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008b; Ware, 2009; Saunders et al., 2000)
602	The construction and subsequent usage of the slipway will result in an increase in vessels, vehicles and people in the area which in turn increases the risk of litter being introduced.	(ABP Research and Consultancy Ltd., 1999; Saunders et al., 2000)
603	The construction and usage of slipways will involve the movement of people, vessels and vehicles in the area surrounding the slipway causing a visual disturbance to any species in the vicinity.	(ABP Research and Consultancy Ltd., 1999)
604	The construction and use of slipways at night will introduce light onto nearby habitats which could effect the way birds behave.	(Shell Offshore Inc., 2011; OSPAR Commission, 2008b)
605	The construction and use of slipways by vessels and vehicles may expose the marine environment to waste water and other chemicals used in vessel maintenance.	(ABP Research and Consultancy Ltd., 1999)
606	The construction and use of slipways by vessels may expose the marine environment to bilge, waste water and other chemicals used in vessel maintenance.	(ABP Research and Consultancy Ltd., 1999; Ware, 2009)
607	The construction and use of slipways by vessels may expose the marine environment to bilge, waste water and other chemicals used in vessel maintenance. Accidental spillage of fuel is also a risk.	(ABP Research and Consultancy Ltd., 1999; Ware, 2009)
608	The construction of a slipway will introduce a range substances associated with the construction phase e.g. concrete, sealants etc. The usage of slipways will involve a range substances involved in the, repair, maintenance and operation of vessels.	(ABP Research and Consultancy Ltd., 1999; Lozano and Mouat, 2009; OSPAR Commission, 2008b; Ware, 2009; Saunders et al., 2000; Pienkowski, 1992)
609	The construction of a slipway will require the excavation of seabed/habitat for foundations and the burial of supporting structures.	(OSPAR Commission, 2008b)
610	The construction of a slipway will result in the permanent excavation and or smothering of habitat by man made structures.	(OSPAR Commission, 2008b)
611	The construction of slipway will require the excavation, movement and disturbance of the seabed/habitat in the footprint and vicinity of the slipway.	(OSPAR Commission, 2008b)
612	The construction of the slipway will require the use of vessels, underwater machinery and the movement of material, all which will cause underwater noise.	(OSPAR Commission, 2008b; Ware, 2009)
613	The construction phase of an outflow pipe will require a number of vessels and vehicles in the marine environment which could cause litter. Some discharges may contain floating waste.	(Cole et al., 1999; Ludwig, 1988)
614	The deployment of anchors/anchor chains/lines can cause abrasion. Fixed moorings and ground tackle can also cause abrasion of the seabed surface. Vessels that dry out on moorings can also cause abrasion impacts.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
615	The drag head penetrates the surface of the sediment producing structural damage.	(Newell and Woodcock, 2013)
616	The height, speed and noise of the aircraft are all factors to consider along with the affected feature when determining impact. Low flying aircraft cause birds to take flight which can reduce feeding opportunities and lead to increase mortality rates.	(Koolhaas et al., 1993; Komenda-Zehnder et al., 2003)
617	The height, speed and noise of the aircraft are all factors to consider along with the impacted feature when determining impact.	(Koolhaas et al., 1993; Komenda-Zehnder et al., 2003)
618	The installation of outfall pipes requires the excavation of seabed and coastal habitat using heavy machinery and vehicles which will cause temporary visual disturbance during the period of construction.	(Burton and Clark, 2000)
619	The introduction and movement of invasive non-indigenous species may occur as a result of vessel movements, hull fouling and fishing activities.	(ICES (International Council for Exploration of the Sea), 2009)
620	The introduction of the MSAT and EPG(M), signed off by the SNCBs in 2013, introduces guidelines to minimise the environmental impacts of RN Maritime operations, either by air or on or under the sea.	(Royal Navy and Joint Nature Conservation Committee (JNCC), 2013)
621	The loud noise made by all-terrain vehicles used for shore based activity may deter wildfowl, waders and seabirds from feeding in some areas. The impact may also be captured under 'Visual disturbance'.	(Sewell et al., 2007; Sewell and Hiscock, 2005; Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
622	The nature of the activity will penetrate the sediment surface producing structural damage.	(Smith, 2008; Defeo et al., 2009)
623	The nature of the activity will result in habitat loss.	(Newell and Woodcock, 2013; Smith, 2008; Defeo et al., 2009)
624	The nature of the activity will result in habitat loss. Aggregate areas could be lowered by as much as 5m over a number of years.	(Newell and Woodcock, 2013; Tillin et al., 2011)
625	The nature of the activity will result in physical change.	(Smith, 2008; Defeo et al., 2009)
626	The nature of the activity will result in physical damage.	(Newell and Woodcock, 2013)
627	The nature of the activity will result in substrate disturbance.	(Department for Business Enterprise and Regulatory Reform, 2008; OSPAR Commission, 2012)
628	The nature of the activity will result in substrate disturbance.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
629	The Oil and Gas industry is a non-extractive (biological) activity.	(E&P Forum and UNEP, 1997; UK Government, 2007)
630	The plume of sediment formed during aggregate dredging will be dispersed and settle by gravity within the primary impact zone.	(Newell and Woodcock, 2013; Tillin et al., 2011)
631	The plume of sediment formed during aggregate screening will be dispersed and settle by gravity within the primary impact zone.	(Newell and Woodcock, 2013; Tillin et al., 2011)

632	The sail/kite and vehicle can cause disturbance to coastal bird species causing them to take flight and extend additional energy.	(Saunders et al., 2000; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; BirdLife International, 2012a; Rodgers and Schwikert, 2002)
633	The sail/kite and vehicle can cause disturbance to coastal bird species causing them to take flight and extend additional energy.	(Saunders et al., 2000; Cutts et al., 2013; Smith, 2004; Pienkowski, 1992)
634	The spoil from the trench excavation will smother the immediate adjacent seabed and there may be significant sedimentation from increased suspended sediment concentrations.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
635	The use of firearms can disturb birds. Disturbed birds can leave nests unattended leading to mortality of chicks. Birds expend energy through fleeing an area, this can lead to increased mortalities where the birds energy budget is adversely impacted.	(Saunders et al., 2000; Smit and Visser, 1993; Hockin et al., 1992; Cutts et al., 2013)
636	The use of slipways by vessels originating from other regions and the discharge of ballast or waste water may introduce non indigenous species to an area.	(ABP Research and Consultancy Ltd., 1999; Royal Yacht Association (RYA) and British Marine Federation, 2010; Ware, 2009)
637	There will noise introduction in relation to this activity.	(Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009)
638	These pollutants originate from materials used in the operation and maintenance of vessels - primarily cleaning materials, lubricants, painting materials (including anti-foulants).	(Saunders et al., 2000; Dafforn et al., 2011; Defra and UK MMAS, 2010; Turner, 2010; OSPAR Commission, 2011)
639	These pollutants originate from materials used in the operation and maintenance of vessels - primarily cleaning materials, lubricants, painting materials including antifoulants.	(Saunders et al., 2000; Dafforn et al., 2011; Defra and UK MMAS, 2010; Turner, 2010; OSPAR Commission, 2011)
640	These pollutants originate from materials used in the operation and maintenance of vessels - primarily cleaning materials, lubricants, painting materials including antifoulants.	No reference(s)
641	These pollutants originate from materials used in the operation and maintenance of vessels - primarily cleaning materials, lubricants, painting materials including anti-foulants.	(Saunders et al., 2000; Dafforn et al., 2011; Defra and UK MMAS, 2010; Turner, 2010; OSPAR Commission, 2011)
642	This activity does not cause this pressure in a marine habitat.	(E&P Forum and UNEP, 1997; UK Government, 2007)
643	This damage can be caused by either a) anchoring (with damaged caused by the anchor, chain or hull of the craft if the craft dries out) or b) installing/using permanent moorings.	No reference(s)
644	This damage can be caused by either a) anchoring (with damaged caused by the anchor, chain or hull of the vessel if the vessel dries out) or b) installing/using permanent moorings.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
645	This damage can be caused by either a) anchoring (with damaged caused by the anchor, chain or hull of the vessel if the vessel dries out) or b) installing/using permanent moorings.	(Saunders et al., 2000; Defra and UK MMAS, 2010; The Green Blue, 2006)
646	This damage can be caused by either a) anchoring (with damaged caused by the anchor, chain or hull of the vessel if the vessel dries out) or b) installing/using permanent moorings. Propeller can cause abrasion/penetration of the seabed.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
647	This is based on assumption all buried cable be left in situ after cessation of use - i.e. Not re excavated. As this is the general consensus amongst decommissioning plans.	No reference(s)
648	Though certain shipping activity has increased risk associated with this e.g. shipping of radioactive waste, operation of nuclear submarines.	No reference(s)
649	Though sheltered conditions in leeward side of structures can cause build up of litter/debris.	No reference(s)
650	Though vessels and ship wash are know to cause erosion and channels and berths can be maintained by vessel movements and the mobilisation of sediments.	No reference(s)
651	Though will depend on type of works potential to cause noise, vibration or disturbance e.g. via access of works plant, type of plant used or other disturbing activities such as intertidal recharge.	No reference(s)
652	Though will maintain change in regime resulting from coastal defences and impacts such as coastal squeeze.	No reference(s)
653	Through exhaust emissions into the water column. Pollution most likely during start up/launch and recovery as engines are cold therefore richer mixes of fuel are burnt. Refuelling typically occurs during launch and recovery but can occur on moorings.	(Saunders et al., 2000; International Petroleum Industry Environmental Conservation Association (IPIECA), 1999; Defra and UK MMAS, 2010; Clark, 1984; Milliken and Lee, 1990)3193
654	Through lead replacement shot and spent cartridges if not collected. Litter can be ingested by marine mammals, birds and fish leading to mortalities of individuals.	(Saunders et al., 2000; Gregory, 2009)2770
655	Tidal flow changes are unlikely in depths greater than 10m but will require confirmation in a case to case basis. Flow speed increases within the dredged area and is reduced at the sides.	(Newell and Woodcock, 2013; BMAPA, 2013)
656	Trampling of sensitive coastal vegetation/benthic vegetation can result when participants of this activity access suitable deployment locations.	(Saunders et al., 2000; The Green Blue, 2006)
657	Trampling of sensitive coastal vegetation/benthic vegetation can result when participants of this activity access suitable deployment locations.	(Saunders et al., 2000; Pienkowski, 1992)
658	Trampling of sensitive coastal vegetation/benthic vegetation can result when participants of this activity access suitable deployment locations. The vehicles wheels can also cause abrasion of the surface of the seabed (intertidal).	(Saunders et al., 2000; Pienkowski, 1992)
659	Trampling of the substrate and abrasion through walking on the intertidal, moving of rocks during rock pooling.	(Saunders et al., 2000; Schlacher and Thompson, 2012; Pienkowski, 1992)
660	Trampling of the substrate and abrasion through walking, trotting, galloping on the seabed - generally intertidal or very shallow sub tidal and this will be restricted to water depths <1m (horse).	(Saunders et al., 2000; Newsome et al., 2004)
661	Translocation of species and selective breeding may result in loss of native local species.	(Philips, 1991)
662	Trenches are usually dug to depths which range from 0.6 to in excess of 3.6m deep.	(OSPAR Commission, 2012)
663	Trenching and burial will produce noise. Also, noise is associated to the vessels used during the operation.	(Merck and Wasserthal, 2009; Ware, 2009)
664	Underwater noise is associated to commercial shipping activities. Also, the dragging of the dredge head over the seafloor will result in underwater noise.	(Newell and Woodcock, 2013; Tillin et al., 2011; Thomsen and Intersessional correspondence group on underwater noise (2007 - 2009), 2009; Ware, 2009)
665	Unless associated with large accidental discharges.	No reference(s)
666	Unless construction results in increased suspended sediment. .	No reference(s)
667	Unless recharge also associated with new coastal structures to retain material on intertidal.	No reference(s)
668	Unless very substantial construction works over a long period.	No reference(s)
669	Unlikely to be significant.	No reference(s)
670	Use of lead shot for wildfowling is illegal.	No reference(s)
671	Vehicle usage will exacerbate this impact over and above collection by hand. Birds are most likely disturbed by noise from this activity.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; BirdLife International, 2012a; Defra and UK MMAS, 2010; Hockin et al., 1992; Gill et al., 2001)
672	Vehicles usage will exacerbate this impact over and above collection by hand. Birds are most likely disturbed by noise from this activity.	(Joint Nature Conservation Committee (JNCC) and Natural England, 2011; BirdLife International, 2012a; Defra and UK MMAS, 2010; Hockin et al., 1992; Gill et al., 2001)
673	Vehicles used are lit at night and can disturb bird behaviours.	(Shell Offshore Inc., 2011; BirdLife International, 2012a)
674	Vehicles used to conduct this operation can be a source of this pressure through emissions and accidental discharges/pollution instances.	(Defra and UK MMAS, 2010; Islam and Tanaka, 2004; Pienkowski, 1992)
675	Vessel movement and infrastructure can impact seabed. Most likely to occur to littoral and shallow sublittoral habitats associated with infrastructure, navigation channels; mobilising sediment, causing erosion, disturbing/ changing seabed.	(Liley et al., 2012; ABP Research and Consultancy Ltd., 1999; Ware, 2009)
676	Vessel movements increase risk of collision which may kill or injure animals, (including those associated corkscrew injuries).	No reference(s)
677	Vessel movements key pathway for translocation and spread of species.	No reference(s)
678	Vessel movements key source of noise, vibration and disturbance in ports and harbours.	No reference(s)
679	Vessels associated with activity could result in hydrocarbon contamination but considered unlikely to generally occur at level that would cause concern (with exception of large scale pollution event).	(Ware, 2009)
680	Vessels can cause propeller damage to the seabed when they operate in shallow water. Propeller wash around slipways can lead to localised scouring/erosion.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
681	Vessels can cause propeller damage to the seabed when vessels operate in shallow water. Propeller wash around slipways can lead to localised scouring/erosion.	(Saunders et al., 2000; The Green Blue, 2009; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Milazzo et al., 2004)
682	Vessels can spread NIS through discharges of ballast/bilge water. Trailers used to move vessels (punt guns) and the vessels themselves can act as vectors for NIS introduction/spread.	(Saunders et al., 2000; West et al., 2007; Rothlisberger et al., 2010)
683	Vessels can spread NIS through discharges of ballast/bilge water. Trailers used to move vessels and the vessels themselves can act as vectors for NIS introduction/spread.	(Saunders et al., 2000; West et al., 2007; Rothlisberger et al., 2010)
684	Vessels used during these activities could result in e.g. oil slicks but considered unlikely to generally occur at level that would cause concern (with exception of large scale pollution event).	(Ware, 2009)

685	Vibration from the dredge head movement and suction.	(Tillin et al., 2011)
686	Vibration originating from the vessel and from gear during operation.	(Defra and UK MMAS, 2010; Kaiser et al., 2001; Roberts et al., 2010; Sewell et al., 2007; Sewell and Hiscock, 2005; Soetaert et al., 2013)
687	Vibrations associated to the burial of the cable.	No reference(s)
688	Vibrations associated to the de-burial of the cable when this is required.	No reference(s)
689	Vibrations associated to the re-burial or repair of the cable when this is required.	(Department for Business Enterprise and Regulatory Reform, 2008)
690	Wash generated waves/wake may cause localised issues regarding erosion.	(Saunders et al., 2000; Defra and UK MMAS, 2010; Ware, 2009; The Green Blue, 2006)
691	Waste materials settling on the seabed below or near the cage leads to increase in organic matter which can impact on benthic ecosystems, result in changes to the nature and chemistry of sediments and structure of benthic communities.	(European Commission, 2012)
692	When cable is de-buried, spoil from the trench excavation will smother the immediate adjacent seabed and there may be significant sedimentation from increased suspended sediment concentrations, However, generally cables are left in place.	(Department for Business Enterprise and Regulatory Reform, 2008; OSPAR Commission, 2012)
693	When cable reburial is required.	(Merck and Wasserthal, 2009)
694	When on mooring likely to minimal - NB engines may be running to charge generators but underwater noise would be less than during transit. Fish, mammals and birds can all be impacted by underwater noise.	(Saunders et al., 2000; Joint Nature Conservation Committee (JNCC) and Natural England, 2011; Defra and UK MMAS, 2010; European Commission, 2011; Codarin et al., 2009)
695	When using elevated structures i.e. Rock armouring, exposed cable, creating scour pits and deposition tails. The size of this flow change will vary on the strength of the ambient current the size of the exposed.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
696	Where associated with beneficial use of sediments to profile area causing elevated suspended sediment. Management realignment scheme may also act as sink or source of sediment, which could alter existing surrounding environment. .	(Paganelli et al., 2013; Rogers et al., 2010; Bray, 2008; ABP Research and Consultancy Ltd., 1999; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009)
697	Where associated with beneficial use of sediments to profile area causing elevated suspended sediment. Management realignment scheme may also act as sink or source of sediment, which could alter existing surrounding environment. .	(Rogers et al., 2010; Bray, 2008; Pontee et al., 2013; OSPAR Commission, 2008a; Govarets and Lauwaert, 2009; OSPAR Commission, 2008b)
698	Where construction includes noisy large plant e.g. piling rigs.	(Associated British Ports, 2011; Hawkins and Popper, 2012; Govarets and Lauwaert, 2009)
699	Where outflow pipes are buried, trench excavation will be required which will remove the existing habitat and if not fully reinstated this could result in habitat change. Rock armouring may also be placed over the pipe resulting in a change in habitat.	(Ludwig, 1988)
700	Where outflow pipes are buried, trench excavation will be required which will remove the existing habitat and if not fully reinstated this could result in habitat loss. Rock armouring may also be placed over the pipe resulting in a loss in habitat.	(Ludwig, 1988)
701	While military activities have the potential to cause adverse impacts, the introduction of the EPG(M) guidelines, introduces guidelines to minimise the environmental impacts of Royal Naval maritime operations, either by air or on or under the sea.	(Royal Navy and Joint Nature Conservation Committee (JNCC), 2013)
702	While military activities have the potential to cause adverse impacts, the introduction of the EPG(M) guidelines, introduces guidelines to minimise the environmental impacts of Royal Naval maritime operations, either by air or on or under the sea.	(Royal Navy and Joint Nature Conservation Committee (JNCC), 2013; Lauwaert, 2009; Ware, 2009)
703	While military activities have the potential to cause adverse impacts, the introduction of the EPG(M) guidelines, introduces guidelines to minimise the environmental impacts of Royal Naval maritime operations, either by air or on or under the sea.	No reference(s)
704	While unlikely this could occur as a result of setting nets in confined water bodies/estuaries, or behavioural effects from the use of 'pingers' on nets – the impacts from the latter may be better covered under 'under water noise' pressures.	No reference(s)
705	Whilst activity could result in loss of certain habitats e.g. seagrass, change unlikely to be permanent if activity were to cease.	(Kaiser et al., 2001; Roberts et al., 2010)
706	Whilst activity would cause pressure, impact considered better captured by 'visual disturbance'.	(ICES (International Council for Exploration of the Sea), 2013; Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
707	Whilst activity would cause pressure, impact considered better captured by 'visual disturbance'.	(Lart, 2012; Polet and Depestele, 2010; Roberts et al., 2010; Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
708	Whilst activity would cause pressure, impact considered better captured by 'visual disturbance'.	(Stillman et al., 2007; Wildfowl and Wetlands Trust (WWT) Consulting, 2012)
709	Whilst trestles could alter the habitat type from sediment to hard structure in the local area, the change would not be permanent (and the habitat type may remain unaffected below the structures).	(European Commission, 2012; Shellfish Association of Great Britain, 2008)
710	Whilst trestles could alter the habitat type from sediment to hard structure in the local area, the change would not be permanent (and the habitat type may remain unaffected below the structures).	No reference(s)
711	Works can cause pressure through increase disturbance, noise, lighting, presence of structures, changes to water quality and suspended sediments. Scale will depend on scale of activity, works can affect sensitive species (birds, fish).	(Ruddock and Whitfield, 2007; Paganelli et al., 2013; Rogers et al., 2010; Hill, 1992; Dwyer et al., 2013; Gill et al., 2001; Fijn et al., 2012)
712	Yes only if the cable needs be reburied or uncovered for repair - the frequency of this being required is a rare occurrence.	(Department for Business Enterprise and Regulatory Reform, 2008)
713	Yes only if the cable needs be reburied or uncovered for repair - the frequency of this being required is a rare occurrence.	(Department for Business Enterprise and Regulatory Reform, 2008; Merck and Wasserthal, 2009)
714	Yes only if the cable needs be reburied or uncovered for repair - the frequency of this being required is a rare occurrence.	(Merck and Wasserthal, 2009)

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Alde Ore Estuary Special Protection Area: DRAFT Supplementary advice on conserving and restoring site features

This document provides supplementary advice about the conservation objectives for the Alde Ore Estuary Special Protection Area (SPA), forming part of the conservation advice package.

In many cases, the attribute targets show if the current objective is to either 'maintain' or 'restore' the attribute. This is based on the best available information, including that gathered during monitoring of the feature's current condition. Where there is no evidence to determine a [marine] feature's condition, a vulnerability assessment, which includes sensitivity and exposure information for features and activities in a site, has been used as a proxy for condition. In these cases, the condition is referred to as 'not assessed'. As new information on feature condition becomes available, this will be added so that the advice remains up to date. Evidence used in preparing the supplementary advice table has been cited with full references provided at the end of the package. Where references have not been provided, Natural England has applied ecological knowledge and expert judgement.

There are some instances where the feature, subfeature or supporting habitat name varies on MAGIC site maps from the conservation advice. Find the alternative names.

Supplementary information on qualifying features

The following sections give you additional, site-specific information on the qualifying features.

Avocet, *Recurvirostra avosetta (breeding)*

Historically the number of breeding pairs within the SPA has been higher than 100 (1993-1996) however in the latest 5 year mean (2010-2013) the number of breeding pairs was 42. These pairs were found to be nesting at Havergate Island and Orford Ness. The decline in the site contrasts with an increase in the wider GB population.

Avocet is present in the site all year round. Breeding starts in April on nest scrapes BirdLife International, 2014 at Havergate Island, Doveys and Belpers lagoons Royal

Society for the Protection of Birds (RSPB), 2005, by June most of the chicks have hatched and the flocks leave the estuary by August.

Since monitoring began in 1996 fledging rates have been poor. On Havergate Island, 86 pairs fledged only 16 young in 1996. On Orford Ness, 17 pairs attempted to breed in 2012 but no young survived for more than a few days. This was largely due to predation by foxes and gulls Crawshaw, 2012.

Feeding habitat includes the intertidal estuary mudflats and the saline lagoons of Havergate Island and Orford Ness. At high tide the birds feed in the lagoons, moving onto the mudflats as they become exposed. Prey includes invertebrates such as insects, crustaceans and worms found in the soft muds.

Condition Assessment: Not assessed

Avocet, *Recurvirostra avosetta (non-breeding)*

The 5 year mean peak of Avocet 1991/92-1995/1996 was 706 individuals which has increased to 1, 597 (5 year mean 2008/2009- 2012/2013). This represents 21% of the GB non-breeding population British Trust for Ornithology (BTO), 2014 Austin et al., 2014.

Avocet are present all year round as they use the site for both breeding and overwintering Joint Nature Conservation Committee (JNCC), 2012b. The overwintering birds are part of the Western European population, which start to arrive on the Suffolk coast in October. The birds start to leave the SPA in February to return to their European breeding grounds with many of the overwintering population breeding outside of Great Britain.

In the Alde-Ore Estuary SPA avocet roost on saltmarsh and banks between Blackheath and Snape. Foraging is particularly concentrated around Iken, Snape and Butley Creek where large flocks of more than 600 birds can be seen in winter British Trust for Ornithology (BTO), 2011.

Condition Assessment: Not assessed

Lesser black-backed gull, *Larus fuscus*

At classification the breeding population of lesser black-backed gull was 14,070 pairs (4 year mean 1994-1997 Joint Nature Conservation Committee (JNCC), 2014.

Since classification, the number of breeding pairs has decreased to 768 at Havergate Island and 1678 at Orford Ness in 2007 with only 1267 pairs breeding on

Havergate Island and 640 on Orford Ness in 2012 Joint nature Conservation Committee (JNCC), 2012a.

Outside the breeding season, often fewer than 10 birds are seen Crawshaw, 2012. In February, the breeding population starts to return. Laying stops by end of May and most individuals have left the SPA by July.

The gulls prefer to nest on islands in large colonies with many nesting on Lantern Marshes on Orford Ness. A small colony exists on the southern end of the Ness and on Havergate Island at Dovey's Lagoon. In 2012, all ground nesting failed on Orford Ness, the only successful pairs nested on the roofs of the Pagodas and the Cobra Mist building Crawshaw, 2012.

Lesser black-backed gull are omnivorous and opportunistic feeders and at Havergate and Orford Ness some have learnt to predate chicks of breeding wader and tern colonies.

Condition Assessment: Not assessed

Little Tern, *Sternula albifrons*

Between 2003- 2013 no more than 3 pairs were breeding within the estuary during any given year, often none bred at all Little Tern Group, 2013. Little tern can however be seen roosting on the shingle ridges at Shingle Street, Orford Ness and Havergate Island.

As a summer visitor they start to arrive from the West African wintering grounds at the beginning of May. On arrival they explore the SPA and wider Suffolk coast looking for suitable shingle nesting sites before settling and breeding. The last known nesting colony was at Sudbourne Beach, south of Slaughden on Orford Ness in 2013 Banks and Austin, 2004. In the same year 40 birds were recorded on Shingle Street but due to disturbance they moved to the Deben Knolls of Deben Estuary SPA, where a breeding colony was established Little Tern Group, 2013.

Condition Assessment: Not assessed

Marsh harrier, *Circus aeruginosus*

In addition to the breeding population, birds are present throughout the year with the site having a wintering population of around 8 birds. Spring brings considerable bird movement in the estuary as northern breeding marsh harrier pass through. In the autumn the returning migratory marsh harriers are seen moving south.

Breeding habitats are located in the upper estuary at Iken, Sudbourne, Boyton and on Orford Ness. Prey includes small mammals (voles, rats and rabbits) and birds (pipit *Anthus spp.*, bearded reedling *Panurus biarmicus,* and moorhen *Gallinula chloropus*) which are found in reedbeds and saltmarshes throughout the SPA and in nearby extensive dry arable farmland. Males can be bigamous or trigamous and require home ranges of up to 1,407 ha, depending on the breeding cycle stage European Science Foundation, 2009, European Science Foundation, 2013. It is therefore unlikely that the site will hold more than 2-3 males with 4-5 breeding females. With 8 females recorded breeding just outside the SPA in 2012 and 2013, the Alde Ore Estuary SPA likely can't support a larger population than recently recorded.

Condition Assessment: Not assessed

Redshank, *Tringa totanus*

When the site was classified the number of overwintering redshank was 1, 662 individuals (5 year mean peak 1989/90- 1993/94) Natural England, 2014a. Since classification, the population has fluctuated widely in response to weather severity with the five year peak mean 2008/2009- 2012/2013 being 1, 921, similar to that when the SPA was classified Austin et al., 2014.

Numbers of wintering birds in the estuary vary greatly depending on weather conditions with far fewer present in extreme cold snaps. There were 5,268 redshank present in 1997, which was an unusually warm winter across Suffolk Banks and Austin, 2004.

Across the site redshank are found frequenting the saltmarshes, mudflats and saline lagoons del Hoyo et al., 1996. At high tide they roost on the upper saltmarshes at Snape, on Orford Ness and on Havergate Island with smaller numbers at Butley Creek.

The saltmarsh and intertidal mudflats and sandflats of the SPA are the main feeding habitat for redshank. On the mudflats they feed on annelid worms Nereis sp, molluscs Peringa ulvae and amphipods Corophium sp. They occasionally feed on small fish from shallow waters on Orford Ness and Havergate Island. At high tides they move onto the grazing marshes and scrapes of Havergate, Orford Ness, Hazelwood marshes and the upper saltmarshes at Iken

Condition Assessment: Not assessed

Ruff, *Philomachus pugnax*

The 5 year peak mean (2008/09 to 2012/13) of ruff within the SPA is five individuals Austin et al., 2014.

Great Britain is at the northern of the Ruff's range for overwintering. Hence more birds pass through during migration with numbers peaking twice annually. In autumn during their southern migration to wintering grounds as far as southern Africa and in spring heading North to breed in Scandinavia, Iceland and Russia BirdLife International, 2013. Wintering ruff also aggregate outside the SPA at Trimley and Minsmere. Presence during migration is dependent on food availability and prevailing weather conditions. In bad weather ruff tend to move swiftly south.

Main feeding habitats are intertidal mudflats and non-tidal marshes. At high tide they move onto the grazing marshes and scrapes of Havergate, Orfordness and Hazelwood. Their wide food range includes small terrestrial invertebrates (beetles and flies) when on the marshes. On the abundant mudflats and scrapes they feed on aquatic estuarine invertebrates e.g. caddis flies, worms, frogs and molluscs.

Condition Assessment: Not assessed

Sandwich Tern, *Sterna sandvicensis*

Sandwich tern have been recorded as nesting on the site since 1986 however the colony on Havergate Island disappeared in 1997 and since has only nested in some years with a maximum of 15 pairs in 2003 Joint Nature Conservation Committee (JNCC), 2014.

Sandwich tern is a summer visitor to the SPA and starts to arrive at the end of March. They nest on Havergate Island, historically in large aggregations of over 100 birds. Prior to 1996 nesting also occurred on the seaward side of the Orford Ness spit. Past nesting attempts on Havergate have been on raised mounds in gravels and shingle with very limited vegetation. Breeding success has been limited by predation of the eggs and young by lesser black-backed gull, fox and brown rat. Numbers of pairs attempting to breed fluctuates due to the tendency for mass movements between colonies Suffolk Ornithologists' Group, 1996, Burgess and Hirons, 1992.

Sandwich tern feed in the shallow waters along the shingle beaches of Orford Ness and Havergate with key prey species including sandeel and sprat del Hoyo et al., 1996.

Condition Assessment: Not assessed

Site-specific seasonality table

In the table below, the months highlighted in grey in each row indicate the months in which significant numbers of each mobile designated feature are most likely to be present at the site during a typical calendar year. Where count data were available, highlighted months with significant numbers were defined on the basis of one or both of the following criteria being met in more than three-fifths (60%) of the years within the six years period 2007-2012. The two criteria used were: i) monthly maxima exceed 10% of the highest mean of monthly maxima over the six-year period; ii) monthly maxima exceed the 2012/2013 national significance threshold. These criteria were predominantly used for non-breeding bird features (based on WeBS data). Where insufficient count data were available to use these criteria, months with significant numbers were highlighted on the basis of generic information on seasonal patterns of occurrence in published sources (see references in table below).

Applicants considering projects and plans scheduled in the periods highlighted in grey would benefit from early consultation with Natural England given the greater scope for there to be likely significant effects that require consideration of mitigation to minimise impacts to qualifying bird features during the principal periods of site usage by those features. The months which are not highlighted in grey are not ones in which the features are necessarily absent, rather that features may be present in less significant numbers in typical years. Furthermore, in any given year features may occur in significant numbers in months in which typically they do not. Thus, applicants should not conclude that projects or plans scheduled in months not highlighted in grey cannot have a significant effect on the features. There may be a lower likelihood of significant effects in those months which nonetheless will also require consideration. Any assessment of potential impacts on the features must be based on up-to-date count data and take account of population trends evident from these data and any other available information. Additional surveys may be required.

Non-breeding waterbird monthly maxima data for this site are available upon request from the Wetland Bird Survey (WeBS: http://www.bto.org/volunteer-surveys/webs/data/submit-data-request). Breeding seabird data are available from the Seabird Monitoring Programme at http://jncc.defra.gov.uk/smp/Default.aspx

Table 1. Presence by month of mobile designated features at the Alde-Ore Estuary SPA. Grey indicates periods of presence in significant numbers whereas blank (white) indicates either periods of absence or of presence but only in numbers of less significance.

Common Name	Latin Name	Designated Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Reference
Avocet	*Recurvirostra avosetta*	Nonbreeding; Wintering													Cramp and Simmons, 1983
Lesser black-backed gull	*Larus fuscus*	Breeding													Forrester and Andrews, 2007, Wernham et al., 2002, Cramp and Simmons, 1983
Little tern	*Sterna albifrons*	Breeding													Kober et al., 2010, Forrester and Andrews, 2007, Pennington et al., 2004, Cramp and Simmons, 1983
Marsh harrier	*Circus aeruginosus*	Breeding													del Hoyo et al., 1994
Redshank	*Tringa totanus*	Nonbreeding; Wintering													Wernham et al., 2002, Cramp and Simmons, 1983
Ruff	*Philomachus pugnax*	Nonbreeding; Wintering													Wernham et al., 2002, Cramp and Simmons, 1983
Sandwich tern	*Sterna sandvicensis*	Breeding													Forrester and Andrews, 2007, Brown and Grice, 2005, Pennington et al., 2004, Cramp and Simmons, 1983
Avocet	*Recurvirostra avosetta*	Breeding													Cramp and Simmons, 1983

Supplementary advice table: attributes applying to individual features

The following table shows attributes which apply to the individual features listed.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Breeding (summer) season	Breeding population: abundance	Maintain presence of the breeding feature whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in the future should also be taken into account. The latest 5-year mean (2010-2013) was 42 pairs (nesting at Havergate Island and Orford Ness including new habitat created in the Airfield). Historically numbers recorded at these locations were higher (100 pairs, 1992-1996).	Warrington et al., 2014; National Trust and Royal Society for the Protection of Birds (RSPB), 2014 Historic and latest site count data is in part derived from combined RSPB and National Trust data. Please contact your Natural England Advisor for further information.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Breeding (summer) season	Breeding population: productivity and survival	Restore the abundance and structure of the assemblage at or above its current or target level (whichever is the higher) through restoring breeding productivity and adult survival.	This target is provided to reflect the required abundance and long-term viability of the population. Changes in the availability of adult birds of breeding age to reproduce, and the annual productivity or breeding success of the population (i.e. the number of chicks successfully raised per breeding pair per year) may adversely affect the overall size and age-structure of the breeding population and its long-term viability. Overall breeding success of the SPA population may also be substantially influenced by any changes in the level of predation of eggs and chicks by generalist native species and/or introduced non-native species. Productivity varies considerably between years, with 18 juveniles fledging in 2014, zero in 2013 and 2012 and 19 in 2010	National Trust and Royal Society for the Protection of Birds (RSPB), 2014
Avocet	Breeding (summer) season	Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats.	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			System (www.apis.ac.uk). Critical Loads: Nitrogen depositions critical load is (20 – 30 kg N ha-1 yr-1) for Pioneer, low-mid, mid-upper saltmarshes. Ammonia critical load is 3µg NH3/m3 (annual mean) (2-4 µg NH3 m-3) in littoral sediment set for Higher Plants. NOx critical load is 30µg NOx/m3 annual mean, 75µg NOx/m3 24-hour mean for littoral sediment, set for All vegetation) SO2 Concentration µg/m3 Maximum: 1.94 Minimum: 1.29 Average: 1.41	Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No expected negative impact on the species due to impacts on the species' broad habitat from acidity. No critical levels have been assigned for SO2. Air pollution impacts on vegetation diversity. Aerial deposits of nitrogen may exceed the site relevant critical load (20 – 30 kg N ha-1 yr-1) above which the diversity of saltmarsh vegetation begins to be altered (possibly to reed) and adversely impacted. Many land use practices contribute to this problem locally. Current loads: Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21	has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
				Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62 Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only provided for species where they have been provided by APIS.	
Avocet	Breeding (summer) season	Supporting habitat: conservation measures	Restore the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as the Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a management plan	Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
				A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Breeding (summer) season	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Restore the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding) Suggested mitigation is to e.g. create Islands on existing lenses of higher ground within Hazelwood Marshes. (IPENS)	To maintain or restore the extent of supporting habitats and their range in order to maintain the population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. Hydrological changes: Flood wall breaches in December 2013 (due to the tidal surge) have led to flooding of Hazelwood Marshes and Lantern Marshes south (both currently intertidal). This has led to a loss of nesting habitat and saline lagoons (IPENS). Coastal Squeeze: Seawalls afford little scope for natural adaptation of the estuary to sea level rise through roll back of habitat. Saltmarsh is at risk of being squeezed in the future (although in 2014 the estuary was perceived as in balance) and limited areas of natural habitat transition within the site could be lost. The developing policy of the Alde and Ore Estuary Partnership should consider scope for natural adaptation to sea level rise. (IPENS) Invasive species: Spartina is encroaching on estuarine muds. With Spartina at the front, and reed encroaching at the back, saltmarsh could be squeezed out. (IPENS) An area of Airfield Marsh that had naturally developed into a coastal grazing marsh but was prone to drying out in summer was modified to retain water levels which resulted in increased breeding. Area of the supporting habitat is currently understood to be:	Natural England, 2014b; Warrington et al., 2014; Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England, 2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment Agency, 2014

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
				432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadows, 1.31 ha Coastal lagoons, 149.36 ha Freshwater and Coastal grazing marsh, 7.70 ha Intertidal mixed sediment, 799.28 ha Intertidal mud, 5.08 ha intertidal sand and muddy sand, Unknown ha Salicornia and other annuals colonising mud and sand, Unknown ha Spartina swords.	
Avocet	Breeding (summer) season	Supporting habitat: hydrology/flow	Maintain the stability of standing water levels (<2 cm fluctuation) in order to prevent flooding of	Changes in source, depth, duration, frequency, magnitude and timing of water supply or flow can have important implications for this feature. Such changes may affect the quality and suitability of habitats used by birds for nesting, drinking, preening, rearing, feeding or roosting. Unless these have already been undertaken, further site-specific investigations may be required to fully inform conservation measures for this feature and/or the likelihood of impacts on this attribute.	Cadbury et al., 1989
Avocet	Breeding (summer) season	Supporting habitat: landform	Maintain the availability of shallow sloping nesting sites and avoid changes in the probability that they will flood at critical times of year.	The physical topography and landform of a site will strongly influence the quality and extent of supporting habitats used by this feature for nesting/rearing, feeding and/or roosting as appropriate. This will also influence the interactions with underlying supporting processes on which the supporting habitat may rely. Any changes or modifications to site topography may adversely affect the ability of the supporting habitats to support and sustain this feature.	Hill, 1988; Goutner, 1986; del Hoyo et al., 1996

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Breeding (summer) season	Supporting habitat: salinity	Maintain water salinity at<2.5%	This feature is known to be particularly susceptible to changes in the salinity (concentration of salt) of its shallow brackish/fresh water habitat; Salinity is a major factor determining the distribution and composition of communities of aquatic invertebrates such as insects, crustaceans and worms on which this feature feeds. High levels of salinity can adversely affect invertebrate food for adults and chicks. The principal factors governing the temporal and spatial nature of the salinity regime of coastal sites are the diurnal incursion of the tide and fresh water flow from the river(s). Any activity changing either of these factors can result in a change to the salinity regime.	Cadbury and Richards, 1978; Hill et al., 1989; del Hoyo et al., 1996]
Avocet	Breeding (summer) season	Supporting habitat: vegetation characteristics	Maintain the proportion of vegetated to bare ground within nesting areas with generally<40% vegetated	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	Goutner, 1986
Avocet	Breeding (summer) season	Supporting habitat: water depth	Maintain the availability and area of standing water of 3-5 cm deep, over at least 50% of the total standing water area.	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival. Deep water surrounding nesting sites may also be important to deterring predators.	Cadbury et al., 1989

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Breeding (summer) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential. Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO data (WFD High/Good boundary)	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Non-breeding (winter and/or passage) season	Non-breeding population: abundance	Maintain the presence of the non-breeding feature whilst avoiding deterioration from its current level of abundance as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve .Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in future should also be taken into account. The SPA's population was 1,597 individuals (5 year mean 2008/09 to 2012/13; WeBS Online), accounting for national increases, this represents 21% of the GB non-breeding population. The 5 year peak mean 1991/1992-1995/1996 was 706 individuals.	Austin et al., 2014

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Non-breeding (winter and/or passage) season	Non-breeding population: condition and survival	Maintain overall adult survival and body condition at a level which is consistent with maintaining the abundance and structure of the population at or above its current or target level, whichever is the higher.	This target is provided to reflect the required abundance and long-term viability of the population. Poor winter body condition may negatively affect a bird's ability to move, forage, and survive whilst present on the SPA, and subsequently affect its ability to migrate and reproduce whilst in its summer breeding grounds.	
Avocet	Non-breeding (winter and/or passage) season	Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). Critical loads: Nitrogen depositions critical load is (20 – 30 kg N ha-1 yr-1) for Pioneer, low-mid,	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			mid-upper saltmarshes. Ammonia critical load is 3µg NH3/m3 (annual mean) (2-4 µg NH3 m-3) in littoral sediment, set for higher plants. NOx critical load is 30 µg NOx/m3 annual mean, 75µg NOx/m3 24-hour mean for littoral sediment, set for All vegetation.	abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No critical levels have been assigned for SO2. Habitat not classed as sensitive to acidity (Littoral sediment). Current loads: Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21 Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62	
Avocet	Non-breeding (winter and/or passage) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Non-breeding (winter and/or passage) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as the Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a management plan Wildfowling is controlled by a management plan and Natural England consent. A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England	Joint Nature Conservation Committee (JNCC), 2011; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Non-breeding (winter and/or passage) season	Supporting habitat: extent and distribution of supporting non-breeding habitat	Maintain the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding	This target may apply to supporting habitat which also lies outside the site boundary. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadows, 1.31 ha Coastal lagoons, 149.36 ha Freshwater and Coastal grazing marsh, 7.70 ha Intertidal mixed sediment, 799.28 ha Intertidal mud, 5.08 ha intertidal sand and muddy sand, Unknown ha Salicornia and other annuals colonising mud and sand, Unknown ha Spartina swords.	
Avocet	Non-breeding (winter and/or passage) season	Supporting habitat: landscape	Maintain the area of open and unobstructed terrain around roosting and feeding sites.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Non-breeding (winter and/or passage) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO data (WFD High/Good boundary)	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Avocet	Year-round	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance affecting nesting/ foraging and/or roosting birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.	Holm and Laursen, 2009
Avocet	Year-round	Supporting habitat: food availability within supporting habitat	Maintain the distribution, abundance and availability of key prey items	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population. Key prey items include (e.g. Gammarus, Corophium, flies, beetles, Neries, Hydrobia, Cardium, gobies. Preferred prey sizes (e.g. worms between 4-15 mm long).	Cramp and Simmons, 1983; Hill et al., 1989; Reay, 1991; Moreira, 1995; del Hoyo et al., 1996]

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Breeding population: abundance	Restore the size of the population to 14,074 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count, or equivalent	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in future should also be taken into account. For classification in 1996, the SPA's breeding population was given as 14,074 pairs (4 year mean 1994-1997 derived from the JNCC Seabird Monitoring Programme database; agreed by NE's Chief Scientist in 2012), which at the time represented 11.3% of the Western Europe/Mediterranean/Western Africa breeding population. However, after a peak of 23,400 pairs in 2000, numbers reduced significantly below the target.	Joint Nature Conservation Committee (JNCC), 2014; Banks and Austin, 2004; Joint Nature Conservation Committee (JNCC), 2012b

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Breeding population: productivity and survival	Restore the abundance and structure of the assemblage at or above its current or target level (whichever is the higher) through restoring breeding productivity and adult survival.	This target is provided to reflect the required abundance and long-term viability of the population. Changes in the availability of adult birds of breeding age to reproduce, and the annual productivity or breeding success of the population (i.e. the number of chicks successfully raised per breeding pair per year) may adversely affect the overall size and age-structure of the breeding population and its long-term viability. Overall breeding success of the SPA population may also be substantially influenced by any changes in the level of predation of eggs and chicks by generalist native species and/or introduced non-native species. Productivity rates of the Havergate Island colony were 0.15, 0.35 and 0.5 from 2009 to 2011. Studies of colonies without significant controlling factors demonstrate productivity rates of 0.43 to 0.69. By comparison, the SPA colony appears to have productivity and survival issues.	Joint Nature Conservation Committee (JNCC), 2014; Cramp and Simmons, 1983

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No expected negative impact on species due to impacts on the species' broad habitat from Nitrogen, acidity, Ammonia, NOx or SO2. Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
				provided for species where they have been provided by APIS.	
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas. The maximum offshore distance reached was 159 km of breeding colonies.	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant. Results from the study of 25 tagged individuals during 2010 and 2011 breeding seasons show that 10% of journeys gulls made from Orford Ness were offshore	British Trust for Ornithology (BTO), 2015; Thaxter et al., 2011; Thaxter et al., 2012

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as the Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a management plan. A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England.	Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance in close proximity to nesting and/or feeding birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Restore the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding)	To maintain or restore the extent of supporting habitats and their range in order to maintain the population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadows, 1.31 ha Coastal lagoons, 149.36 ha Freshwater and coastal grazing marsh, 3.31 ha Intertidal biogenic reef: mussel beds, 7.70 ha Intertidal mixed sediments, 799.28 ha Intertidal mud, 5.08 ha Intertidal sand and muddy sand, Unknown ha Salicornia and other annuals colonising mud and sand, Unknown ha Spartina swords.	Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England, 2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment Agency, 2014
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: vegetation characteristics	Maintain the extent and distribution of predominantly medium to tall [i.e. 20-60 cm] grassland swards.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	Hosey and Goodridge, 1980; Calladine, 1997; Snow and Perrins, 1998

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Breeding (summer) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO data (WFD High/Good boundary)	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Lesser black-backed gull	Non-breeding (winter and/or passage) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	
Little tern	Breeding (summer) season	Breeding population: abundance	Restore the presence of the breeding feature whilst avoiding deterioration from its current level of abundance as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in future should also be taken into account. In 2013 a maximum of 4 pairs attempted to breed at the site.	Little Tern Group, 2013; Cook and Robinson, 2010

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Little tern	Breeding (summer) season	Breeding population: productivity and survival	Restore the abundance and structure of the assemblage at or above its current or target level (whichever is the higher) through restoring breeding productivity and adult survival.	This target is provided to reflect the required abundance and long-term viability of the population. Changes in the availability of adult birds of breeding age to reproduce, and the annual productivity or breeding success of the population (i.e. the number of chicks successfully raised per breeding pair per year) may adversely affect the overall size and age-structure of the breeding population and its long-term viability. Overall breeding success of the SPA population may also be substantially influenced by any changes in the level of predation of eggs and chicks by generalist native species and/or introduced non-native species.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Little tern	Breeding (summer) season	Supporting habitat: air quality	Restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). Critical Loads: Nitrogen critical load is 8-15 kg N ha-1 yr -1 for coastal stable dune grassland Acidity critical loads are: MinCLminN: 0.223 MaxCLminN: 0.438 MinCLMaxS: 0.480 MaxCLMaxS: 4.140 MinCLMaxN: 0.730 MaxCLMaxN: 4.578 For acid grassland and: MinCLminN: 0.856 MaxCLminN: 1.710 MinCLMaxS: 4.000 MaxCLMaxS: 4.000	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. Habitat not classed as sensitive to acidity (Supralittoral sediment, acidic and calcareous type). No critical levels have been assigned for SO2. Current loads:	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			MinCLMaxN: 4.856 MaxCLMaxN: 5.710 For Calcareous grassland (using base cation). Ammonia critical load is 3µg NH3/m3 (annual mean) (2-4 µg NH3 m-3) in littoral sediment, Supralittoral sediment (calcareous and acidic type) set for Higher Plants. NOx critical load is 30 µg NOx/m3 annual mean, 75µg NOx/m3 24-hour mean for littoral sediment, set for all vegetation.	Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21 Acid Deposition Nitrogen | Sulphur keq/ha/yr Maximum: 1.3 | 0.21 Minimum: 0.87 | 0.19 Average: 1.09 | 0.2 Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62 Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only provided for species where they have been provided by APIS.	
Little tern	Breeding (summer) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas, generally within 6 km of breeding colonies.	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	del Hoyo et al., 1996; Perrow et al., 2006; Thaxter et al., 2012

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Little tern	Breeding (summer) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including shooting) requires partnership agreement through a management plan A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England.	Joint Nature Conservation Committee (JNCC), 2011; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Little tern	Breeding (summer) season	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance affecting nesting and/or feeding birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures. In Suffolk, identified sources of disturbance include, walkers, dogs, beach-fishing, motorbikes, four-wheel drive vehicles, quad bikes or helicopters. Where human disturbance becomes too great, the colony is abandoned.	Suffolk Biodiversity Partnership, 2006

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Little tern	Breeding (summer) season	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding)	To maintain or restore the extent of supporting habitats and their range in order to maintain the population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, 1.31 ha Coastal lagoons.	Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England, 2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment Agency, 2014
Little tern	Breeding (summer) season	Supporting habitat: landform	Maintain the availability of shallow sloping nesting sites, grading to [<30 cm] above water level, or the probability that they will	The physical topography and landform of a site will strongly influence the quality and extent of supporting habitats used by this feature for nesting/rearing, feeding and/or roosting as appropriate. This will also influence the interactions with underlying supporting processes on which the supporting habitat may rely. Any changes or modifications to site topography may adversely affect the ability of the supporting habitats to support and sustain this feature.	del Hoyo et al., 1996

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Little tern	Breeding (summer) season	Supporting habitat: vegetation characteristics	Maintain vegetation cover (generally<15%) throughout areas used for nesting, providing sufficient bare ground for the colony as a	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	Richards, 1990; Burgess and Hirons, 1992; del Hoyo et al., 1996
Little tern	Breeding (summer) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water. Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential. Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			5th percentile of DO data (WFD High/Good boundary)		
Little tern	Year-round	Supporting habitat: food availability within supporting habitat	Maintain the availability of key prey species (e.g. crustacea, annelids, sandeel, herring, clupeidae) at preferred prey sizes.	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	del Hoyo et al., 1996; Perrow et al., 2006

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Marsh harrier	Breeding (summer) season	Breeding population: abundance	Maintain the presence of the breeding feature whilst avoiding deterioration from its current level of abundance as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in future should also be taken into account.	
Marsh harrier	Breeding (summer) season	Breeding population: productivity and survival	Maintain the abundance and structure of the assemblage at or above its current or target level (whichever is the higher) through maintaining breeding productivity and adult survival.	This target is provided to reflect the required abundance and long-term viability of the population. Changes in the availability of adult birds of breeding age to reproduce, and the annual productivity or breeding success of the population (i.e. the number of chicks successfully raised per breeding pair per year) may adversely affect the overall size and age-structure of the breeding population and its long-term viability. Overall breeding success of the SPA population may also be substantially influenced by any changes in the level of predation of eggs and chicks by generalist native species and/or introduced non-native species.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Marsh harrier	Breeding (summer) season	Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). Critical levels: Nitrogen depositions critical load is 15-30 kg N ha-1 yr-1 for rich fens. Ammonia critical load is 3µg NH3/m3 (annual mean) (2-4 µg NH3 m-3) set for fen, marsh and swamp. NOx critical load is 30 µg NOx/m3 annual mean, 75µg NOx/m3 24-hour mean for Fen, marsh and swamp, set for All vegetation.	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No critical levels have been assigned for SO2. Habitat not classed as sensitive to acidity (Fen, marsh and swamp).	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
				Current load: Current loads for Max/Min/Av are 18.2/12.2/15.2 kg N/ha/yr Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21 Acid Deposition Nitrogen | Sulphur keq/ha/yr Maximum: 1.3 | 0.21 Minimum: 0.87 | 0.19 Average: 1.09 | 0.2 Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62 Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only provided for species where they have been provided by APIS.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Marsh harrier	Breeding (summer) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a management plan A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England	Joint Nature Conservation Committee (JNCC), 2011; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England, 2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
					Agency, 2014

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Marsh harrier	Breeding (summer) season	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding)	To maintain or restore the extent of supporting habitats and their range in order to maintain the population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending to the nature, age and accuracy of data collection. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadows, 1.31ha Coastal lagoons, 1.68 ha Coastal reedbeds, 149.36 ha Freshwater and coastal grazing marsh, Unknown ha Salicornia and other annuals colonising mud and sand, Unknown ha Spartina swards.	
Marsh harrier	Breeding (summer) season	Supporting habitat: vegetation characteristics	Maintain a management regime that ensures the constant availability of areas of dense reed stands as nesting cover.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	Cramp and Simmons, 1980

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Marsh harrier	Breeding (summer) season	Supporting habitat: water depth	Maintain the availability of water over the entire reedbed area, with a high proportion of the area with a water depth of 0.1 m to 0.3 m.	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival. Deep water surrounding nesting sites may also be important to deterring predators.	Newbold, 1997
Marsh harrier	Breeding (summer) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential. Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			data (WFD High/Good boundary).		
Marsh harrier	Year-round	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance affecting nesting, feeding and/or communal roosting birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Marsh harrier	Year-round	Supporting habitat: food availability within supporting habitat	Maintain the distribution, abundance and availability of key prey items (e.g. mammals, birds) of preferred prey sizes (e.g. voles, mice, rabbit; birds of pipit to duck size).	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	Cramp and Simmons, 1980; Sills, 1984; Underhill-Day, 1985
Marsh harrier	Year-round	Supporting habitat: landscape	Maintain continuous reed cover over large areas avoiding fragmentation of extensive reedbeds.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	English Nature, 1994

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Non-breeding (winter and/or passage) season	Non-breeding population: abundance	Maintain the size of the population at a level which is above 1,662 individuals (5 year winter peak mean 1989/90-1993/94) or its current level where this is higher, as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve .Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in future should also be taken into account. Since classification, the wintering population of the SPA has fluctuated widely in response to weather severity. The SPA population 5 year peak mean (2008/09 to 2012/13) is 1,921, similar to that when the SPA was classified.	Natural England, 2014a; Joint Nature Conservation Committee (JNCC), 2011; Austin et al., 2014

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Non-breeding (winter and/or passage) season	Non-breeding population: condition and survival	Maintain overall adult survival and body condition at a level which is consistent with maintaining the abundance and structure of the population at or above its current or target level, whichever is the higher.	This target is provided to reflect the required abundance and long-term viability of the population. Poor winter body condition may negatively affect a bird's ability to move, forage, and survive whilst present on the SPA, and subsequently affect its ability to migrate and reproduce whilst in its summer breeding grounds.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). Critical loads: Nitrogen depositions critical load is 20 – 30 kg N ha-1 yr-1 for Pioneer, low-mid, mid-upper saltmarshes. Acidity critical load is: MinCLminN: 0.223 MaxCLminN: 0.438 MinCLMaxS: 0.480 MaxCLMaxS: 4.140 MinCLMaxN: 0.730 MaxCLMaxN: 4.578 For Acid grassland and: MinCLminN: 0.856 MaxCLminN: 1.710	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No expected negative impact on species due to impacts on the species' broad habitat. No critical levels have been assigned for SO2.	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			MinCLMaxS: 4.000 MaxCLMaxS: 4.000 MinCLMaxN: 4.856 MaxCLMaxN: 5.710 For calcareous grassland (using base cation). Ammonia critical load is 3µg NH3/m3 (annual mean) (2-4 µg NH3 m-3) in littoral sediment, set for higher plants. NOx critical load is 30 µg NOx/m3 annual mean, 75µg NOx/m3 24-hour mean for littoral sediment, set for All vegetation.	Current loads: Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21 Acid Deposition Nitrogen | Sulphur keq/ha/yr Maximum: 1.3 | 0.21 Minimum: 0.87 | 0.19 Average: 1.09 | 0.2 Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62 SO2 Concentration µg/m3 Maximum: 1.94 Minimum: 1.29 Average: 1.41 Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only provided for species where they have been provided by APIS.	
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a management plan. Wildfowling is controlled by a management plan and NE consent. A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England	National Trust and Royal Society for the Protection of Birds (RSPB), 2014; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance affecting foraging and/or roosting birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.	Burton et al., 2002; Kirby et al., 2004
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: extent and distribution of supporting non-breeding habitat	Maintain the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/ wintering period (moulting, roosting, loafing, feeding).	This target may apply to supporting habitat which also lies outside the site boundary. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadow, 1.31 ha Coastal lagoons, 149.36 ha Freshwater and Coastal Grazing Marsh, 3.31 ha Intertidal biogenic reed: mussel beds, 7.70 ha Intertidal mixed sediments, 799.28 ha Intertidal mud, 5.08 ha Intertidal sand and muddy sand, Unknown ha Salicornia and other annuals colonising mud and sand.	Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England,

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
					2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment Agency, 2014
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: hydrology/flow	Maintain the availability of fresh water on mudflats within feeding and resting areas.	Changes in source, depth, duration, frequency, magnitude and timing of water supply or flow can have important implications for this feature. Such changes may affect the quality and suitability of habitats used by birds for nesting, drinking, preening, rearing, feeding or roosting. Unless these have already been undertaken, further site-specific investigations may be required to fully inform conservation measures for this feature and/or the likelihood of impacts on this attribute.	Ravenscroft and Beardall, 2003

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: landform	Maintain a high density of channel networks within intertidal feeding areas.	The physical topography and landform of a site will strongly influence the quality and extent of supporting habitats used by this feature for nesting/rearing, feeding and/or roosting as appropriate. This will also influence the interactions with underlying supporting processes on which the supporting habitat may rely. Any changes or modifications to site topography may adversely affect the ability of the supporting habitats to support and sustain this feature.	Lourenço et al., 2005
Redshank	Non-breeding (winter and/or passage) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential. Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			data (WFD High/Good boundary)		
Redshank	Year-round	Supporting habitat: food availability within supporting habitat	Maintain availability of key prey species (e.g. earthworm, leatherjacket, grassland/marsh invertebrates) of preferred prey sizes.	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	Cramp and Simmons, 1983; del Hoyo et al., 1996

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Year-round	Supporting habitat: food availability within supporting habitat	Maintain the availability of key prey species (e.g. Hydrobia, Macoma, Corophium, Neires) of preferred prey sizes.	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	Goss-Custard et al., 1977; del Hoyo et al., 1996
Redshank	Year-round	Supporting habitat: hydrology/flow	Maintain water availability within feeding areas to maintain moderately high water tables that provide shallow surface water.	Changes in source, depth, duration, frequency, magnitude and timing of water supply or flow can have important implications for this feature. Such changes may affect the quality and suitability of habitats used by birds for nesting, drinking, preening, rearing, feeding or roosting. Unless these have already been undertaken, further site-specific investigations may be required to fully inform conservation measures for this feature and/or the likelihood of impacts on this attribute.	Royal Society for the Protection of Birds (RSPB), 1997;93 Sutherland and Hill, 1995; Ausden et al., 2003; Smart et al., 2006
Redshank	Year-round	Supporting habitat: landscape	Maintain open and unobstructed terrain around nesting, roosting and feeding sites.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Redshank	Year-round	Supporting habitat: vegetation characteristics	Maintain a vegetation structure of key roost sites dominated by bare ground or a short sparsely-vegetated sward.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature.	
Redshank	Year-round	Supporting habitat: water depth	Maintain the availability of standing water of 1-5 cm deep, over at least 50% of the total standing water area.	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival. Deep water surrounding nesting sites may also be important in deterring predators. This feature needs shallow water pools for its breeding habitat and may also prefer to feed in grasslands in the winter which are partly flooded.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Non-breeding population: abundance	Maintain the presence of the non-breeding feature whilst avoiding deterioration from its current level of abundance as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve (subject to natural changes). Therefore, where at any time the population size is greater than the minimum target-value given, any measures and/or impact-assessments should take account of this higher level. Unless otherwise stated the population size will be that measured using standard methods such as peak mean counts or breeding bird surveys. This value is also provided recognising there will be inherent variability as a result of natural fluctuations and margins of error during data collection. Whilst we will endeavour to keep these values as up to date as possible, local Natural England staff can advise that the figures stated are correct. At classification in 1996, the non-breeding population of ruff in the SPA was just three individuals (5 year mean 1991/92 to 1995/06), which at the time represented 0.4% of the GB non-breeding population. The 5 year peak mean (2008/09 to 2012/13) figure is five individuals.	Natural England, 2014a; Joint Nature Conservation Committee (JNCC), 2011; Austin et al., 2014

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Non-breeding population: condition and survival	Maintain overall adult survival and body condition at a level which is consistent with maintaining the abundance and structure of the population at or above its current or target level, whichever is the higher.	This target is provided to reflect the required abundance and long-term viability of the population. Poor winter body condition may negatively affect a bird's ability to move, forage, and survive whilst present on the SPA, and subsequently affect its ability to migrate and reproduce whilst in its summer breeding grounds.	Austin et al., 2014

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: air quality	Maintain concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). Critical loads: Nitrogen depositions critical load is 20 – 30 kg N ha-1 yr-1 for Pioneer, low-mid, mid-upper saltmarshes. Acidity critical load is: MinCLminN: 0.223 MaxCLminN: 0.438 MinCLMaxS: 0.480 MaxCLMaxS: 4.140 MinCLMaxN: 0.730 MaxCLMaxN: 4.578 For Acid grassland and: MinCLminN: 0.856	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No expected negative impact on the species due to impacts on the species' broad habitat from Nitrogen, acidity, Ammonia or NOx. Littoral sediment is not	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			MaxCLminN: 1.710 MinCLMaxS: 4.000 MaxCLMaxS: 4.000 MinCLMaxN: 4.856 MaxCLMaxN: 5.710 For calcareous grassland (using base cation). Ammonia critical load is 3µg NH3/m3 (annual mean) (2-4 µg NH3 m-3) in littoral sediment, set for higher plants. NOx critical load is 30 µg NOx/m3 annual mean, 75µg NOx/m3 24-hour mean for littoral sediment, set for all vegetation.	sensitive to acidity. No critical levels have been assigned for SO2. Current loads: Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21 Acid Deposition Nitrogen | Sulphur keq/ha/yr Maximum: 1.3 | 0.21 Minimum: 0.87 | 0.19 Average: 1.09 | 0.2 Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62 SO2 Concentration µg/m3 Maximum: 1.94 Minimum: 1.29 Average: 1.41 Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only provided for species where they have been provided by APIS.	
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas.	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as the Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. 'Managed realignment' is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a management plan. Wildfowling is controlled by a management plan and NE consent. A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England	Joint Nature Conservation Committee (JNCC), 2011; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance affecting foraging and/or roosting birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: extent and distribution of supporting non-breeding habitat	Maintain the extent and distribution of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of the non-breeding/wintering period (moulting, roosting, loafing, feeding).	This target may apply to supporting habitat which also lies outside the site boundary. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadows, 1.31 ha Coastal lagoons, 149.36 ha Freshwater and coastal grazing marsh, 3.31 ha Intertidal mixed sediments, 799.28 ha Intertidal mud, 5.08 ha Intertidal sand and muddy sand, Unknown ha Salicornia and other annual colonising mud and sand, Unknown ha Spartina swards.	Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England, 2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment Agency, 2014
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: food availability within supporting habitat	Maintain the availability of key prey species (e.g. Caddis flies, crustaceans, molluscs and worms) of preferred prey sizes.	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	del Hoyo et al., 1992

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Non-breeding (winter and/or passage) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water. Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential. Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO data (WFD High/Good boundary)	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; Natural England, 1996; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Year-round	Supporting habitat: food availability within supporting habitat	Maintain availability of key prey species (e.g. dipteran flies, beetles, earthworms) at preferred prey sizes.	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	Cramp and Simmons, 1983; del Hoyo et al., 1996
Ruff	Year-round	Supporting habitat: landscape	Maintain open and unobstructed terrain around nesting, roosting and feeding sites.	This feature is known to favour large areas of open terrain, largely free of obstructions, in and around its nesting, roosting and feeding areas. Often there is a need to maintain an unobstructed line of sight within nesting, feeding or roosting habitat to detect approaching predators, or to ensure visibility of displaying behaviour. An open landscape may also be required to facilitate movement of birds between the SPA and any off-site supporting habitat.	
Ruff	Year-round	Supporting habitat: vegetation characteristics	Maintain a vegetation structure of key roost sites dominated by bare ground or a short sparsely-vegetated sward.	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature. Grazing management is implemented by the National Trust on Orford Ness with the aim to attract breeding and overwintering waders.	National Trust and Royal Society for the Protection of Birds (RSPB), 2015

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Ruff	Year-round	Supporting habitat: water depth	Maintain the availability of water at optimal depths, typically 1-3 cm deep, over at least 50% of the total water area (non-tidal).	This feature is known to require extensive areas of water in which to feed. Birds are visual predators, with some having the ability to dive or to feed from the surface. As they will rely on detecting their prey within the water to hunt, the depth of water at critical times of year may be paramount for successful feeding and therefore their fitness and survival. Deep water surrounding nesting sites may also be important to deterring predators.	Stroud et al., 1990; van Rhijn, 1991
Sandwich tern	Breeding (summer) season	Breeding population: abundance	Restore the presence of the breeding feature whilst avoiding deterioration from its current level of abundance as indicated by the latest mean peak count or equivalent.	This target is required in order to sustain the population and contribute to a viable local national and bio-geographic species population. Due to the mobility of birds and the dynamic nature of population change, the target-value given for the population size of this feature is considered to be the minimum standard for conservation/restoration measures to achieve. Given the natural fluctuations in numbers over time, any impact-assessments should focus on the current size of the site's population, as derived from the latest known or estimated level established using the best available data. Similarly, where there is evidence to show that a feature has historically been more abundant than the stated minimum or current levels, maintaining the ability of the site to support the feature in such higher numbers in future should also be taken into account.. However, the SPA's colony on Havergate Island disappeared in 1997 and since has only nested in some years with a maximum of 15 pairs in 2003.	Joint Nature Conservation Committee (JNCC), 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Breeding (summer) season	Breeding population: productivity and survival	Restore the abundance and structure of the assemblage at or above its current or target level (whichever is the higher) through restoring breeding productivity and adult survival.	This target is provided to reflect the required abundance and long-term viability of the population. Changes in the availability of adult birds of breeding age to reproduce, and the annual productivity or breeding success of the population (i.e. the number of chicks successfully raised per breeding pair per year) may adversely affect the overall size and age-structure of the breeding population and its long-term viability. Overall breeding success of the SPA population may also be substantially influenced by any changes in the level of predation of eggs and chicks by generalist native species and/or introduced non-native species.	Joint Nature Conservation Committee (JNCC), 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Breeding (summer) season	Supporting habitat: air quality	Restore concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk). Critical Loads: Nitrogen depositions critical load is 8 – 10 kg N ha-1 yr-1 for Coastal stable dune grasslands, acid type; 10-15 kg N ha-1 yr-1 for the calcareous type, and 10-20 kg N ha-1 yr-1 for Shifting coastal dunes. Acidity critical load is MinCLminN: 0.223 MaxCLminN: 0.438 MinCLMaxS: 0.480 MaxCLMaxS: 4.140 MinCLMaxN: 0.730 MaxCLMaxN: 4.578	This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of nesting, feeding or roosting habitats. Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. No expected negative impact on the species due to impacts on the species' broad habitat from acidity. No critical levels have been assigned for SO2.	The UK Air Pollution Information System (www.apis.ac.uk) provides a comprehensive source of information on air pollution and its effects on habitats and species. APIS has been developed in partnership by the UK conservation and regulatory agencies and the Centre for Ecology and Hydrology.

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
			For acid grassland; and MinCLminN: 0.856 MaxCLminN: 1.710 MinCLMaxS: 4.000 MaxCLMaxS: 4.000 MinCLMaxN: 4.856 MaxCLMaxN: 5.710 For Calcareous grassland (using base cation) Ammonia critical load is 3µg NH_3/m^3 (annual mean) (2-4 µg NH_3 m^{-3}) in supralittoral sediment set for Higher Plants. NOx critical load is 30µg NO_x/m^3 annual mean, 75µg NO_x/m^3 24-hour mean for littoral sediment, set for all vegetation.	Current loads: Nitrogen Deposition kg N/ha/yr Maximum: 18.2 Minimum: 12.18 Average: 15.21 Ammonia Concentration µg/m3 Maximum: 1.55 Minimum: 0.48 Average: 1.05 NOx Concentration µg/m3 Maximum: 9.73 Minimum: 10.38 Average: 9.62 Current levels are based on measured-interpolated data for a 3 year average 2009-2011 with targets only provided for species where they have been provided by APIS.	

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Breeding (summer) season	Supporting habitat: connectivity with supporting habitats	Maintain safe passage of birds moving between roosting and feeding areas, generally within 49 km of breeding colonies.	This target has been included because the ability of the feature to safely and successfully move to and from nesting, feeding and roosting areas is critical to their breeding success and to the adult fitness and survival. This target will apply within the site boundary and where birds regularly move to and from off-site habitat where this is relevant.	Thaxter et al., 2012
Sandwich tern	Breeding (summer) season	Supporting habitat: conservation measures	Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.	This target has been included because active and ongoing conservation management is often needed to protect, maintain or restore this feature at this site. Other measures may also be required, and in some cases, these measures may apply to areas outside of the designated site boundary in order to achieve this target. Further details about the necessary conservation measures for this site can be provided by Natural England. This information will typically be found within, where applicable, supporting documents such as the Natura 2000 Site Improvement Plan, Site Management Strategies or Plans, the Views about Management Statement for the underpinning SSSI and/or management agreements. Threats to supporting habitats posed by sea level rise and coastal squeeze are being addressed through the EA Local Environment Action Plan and the Estuary Management Plan. ‘Managed realignment’ is a potential option to consider. Effective predator control (including by shooting) requires partnership agreement through a	Joint Nature Conservation Committee (JNCC), 2011; Alde and Ore Estuary Partnership, 2014; Natural England, 2014c

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
				management plan. A considerable part of the site is sympathetically managed by the Suffolk Wildlife Trust, National Trust, RSPB and Natural England.	
Sandwich tern	Breeding (summer) season	Supporting habitat: disturbance caused by human activity	The frequency, duration and/or intensity of disturbance affecting nesting and/or feeding birds should not reach levels that substantially affect the feature.	The nature, scale, timing and duration of some human activities can result in the disturbance of birds at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population. Such disturbing effects can for example result in changes to feeding or roosting behaviour, increases in energy expenditure due to increased flight, abandonment of nest sites and desertion of supporting habitat (both within or outside the designated site boundary where appropriate). This may undermine successful nesting, rearing, feeding and/or roosting, and/or may reduce the availability of suitable habitat as birds are displaced and their distribution within the site contracts. Disturbance associated with human activity may take a variety of forms including noise, light, sound, vibration, trampling, presence of people, animals and structures.	Bourne and Smith, 1974; Garthe and Hüppop, 2004

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Breeding (summer) season	Supporting habitat: extent and distribution of supporting habitat for the breeding season	Maintain the extent, distribution and availability of suitable breeding habitat which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding)	To maintain or restore the extent of supporting habitats and their range in order to maintain the population. The information available on the extent and distribution of supporting habitat used by the feature may be approximate depending on the nature, age and accuracy of data collection. Area of the supporting habitat is currently understood to be: 432.25 ha Annual vegetation of drift lines, Unknown ha Atlantic salt meadows, 1.31 ha Coastal lagoons.	Dargie, 1993, Natural England, 2010b; Gilbert et al., 1996, Downie, 1996, Natural England, 2013, Sneddon and Randall, 1993, Natural England, 2007, Ordnance Survey, 2009, Ordnance Survey, 2005, Dyer et al., 1991, Marine Nature Conservation Review, 1992, Natural England, 2010a, English Nature, 2003, Hill et al., 1996 Brown et al., 2013, Environment Agency, 2014
Sandwich tern	Breeding (summer) season	Supporting habitat: landform	Maintain the availability of shallow sloping nesting sites, grading to [<30 cm] above water level, or the probability that they will not	The physical topography and landform of a site will strongly influence the quality and extent of supporting habitats used by this feature for nesting/rearing, feeding and/or roosting as appropriate. This will also influence the interactions with underlying supporting processes on which the supporting habitat may rely. Any changes or modifications to site topography may adversely affect the ability of the supporting habitats to support and sustain this feature.	Snow and Perrins, 1998; del Hoyo et al., 1996

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Breeding (summer) season	Supporting habitat: vegetation characteristics	Maintain vegetation cover which should be<10% throughout areas used for nesting, providing sufficient bare ground for the colony as a	The height, cover, variation and composition of vegetation are often important characteristics of habitats supporting this feature which enable successful nesting/rearing/concealment/roosting. Many bird species will have specific requirements that conservation measures will aim to maintain, for others such requirements will be less clear. Activities that may directly or indirectly affect the vegetation of supporting habitats and modify these characteristics may adversely affect the feature. Condition assessment shows an intact vegetation structure. Where a SSSI unit has been classed as unfavourable, this is mainly due to disturbance.	Natural England, 2015; Burgess and Hirons, 1992; del Hoyo et al., 1996

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Breeding (summer) season	Supporting habitat: water quality/quantity	Restore water quality and quantity to a standard which provides the necessary conditions to support the SPA feature, where the supporting habitats of the feature are dependent on surface water. Current EA chemical quality; does not require assessment. Current EQ ecological quality: moderate potential. Maintain Dissolved Oxygen (DO) at ≥ 5.7mg l-1 standardised to a salinity of 35 using 5th percentile of DO data (WFD High/Good boundary)	For many SPA features which are dependent on wetland habitats supported by surface water, maintaining the quality and quantity of water supply will be critical, especially at certain times of year during key stages of their life cycle. Poor water quality and inadequate quantities of water can adversely affect the availability and suitability of breeding, rearing, feeding and roosting habitats. Typically, meeting the surface water and groundwater environmental standards set out by the Water Framework Directive (WFD 2000/60/EC) will also be sufficient to support the SPA Conservation Objectives but in some cases more stringent standards may be needed to support the SPA feature. Further site-specific investigations may be required to establish appropriate standards for the SPA.	Environment Agency Marine Monitoring Service, 2014; European Commission (EC), 2011

Feature	Season	Attribute	Target	Supporting and/or explanatory notes	References
Sandwich tern	Year-round	Supporting habitat: food availability within supporting habitat	Maintain the availability of key prey species (e.g. sandeel, sprat) at preferred prey sizes.	This target is included because the availability of an abundant food supply is critically important for successful breeding, adult fitness and survival and the overall sustainability of the population. As a result, inappropriate management and direct or indirect impacts which may affect the distribution, abundance and availability of prey may adversely affect the population.	Cramp et al., 1974; del Hoyo et al., 1996

Alternative feature / subfeature / supporting habitat names found on MAGIC site maps

Definitions for the alternative feature names shown on MAGIC site maps, are available within the UK Biodiversity Action Plan priority habitat descriptions.

Supporting habitat / feature name used throughout the conservation advice package (annex 1 feature code)	Alternative feature name as shown on MAGIC site maps
Freshwater and coastal grazing marsh	Coastal and floodplain grazing marsh
Annual vegetation of drift lines (H210)	Coastal vegetated shingle
Perennial vegetation of stony banks (H1220)	Coastal vegetated shingle
Vegetated sea cliffs of the Atlantic and Baltic coasts (H1230)	Maritime cliffs and slope
Coastal reedbeds	Reedbeds
Coastal lagoons (H1150)	Saline lagoons
Atlantic decalcified fixed dunes (*Calluno-ulicetea*) (H2150)	Coastal sand dunes
Dunes with *Hippophae rhamnoides* (H2060)	Coastal sand dunes
Dunes with *Salix repens ssp. argentea (Salicion arenariae*) (H2170)	Coastal sand dunes
Embryonic shifting dunes (H2110)	Coastal sand dunes
Fixed dunes with herbaceous vegetation (grey dunes) (H2130)	Coastal sand dunes
Humid dune slacks (H2190)	Coastal sand dunes

Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) (H2120)	Coastal sand dunes
Atlantic salt meadows (*Glauco-puccinellietalia maritimae*) (H1330)	Saltmarsh
Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) (H1420)	Saltmarsh
Salicornia and other annuals colonising mud and sand (H1310)	Saltmarsh
Spartina swards (*Spartinion maritimae*) (H1320)	Saltmarsh
Lower saltmarsh	Saltmarsh
Lower-mid saltmarsh	Saltmarsh
Mid-upper saltmarsh	Saltmarsh
Pioneer saltmarsh	Saltmarsh
Transition and driftline saltmarsh	Saltmarsh
Upper saltmarsh	Saltmarsh

The following conservation advice features / subfeatures/ supporting habitats are currently not available through MAGIC because the definition is still being confirmed.

- Intertidal stony reef
- Subtidal stony reef
- Water column
- Seabird assemblage (AS_1_b)
- Waterbird assemblage (AS_2_nb)
- All non-habitat species

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EC Directive 79/409 on the Conservation of Wild Birds: Special Protection Areas

Alde-Ore Estuary (Suffolk)

The Alde-Ore Estuary proposed Special Protection Area (pSPA) is situated on the east coast of Suffolk between Aldeburgh in the north and Bawdsey in the south. The site comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. The variety of habitats important for breeding and wintering birds includes vegetated shingle, intertidal mudflats, semi-improved grazing marsh, saltmarsh and saline lagoons.

The site includes the entire Alde-Ore Estuary SSSI, notified in 1985 (revised in 1992 under the Wildlife and Countryside Act, 1981). The Alde-Ore Estuary SSSI includes the Orfordness-Havergate NNR, the English Nature owned part of which has already been designated as Orfordness-Havergate SPA.

The site qualifies under Article 4.1 of the EC Birds Directive by sustaining nationally important numbers of the following Annex 1 species, marsh harrier *Circus aeruginosus* (breeding), avocet *Recurvirostra avosetta* (wintering and breeding) ruff *Philomachus pugnax* (wintering), sandwich tern *Sterna sandvicensis* (breeding) and little tern *Sterna albifrons* (breeding). Further Annex 1 species winter on site, including, bittern *Botaurus stellaris*, Bewick's Swan *Cygnus columbianus*, hen harrier *Circus cyaneus*, golden plover *Pluvialis apricaria*, and short-eared owl *Asio flammeus*. Mediterranean gull *Larus melanocephalus*, common tern *Sterna hirundo* and Arctic tern *Sterna paradisaea* breed on Havergate Island.

The site qualifies under Article 4.2 of the Directive by regularly supporting internationally important numbers of two migratory species. The Orfordness colony of breeding lesser black-backed gull *Larus fuscus graellsii*, represented in 1995, 12% of the British population and 8% of the world population of the *graellsii* race. The five year wintering peak mean 1989/90 to 1993/94 for redshank *Tringa totanus*, was 1,662 birds, representing 1.5 % of the British population and 1.1% of the east Atlantic flyway population.

The site supports over 1% of the British wintering population of the following (calculated from five year winter peak means 1989/90 to 1993/94), shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, black-tailed godwit *Limosa limosa*. In addition, the site supports over 1% of the British breeding population of, Gadwall *Anas strepera*, shoveler *Anas clypeata* and herring gull *Larus argentatus*.

The site also supports a notable assemblage of breeding and wintering wetland birds, in addition to the species mentioned above. Breeding species include, oystercatcher *Haematopus ostralegus*, ringed plover *Charadrius hiaticula*, lapwing *Vanellus vanellus* (also winter) black headed gull *Larus ridibundus* and barn owl *Tyto alba*. Wintering species include, cormorant *Phalacrocorax carbo*, European white-fronted goose *Anser abifrons albifrons*, brent goose *Branta bernicla*, pintail *Anas acuta*, grey plover *Pluvialis squatarola*, dunlin *Calidris alpina* and curlew *Numenius arquata*.

This citation / map relates to a site entered in the Register of European sites for Great Britain
Register reference number UK9009112
Date of registration 25 AUG 1998

Signed ....
on behalf of the Secretary of State for the Environment

SPA Citation
January 1996

European Site Conservation Objectives for Dew's Ponds Special Area of Conservation Site Code: UK0030133

With regard to the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

S1166*. Triturus cristatus*; Great crested newt

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features as required by the provisions of Article 6(1) and 6(2) of the Directive.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in Article 1 of the Habitats Directive.

Publication date: 31 March 2014 – version 2. This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014.

European Site Conservation Objectives Supplementary Advice

Dew's Ponds Special Area of Conservation (SAC)

Great Crested Newt (female)

Date of publication: 25 April 2014

About this document

This document provides indispensable information to enable the application and achievement of the Conservation Objectives for this European Site and should therefore be read in conjunction with the Conservation Objectives document. Users of this document should also be mindful that this site may coincide with other European Site(s), and if so should also refer to the separate European Site Conservation Objectives and Supplementary Advice (subject to availability) for those sites.

This advice should be used primarily to inform Habitats Regulations Assessments ('HRA') of proposed plans or projects that may affect the SAC, and to assist with the planning of measures necessary for the conservation or restoration of the site and its qualifying features.

The information contained in this document is necessarily technical in nature and based on current levels of knowledge and understanding. Whilst it seeks to be as comprehensive as possible, it may not be exhaustive. There may be other attributes and factors relating to the qualifying features and the integrity of a site which are subsequently identified or become apparent, and these should also be considered along with the Conservation Objectives and this document as appropriate. This document may be updated in future by Natural England in light of changes to the best available scientific knowledge and evidence and in response to changes (natural or otherwise) in the circumstances of the European Site.

Please note that this Supplementary Advice is provided without prejudice to any formal representations or further advice Natural England may provide in its role as the appropriate nature conservation body as required by the assessment and/or review provisions contained in the Conservation of Habitats and Species Regulations 2010 (as amended). Similarly this document does not constitute Natural England's advice about notified SSSI features and/or legally protected species which may also be present on this Site. This will be provided separately.

Understanding this document

The following tables contain information about the ecological characteristics of this site based on each of its qualifying features and which, in Natural England's view, are most likely to influence the achievement of the Conservation Objectives and thereby contribute to the overall favourable conservation status of that species or habitat. These ecological characteristics are here referred to as '**attributes'** and each attribute has an indicative '**target'** which outlines the desired state or condition to be achieved using the necessary conservation or restoration measures.

The attributes and targets are initially derived from national frameworks of guidance for each qualifying feature which has been developed by Natural England based on the best available scientific evidence and, where appropriate, expert opinion[1]. These have then been reviewed by local Natural England staff to reflect the particular characteristics and circumstances of individual sites. Targets have been quantified where it has been possible to do so.

The **'supporting and/or explanatory notes'** column provides additional information and justification as to why an attribute and/or a target is considered important and has been included. **'Sources of site-based evidence'** details the site-specific information which Natural England has used to tailor the targets to each site. These sources may already be publically available or will be available from Natural England on request.

The supplementary advice to the Conservation Objectives aims to describe the wide range of ecological attributes that are most likely to contribute to a site's overall integrity. Some, but not all, of these will also be suitable to be used for regular monitoring of the condition of the qualifying features. The attributes selected for monitoring the features, and the standards used to assess their present condition, are listed in separate monitoring documents which are available from Natural England.

[1] It is acknowledged that identifying the ecological characteristics that support features is not an exact science; there are inherent difficulties in making such judgements because of the complexity of ecological processes and functions and the limitations of our information and understanding about them.

Using this document

The attributes listed in the following tables are considered to be those most likely to contribute to this European Site's ecological integrity and towards the achievement of the European Site Conservation Objectives. The detailed advice Natural England gives and the decisions we make will therefore be informed by the information contained in this document. It is therefore recommended that anyone developing, proposing or assessing an activity, plan or project that may affect the European Site has early regard to both the European Site Conservation Objectives and this Supplementary Advice. Further guidance on how to undertake an assessment of the implications of a proposal on a European Site ('*Habitats Regulations Assessment*') is currently available here.

This Supplementary Advice should inform the HRA process, but should not act as the sole basis for judgements which must be made by competent authorities regarding the likelihood of significant effects and/or adverse effects on site integrity from a plan or project. Those making these judgements should consider this advice (and any further case-specific advice) alongside the specific details of the given plan or project and the prevailing characteristics and specific environmental conditions of the site, including the present condition of the site's qualifying features as indicated by Natural England's site condition assessments. In addition, a qualifying feature's current national status may provide useful context to an assessment. This may include consideration of the latest national status assessments compiled by JNCC (often referred to as 'Article 17 Reports').

The following tables can form an initial basis to inform both the scope of conservation measures and the assessment as to whether a given activity, plan or project might adversely affect an attribute or undermine its ability to achieve its desired target and thereby undermine the Conservation Objectives. Please note that not all of the attributes and targets listed in the following tables will be relevant to every situation. For example, some of the targets given will be more relevant to site-based conservation measures and management than to assessments of impact. Similarly, some of the attributes may clearly not be capable of being affected due to the location or nature of the proposal.

In general, any proposals should as far as possible be designed or adapted in a way so that each attribute will be unaffected. Otherwise, those preparing information for a HRA should include evidence relating to any likely impacts on the relevant attributes or targets as part of the environmental information to be submitted to a competent authority or other decision making body. Similarly, those undertaking a HRA must consider the European Site Conservation Objectives and when doing so should take into account this Supplementary Advice and the likely effects of a plan or project on the current level or condition of the attributes and on the ability to achieve their targets (subject to natural changes) as part of the assessment.

Assessment of impacts that are deemed to lead to temporary or short-term change of an attribute should also be supported by an adequate level of evidence that the attribute affected is ecologically able and likely to recover rapidly to its pre-impact level or at least maintained at its current level or condition and will still be able to achieve the target outlined (subject to natural changes). The term 'current' is described here as that which is the latest known or estimated level established using the best available data gathered using recommended and best practice survey methods. For example, this may be the latest actual or peak mean count or area measurement. In some cases it is recognised that no recent data may be readily available for an attribute and new data may need to be gathered to inform the HRA process.

Further guidance about using this Supplementary Advice document can also be provided as part of early consultation with Natural England or by seeking independent ecological advice as appropriate.

European Site Information

Name of European Site	Dew's Ponds Special Area of Conservation
Location	Suffolk
EU Site Code	UK0030133
European Site background details (site description, boundary map, Standard Natura 2000 Data Form)	Available at http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0030133
Names of component Sites of Special Scientific Interest (SSSIs)	Dew's Ponds SSSI
Relationship with other European Site designations	n/a

Why is Dew's Ponds SAC important?

This section provides more information about the reasons why this European Site is important and has been designated.

General description of the SAC

Covering an area of 6.74 hectares, the site supports one of the largest known breeding populations of great crested newts in the UK. The site lies in NE Suffolk in the parish of Bramfield. This part of Suffolk has a high density of farm ponds supporting a widespread distribution of great crested newts. There are 12 ponds within the site, ranging from long established farm ponds to more recently dug ones. Rough, semi-improved grassland surrounds the ponds with some scrub and hedgerow habitat. The terrestrial habitats are important to newts for feeding, shelter and hibernation during the non-breeding season.

Qualifying Features of the SAC

Dew's Ponds SAC is important because it contains habitats and / or species listed in Annexes I and II respectively of the Habitats Directive requiring special conservation measures. They are described as its 'qualifying features', and they are listed in the European Site Conservation Objectives. They are important at a European level and for this reason the European Commission has entered the Dew's Ponds SAC on the List of Sites of Community Importance. An asterisk (*) will indicate that the feature is considered to be a Priority feature (see explanatory notes of the Conservation Objectives document for further explanation).

For the purposes of preparing for or undertaking an assessment required by the Conservation of Habitats and Species Regulations 2010 (as amended), all of the qualifying features listed below must all be treated equally.

The following Annex II species of European importance were the primary reason for the initial selection of this SAC:

- **1166 Great crested newt *Triturus cristatus***

  The great crested newt *Triturus cristatus* is the largest native British newt, reaching up to around 17cms in length. It has a granular skin texture (caused by glands which contain toxins making it unpalatable to predators), and in the terrestrial phase is dark grey, brown or black over most of the body, with a bright yellow/orange and black belly pattern. Adult males have jagged crests running along the body and tail. Newts require aquatic habitats for breeding. Eggs are laid singly on pond vegetation in spring, and larvae develop over summer to emerge in August – October, normally taking 2–4 years to reach maturity. Juveniles spend most time on land, and all terrestrial phases may range a considerable distance from breeding sites.

Breeding sites are mainly medium-sized ponds, though ditches and other water body types may also be used less frequently. Ponds with ample aquatic vegetation (which is used for egg-laying) seem to be preferred. Great crested newts can be found in rural, urban and post-industrial settings, with populations less able to thrive where there are high degrees of fragmentation. The connectivity of the landscape is important, since great crested newts often occur in meta-populations that encompass a cluster of several or many ponds. This helps ensure the survival of populations even if sub-populations are affected by, for example, the temporary drying-out of breeding ponds.

The great crested newt is also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended), making it a European Protected Species. A Licence may therefore be required for any activities likely to harm or disturb great crested newts.

Dew's Ponds SAC in rural East Suffolk comprises a series of 12 ponds set in an area of formerly predominantly arable land. The ponds range from old field ponds created for agricultural purposes to some constructed in recent years specifically for wildlife. Some of the land has been converted from arable to grassland, with a variety of grassland types present; other habitats include hedges and ditches. Great crested newts have been found in all ponds on site, though the presence of fish seems to have affected newt numbers in recent years in two ponds.

Table 1: Supplementary Advice for Qualifying Features: 1166 Great crested newt *Triturus cristatus*

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
Supporting habitat: structure/function	Overall Habitat Suitability Index score	For this SAC, maintain an overall Great Crested Newt Habitat Suitability Index score of no less than 0.8.	The Habitat Suitability Index provides an overall measure of evaluating habitat quality and quantity for Great Crested Newts. The Index score lies between 0 and 1, with a value of 1 representing optimal Great Crested Newt habitat. In general, the higher the index-score the more likely the site is to support great crested newts. The HSI methodology is documented in ARG-UK Advice Note 5 (May 2010). The HSI should not be used as a substitute for more detailed surveys and consideration of other attributes where necessary.	
Supporting habitat: structure/function	Presence of ponds	Maintain the number of ponds present within the site at not less than 12	Ponds to include breeding ponds as well as non-breeding ponds, since the latter may be used for foraging or sustaining prey populations. The surface area of a pond is taken from when water reaches its highest level (excluding flooding events), which will usually be in the spring.	12 ponds are listed in SSSI notification file and citation. This attribute will be periodically monitored as part of Natural England's site condition assessments.
Supporting habitat: structure/function	Permanence of ponds	Maintain the permanence of water within ponds present within the site	Ponds to include breeding ponds as well as non-breeding ponds, since the latter may be used for foraging or sustaining prey populations. Ponds should have a high degree of permanence (i.e. they should never or rarely dry out other than though periods of natural drought) and this may be adversely affected by changes in the supply or flow of water (from either surface water and/or groundwater sources) to the ponds.	This attribute will be periodically monitored as part of Natural England's site condition assessments.
Supporting habitat:	Cover of macrophytes	Maintain a high cover of macrophytes, typically	Marginal and emergent vegetation are important components of a great crested newt pond as they provide excellent egg-laying sites. Good plants for this	This attribute will be

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
structure/function		between 50-80%, within ponds	purpose include water forget-me-not *Myosotis scorpioides*, flote/sweet grass *Glyceria fluitans* and great hairy willowherb *Epilobium hirsutum*. They are, however, an integral part of the natural successional change of a water body and whilst it is preferable to have a good range and area of marginal plants, they should not extend across the entire water surface. In most circumstances it will be desirable to retain a fringe of marginal and emergent vegetation around at least half of a pond's edge. Where the marginal vegetation is particularly invasive, and provides no specific benefit to crested newts, it may be decided that its complete removal is necessary.	periodically monitored as part of Natural England's site condition assessments.
Supporting habitat: structure/function	Invasive, non-native and/or introduced species	Invasive non-native species should be rare or absent components of open water habitat supporting the great crested newt.	Submerged vegetation is an important component of the pond ecosystem, making it habitable to a wide range of animals, but too many plants can occasionally be undesirable for newts, if the water column becomes completely shaded and choked. Introduced or 'alien' submerged plants can grow very vigorously and dominate more beneficial native species. New Zealand stonecrop *Crassula helmsii* and Canadian pondweed *Elodea canadensis* are two examples to be avoided. In most instances, any introductions should be avoided and if present the complete removal of such species is usually recommended.	This attribute will be periodically monitored as part of Natural England's site condition assessments.
Supporting habitat: structure/function	Quality of Supporting terrestrial habitat	Maintain the quality of terrestrial habitat likely to be utilised by Great Crested Newts, with no fragmentation of habitat by significant barriers to newt dispersal.	Great crested newts need both aquatic and terrestrial habitat. Good quality terrestrial habitat, particularly within 500 metres of the breeding ponds, provides important sheltering, dispersing and foraging conditions and can include all semi-natural habitat along with meadows, rough tussocky grassland, scrub, woodland, as well as 'brownfield' land or low-intensity farmland. Good quality terrestrial habitat for Great Crested Newts also has structural diversity which can be provided by features such as hedges, ditches, stone walls, old farm buildings, loose stone/rocks, rabbit burrows and small mammal holes. Good habitat provides a range of invertebrates, such as earthworms, insects, spiders and slugs, on which Great Crested Newts are known to feed. Fragmentation refers to significant barriers to newt movement such as walls and buildings, but not footpaths or tracks. Newts disperse over land to forage for food, and move between ponds. The distances moved during dispersal vary widely according to habitat quality and availability. At most sites, the majority of adults probably stay within around 250m of the breeding pond but may well travel further if there are areas of high quality foraging and refuge habitat extending beyond this range.	
Supporting habitat: structure/function	Shading of ponds	Pond perimeters should generally be free of shade (typically affecting less	Shading from trees and/or buildings (not including emergent pond vegetation) can negatively affect the abundance of marginal vegetation in ponds, water temperature and the rate of hatching and development of great crested newt	This attribute will be periodically

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
		than 60% of the shoreline)	eggs and larvae.	monitored as part of Natural England's site condition assessments.
Supporting habitat: structure/function	Presence of fish and wildfowl	Fish and wildfowl are absent from all ponds.	At high densities, waterfowl (i.e. most water birds such as ducks, geese and swans but excluding moorhen) can remove all aquatic vegetation, adversely affect water quality and create turbid pond water conditions. Some may also actively hunt adult Great Crested Newts and their larvae. Similarly fish can be significant predators of newt larvae. The presence of waterfowl and fish can reduce habitat suitability. These should be wholly absent from sites which support fewer than 5 ponds.	This attribute will be periodically monitored as part of Natural England's site condition assessments.
Supporting processes (on which the feature or its supporting habitat relies)	Water quality	Maintain the quality of pond waters within the site as indicated by the presence of an abundant and diverse invertebrate community.	As the clarity and chemical status of water bodies supporting Great Crested Newts can be subjective, the presence of an abundant and diverse community of freshwater invertebrates can be indicative of suitable water quality standards. Invertebrate groups present should include groups such as mayfly larvae and water shrimps. This will ensure ponds support a healthy (mainly invertebrate) fauna to provide food for developing newt larvae and adults.	
Population (of the feature)	Population size	The size of the great crested newt population is being maintained at or above a peak mean of at least 229 adults.	Estimating the average size of the Great crested newt population will normally be based on the peak count of adults undertaken in the known peak season for the area, and in-year weather conditions; likely to be Mid-April to Mid May in central areas. The peak count is derived by summing the counts across the site on 'best' night for each season. Considerable natural between-year variation in population counts is frequent.	Figures supplied by Tom Langton at notification: 229 is peak in the 3 years preceding notification in 2000. Average count 1990 – 2000 is 174; peak in this current10 year period is 269. This attribute will be

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
				periodically monitored as part of Natural England's site condition assessments.
Population (of the feature)	Population viability	The presence of great crested newt eggs in breeding ponds is consistently at a level which is likely to maintain the abundance of the population at or above its target level.	A "breeding pond" is defined as a pond in which egg-laying and successful metamorphosis (e.g. the pond doesn't dry up too soon) is likely to occur at least once every three years. The optimum time to survey for eggs is mid-March to mid-May. Presence of eggs can be recorded by day or night visits and surveys should be combined with visits for the adult component.	This attribute will be periodically monitored as part of Natural England's site condition assessments.
Population (of the feature)	Supporting metapopulation	Maintain the connectivity of the SAC population to other closely-associated Great Crested Newt populations (either within or outside of the site boundary)	Great crested newts often exist in metapopulations. A metapopulation is a group of associated populations made up of newts which breed in, and live around, a cluster of ponds. There will be some interchange of newts between these populations, even though most adults consistently return to the same pond to breed, and so it will be important to avoid the isolation of these populations from each other. A metapopulation associated with a SAC may occur outside of the designated site boundary. The connectivity of the wider local landscape to the SAC may therefore be important as this may help to ensure the survival of the overall population even if sub-populations are temporarily affected by, for example, pond desiccation or fish introductions.	
Supporting processes (on which the feature and/or its supporting habitat relies)	Conservation measures	Management or other measures (within and/or outside the site boundary as appropriate) necessary to maintain or restore the Great Crested Newt feature and/or its supporting habitat are underway and are not being undermined or compromised.	This target has been included because active and ongoing conservation management is needed to protect, maintain or restore this feature at this site. Further details about the necessary conservation measures for this site can be provided by contacting Natural England. This information will typically be found within, where applicable, supporting documents such as Natura 2000 Site Improvement Plan, site management strategies or plans, the Views about Management Statement for the underpinning SSSI and/or management agreements.	Natural England's Views about the Management of the SSSI which underpin this SAC are available from http://www.sssi.naturalengland.org.uk/Special/s

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
				ssi/search.cfm
Supporting habitat: extent and distribution	Extent of supporting terrestrial habitat	Maintain the full extent of terrestrial habitat which supports the Great Crested Newt feature	In order to contribute towards the objective of achieving an overall favourable conservation status of the feature at a UK level, it is important to maintain or if appropriate restore the extent of supporting habitats and their range within this SAC. The information available on the extent and distribution of supporting habitat used by the feature may be approximate, depending on the nature, age and accuracy of the most recent evidence, and may be subject to periodic review in light of improvements in data. The broad habitats known or likely to support the feature at this SAC are: standing water, rough grassland, scrub and hedgerow.	
Supporting habitat: extent and distribution	Distribution of supporting terrestrial habitat	Maintain the distribution and continuity of the feature's supporting habitat, including where applicable its component vegetation types and associated transitional vegetation types, across the site.	This target has been included because a contraction in the range, or geographic spread, of the supporting habitat (and its component vegetation) across the site will reduce its overall area, the local diversity and variations in its structure and composition, and may undermine the resilience of the Great Crested Newt feature to adapt to future environmental changes. Contraction may also reduce and break up the continuity of a habitat within a site and how well the species feature is able to occupy and use habitat within the site. Such fragmentation may have a greater amount of open edge habitat which will differ in the amount of light, temperature, wind, and even noise that it receives compared to its interior. These conditions may not be suitable for this feature and this may affect its viability.	
Supporting processes (on which the feature and/or its supporting habitat relies)	Adaptation and resilience of the feature and the supporting processes on which it relies	The feature's ability, and that of its supporting habitat, to adapt or evolve to wider environmental change, either within or external to the site, is not prejudiced	This attribute and target has been included to recognise the increasing likelihood of supporting habitat features needing to absorb or adapt to wider environmental changes. Resilience may be described as the ability of an ecological system to cope with, and adapt to environmental stress and change whilst retaining the same basic structure and ways of functioning. Such environmental changes may include changes in sea levels, precipitation and temperature for example, which are likely to affect the extent, distribution, composition and functioning of a feature within a site. The vulnerability and response of features to such changes will vary. Using best available information, any necessary or likely adaptation or adjustment by the feature and its management in response to actual or expected climatic change should be allowed for, as far as practicable, in order to ensure the feature's long-term viability.	
Supporting	Soils, substrate	The properties of the	This target is included because soil and substrate supports basic ecosystem	

Attributes		Targets	Supporting and/or Explanatory Notes	Sources of site-based evidence (where available)
habitat: structure/function	and nutrient cycling	underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungal:bacterial PLFA ratio, are maintained within typical values for the supporting habitat	function and is a vital part of the natural environment. Its properties strongly influence the colonisation, growth and distribution of those plant species which together form vegetation types, and therefore provides a habitat used by a wide range of organisms. Soil biodiversity has a vital role to recycle organic matter. Changes to natural soil properties may therefore affect the ecological structure, function and processes associated with the supporting habitat of this Annex I feature.	
Supporting processes (on which the feature and/or its supporting habitat relies)	Air quality	Maintain or restore as necessary the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).	This target has been included because the supporting habitat type is considered sensitive to changes in air quality, particularly nitrogen and acidity. The exceedance of critical values for air pollutants may modify the chemical status of its substrate, accelerating or damaging plant growth, altering its vegetation structure and composition and reducing supporting habitat quality and population viability of this feature. Critical Loads and Levels are recognised thresholds below which such harmful effects on sensitive UK habitats will not occur to a significant level, according to current levels of scientific understanding. There are critical levels for ammonia (NH3), oxides of nitrogen (NOx) and sulphur dioxide (SO2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales.	More information about site-relevant Critical Loads and Levels for this SAC is available by using the 'search by site' tool on the Air Pollution Information System (www.apis.ac.uk).

Version Control
Advice last updated: N/A

Variations from national feature-framework of integrity-guidance:

Targets have been set to '*maintain*' rather than '*restore*' as the underlying SSSI was in favourable condition at notification

Document control information		
Status of this Version	Final v1	
Prepared by	Matthew Ginn	**Date** 11 March 2014
Other notes		
Quality assurance information		
Checked and reviewed by:	Steve Clifton	**Date** 26 March 2014
Finalised on:	25 April 2014	

Improvement Programme for England's Natura 2000 Sites (IPENS)

Planning for the Future

Site Improvement Plan

Dew's Ponds

Site Improvement Plans (SIPs) have been developed for each Natura 2000 site in England as part of the Improvement Programme for England's Natura 2000 sites (IPENS). Natura 2000 sites is the combined term for sites designated as Special Areas of Conservation (SAC) and Special Protected Areas (SPA). This work has been financially supported by LIFE, a financial instrument of the European Community.

The plan provides a high level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site(s) and outlines the priority measures required to improve the condition of the features. It does not cover issues where remedial actions are already in place or ongoing management activities which are required for maintenance.

The SIP consists of three parts: a Summary table, which sets out the priority Issues and Measures; a detailed Actions table, which sets out who needs to do what, when and how much it is estimated to cost; and a set of tables containing contextual information and links.

Once this current programme ends, it is anticipated that Natural England and others, working with landowners and managers, will all play a role in delivering the priority measures to improve the condition of the features on these sites.

The SIPs are based on Natural England's current evidence and knowledge. The SIPs are not legal documents, they are live documents that will be updated to reflect changes in our evidence/knowledge and as actions get underway. The information in the SIPs will be used to update England's contribution to the UK's Prioritised Action Framework (PAF).

The SIPs are not formal consultation documents, but if you have any comments about the SIP or would like more information please email us at IPENSLIFEProject@naturalengland.org.uk, or contact Natural England's Responsible Officer for the site via our enquiry service 0300 060 3900, or enquiries@naturalengland.org.uk

This Site Improvement Plan covers the following Natura 2000 site(s)

UK0030133 Dew's Ponds SAC

Site description

The site supports one of the largest known breeding populations of great crested newts in the UK. There are 12 ponds within the site, ranging from long established farm ponds to more recently dug ones.

Rough, semi-improved grassland surrounds the ponds with some scrub and hedgerow habitat. The terrestrial habitats are important to newts for feeding, shelter and hibernation during the non-breeding season.

There are no Issues identified for this site.

Site details

The tables in this section contain site-relevant contextual information and links

Qualifying features

#UK Special responsibility

Dew's Ponds SAC	S1166 *Triturus cristatus*: Great crested newt

Site location and links

Dew's Ponds SAC

Area (ha)	**6.74**	*Grid reference*	**TM387718**	Map link
Local Authorities				Suffolk
Site Conservation Objectives				European Site Conservation Objectives for Dew's Ponds SAC
European Marine Site conservation advice				n/a
Regulation 33/35 Package				n/a
Marine Management Organisation site plan				n/a

Water Framework Directive (WFD)

The Water Framework Directive (WFD) provides the main framework for managing the water environment throughout Europe. Under the WFD a management plan must be developed for each river basin district. The River Basin Management Plans (RMBP) include a summary of the measures needed for water dependent Natura 2000 sites to meet their conservation objectives. For the second round of RBMPs, SIPs are being used to capture the priorities and new measures required for water dependent habitats on Natura 2000 sites. SIP actions for non-water dependent sites/habitats do not form part of the RBMPs and associated consultation.

Dew's Ponds SAC

River basin	Anglian	Anglian RBMP
WFD Management catchment	East Suffolk	
WFD Waterbody ID (Cycle 2 draft)	n/a	

Overlapping or adjacent protected sites

Site(s) of Special Scientific Interest (SSSI)	
Dew's Ponds SAC	Dew's Ponds SSSI

National Nature Reserve (NNR)	
Dew's Ponds SAC	n/a

Ramsar	
Dew's Ponds SAC	n/a

Special Areas of Conservation (SAC) and Special Protection Areas (SPA)	
Dew's Ponds SAC	n/a

Version	*Date*	*Comment*
1.0	07/10/2014	

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Dew's Ponds
Unitary Authority/County:	Suffolk
SAC status:	Designated on 1 April 2005
Grid reference:	TM387718
SAC EU code:	UK0030133
Area (ha):	6.74
Component SSSI:	Dew's Ponds SSSI

Site description:
This site in rural East Suffolk comprises a series of 12 ponds set in an area of formerly predominantly arable land. The ponds range from old field ponds created for agricultural purposes to some constructed in recent years specifically for wildlife. Some of the land has been converted from arable to grassland, with a variety of grassland types present. Other habitats include hedges and ditches. Great crested newts *Triturus cristatus* have been found in the majority of ponds on the site.

Qualifying species: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:

- Great crested newt *Triturus cristatus*

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0030133
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

European Site Conservation Objectives for Minsmere–Walberswick Special Protection Area Site Code: UK9009101

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **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 population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A021 *Botaurus stellaris*; Great bittern (Breeding)
A051 *Anas strepera*; Gadwall (Non-breeding)
A051 *Anas strepera*; Gadwall (Breeding)
A052 *Anas crecca*; Eurasian teal (Breeding)
A056 *Anas clypeata*; Northern shoveler (Breeding)
A056 *Anas clypeata*; Northern shoveler (Non-breeding)
A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
A082 *Circus cyaneus*; Hen harrier (Non-breeding)
A132 *Recurvirostra avosetta*; Pied avocet (Breeding)
A195 *Sterna albifrons*; Little tern (Breeding)
A224 *Caprimulgus europaeus*; European nightjar (Breeding)
A394 *Anser albifrons albifrons*; Greater white-fronted goose (Non-breeding)

This is a European Marine Site

This SPA is a part of the Minsmere–Walberswick European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Regulation 35 Conservation Advice document for the EMS. For further details about this please visit the Natural England website at http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx or contact Natural England's enquiry service at enquiries@naturalengland.org.uk or by phone on 0845 600 3078.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where this is available) will also provide a framework to inform the management of the European Site under the provisions of Articles 4(1) and 4(2) of the Wild Birds Directive, and the prevention of deterioration of habitats and significant disturbance of its qualifying features required under Article 6(2) of the Habitats Directive.

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 30 June 2014 (Version 2). This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014. Previous references to additional features identified in the 2001 UK SPA Review have also been removed.

European Site Conservation Objectives for Minsmere to Walberswick Heaths and Marshes Special Area of Conservation
Site Code: UK0012809

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats and habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1210. Annual vegetation of drift lines

H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves

H4030. European dry heaths

This is a European Marine Site

This site is a part of the Minsmere–Walberswick European Marine Site. These conservation objectives should be used in conjunction with the Regulation 35 Conservation Advice Package, for further details please contact Natural England's enquiry service at enquiries@naturalengland.org.uk, or by phone on 0845 600 3078, or visit the Natural England website at:
http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features as required by the provisions of Article 6(1) and 6(2) of the Directive.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in Article 1 of the Habitats Directive.

Publication date: 30 June 2014 – version 2. This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014.

Improvement Programme for England's Natura 2000 Sites (IPENS)

Planning for the Future

Site Improvement Plan

Minsmere to Walberswick Heaths and Marshes

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Once this current programme ends, it is anticipated that Natural England and others, working with landowners and managers, will all play a role in delivering the priority measures to improve the condition of the features on these sites.

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This Site Improvement Plan covers the following Natura 2000 site(s)

UK0012809	**Minsmere to Walberswick Heaths & Marshes SAC**
UK9009101	**Minsmere-Walberswick SPA**

Site description

Minsmere – Walberswick Heaths & Marshes SAC and SPA is located on the Suffolk coast south of Southwold in eastern England. It comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mud-flats, lagoons, shingle, woodland and areas of lowland heath.

It supports the largest continuous stand of Common Reed *Phragmites australis* in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. There are nationally important numbers of breeding and wintering birds. In particular, the reedbeds are of major importance for breeding Bittern *Botaurus stellaris* and Marsh Harrier *Circus aeruginosus*. A range of breeding waders (e.g. Avocets *Recurvirostra avosetta*) and heathland birds occur in other areas of the SPA. The shingle beaches support important numbers of breeding Little Tern *Sterna albifron*s, which feed substantially outside the SPA in adjacent marine waters. The site is also important for wintering Bitterns and raptors. The SAC features are heathland, vegetated annual and perrenial shingle habitats.

Plan Summary

This table shows the prioritised issues for the site(s), the features they affect, the proposed measures to address the issues and the delivery bodies whose involvement is required to deliver the measures. The list of delivery bodies will include those who have agreed to the actions as well as those where discussions over their role in delivering the actions is on-going.

Priority & Issue	Pressure or Threat	Feature(s) affected	Measure	Delivery Bodies
1 Coastal squeeze	Pressure	A051(B) Gadwall, A051(NB) Gadwall	Ensure there is scope for natural adapation or intertidal habitat creation, to offset the impacts of sea level rise	Environment Agency, National Trust, Natural England, RSPB, Suffolk Coastal District Council, Suffolk Wildlife Trust, Waveney District Council, Landowner(s), Blyth Estuary Group, EDF Energy
2 Public Access/Disturbance	Pressure	A021(B) Bittern, A021(NB) Bittern, A051(B) Gadwall, A051(NB) Gadwall, A056(B) Shoveler, A056(NB) Shoveler, A132(B) Avocet, A132(NB) Avocet, A195(B) Little Tern, A224(B) European nightjar, A246(B) Woodlark, A394(NB) Greater white-fronted goose, H1210 Annual vegetation of drift lines, H1220 Coastal shingle vegetation outside the reach of waves, H4030 European dry heaths	Reduce habitat and bird disturbance	Ministry of Defence (MoD), National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk Wildlife Trust, Waveney District Council, Local partnership

3 Changes in species distributions	Pressure	A081(B) Marsh Harrier, A195(B) Little Tern, A224(B) European nightjar, A246(B) Woodlark	Investigate population trends, identify threats and remedy accordingly	Forestry Commission, National Trust, Natural England, RSPB, Suffolk Wildlife Trust, British Trust for Ornithology (BTO), Sandlings Bird Group
4 Invasive species	Pressure	A051(NB) Gadwall, A056(NB) Shoveler, A132(B) Avocet, A132(NB) Avocet, A394(NB) Greater white-fronted goose	Monitor Spartina anglica, and manage as appropriate	Natural England
5 Inappropriate pest control	Threat	A224(B) European nightjar, A246(B) Woodlark	Ensure the adequate protection of nesting birds from predators	Natural England, RSPB, Suffolk Wildlife Trust, British Trust for Ornithology (BTO)
6 Air Pollution: impact of atmospheric nitrogen deposition	Pressure/ Threat	A051(B) Gadwall, A051(NB) Gadwall, A056(B) Shoveler, A056(NB) Shoveler, A132(B) Avocet, A132(NB) Avocet, A224(B) European nightjar, A246(B) Woodlark, A394(NB) Greater white-fronted goose, H4030 European dry heaths	Establish a Site Nitrogen Action Plan	Natural England
7 Water Pollution	Threat	A051(B) Gadwall, A051(NB) Gadwall, A056(B) Shoveler, A056(NB) Shoveler, A132(B) Avocet, A132(NB) Avocet, A394(NB) Greater white-fronted goose	Ensure appropriate thresholds are maintained	Environment Agency, Natural England
8 Deer	Threat	A021(B) Bittern, A021(NB) Bittern, A224(B) European nightjar, A246(B) Woodlark, H4030 European dry heaths	Ensure that coordinated deer management maintains sustainable numbers	Forestry Commission, National Trust, Natural England, RSPB, Suffolk Wildlife Trust, The Deer Initiative, Landowner(s)
9 Fisheries: Commercial marine and estuarine	Pressure	A195(B) Little Tern	Revised approach to fisheries management (Article 6 project) and the Little Tern project	Eastern Inshore Fisheries Conservation Authority (IFCA), Natural England, Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Issues and Actions

This table outlines the prioritised issues that are currently impacting or threatening the condition of the features, and the outstanding actions required to address them. It also shows, where possible, the estimated cost of the action and the delivery bodies whose involvement will be required to implement the action. Lead delivery bodies will be responsible for coordinating the implementation of the action, but not necessarily funding it. Delivery partners will need to support the lead delivery body in implementing the action. In the process of developing the SIPs Natural England has approached the delivery bodies to seek agreement on the actions and their roles in delivering them, although in some cases these discussions have not yet been concluded. Other interested parties, including landowners and managers, will be involved as the detailed actions are agreed and delivered. Funding options are indicated as potential (but not necessarily agreed or secured) sources to fund the actions.

1 Coastal squeeze

As coastal change takes place there's a loss of SPA wintering and breeding habitat. Coastal Squeeze and greater frequency of coastal flooding is leading to loss of reedbed (at Walberswick and Corporation Marshes) and to loss of freshwater marsh (between Dunwich and Walberswick). There is evidence of erosion and accretion on leading edges at the Blyth (limited in most places) where coastal management is in line with the Shoreline Management Plan and deemed appropriate, but this may change in the future with sea level rise, increased flood risk and increased/reduced tidal prism. There is a risk of saline incursion into Westward Marshes if Waller's Wall is no longer maintained.

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
1A	Ensure the Shoreline Management Plan considers coastal squeeze and incorporates appropriate mitigation and compensation for any change that affects the integrity of the site.	Not yet determined	2014-50	Shoreline Management Plan and Strategies	Not yet determined	Environment Agency	National Trust, Natural England, RSPB, Suffolk Wildlife Trust, Waveney District Council, Blyth Estuary Group, EDF Energy

Action	*Action description*	*Cost estimate*	*Timescale*	*Mechanism*	*Funding option*	*Delivery lead body*	*Delivery partner(s)*
1B	Investigate and monitor coastal squeeze/ coastal change to provide a robust evidence base against which appropriate management requirements can be determined. This should examine the short-, medium-, and long term, including how nature conservation interests are affected by coastal change, (e.g. freshwater to saline). Identify evidence gaps and undertake appropriate investigations.	£20,000	2015-25	Investigation / Research / Monitoring	Not yet determined	Environment Agency	Natural England, Landowner(s)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1C	Develop a Minsmere to Walberswick Heaths and Marshes adaptation plan that captures all the known issues. Opportunities for habitat creation where known should be included. Once produced the plan should be appropriately assessed to ensure that proposed actions will maintain the integrity of the Minsmere to Walberswick Heaths and Marshes designated site network and the features for which it is designated.	£10,000	2015-20	Mechanism not identified / develop mechanism	Not yet determined	Environment Agency	National Trust, Natural England, RSPB, Suffolk Coastal District Council, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1D	Address impacts of coastal squeeze on SPA/SAC features through the Environment Agency Regional Habitat Creation Programme, including enabling adaptation to take place and creation of freshwater marsh elsewhere to mitigate/compensate against loss of future loss of freshwater habitat (Dingle Marshes, and other locations.)	Not yet determined	2018-50	Habitat creation / restoration strategy: Other		Environment Agency	Natural England

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1E	Extend Dunwich River diversion further to the south through Dingle Marshes to allow natural coastal process to take place and prevent river channel blockage through shingle roll back.	Not yet determined	2018-20	Flood Risk Maintenance Programme: Flood Risk Management - Capital/ Improvement Schemes	Flood and Coastal Erosion Risk Management (FCERM) 2015-21	Environment Agency	Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
1F	Improve Dingle Marshes sluice function at to allow better evacuation of seawater from Dingle Marshes following over topping events.	Not yet determined	2017	Flood Risk Maintenance Programme: Flood Risk Management - Capital/ Improvement Schemes	Flood and Coastal Erosion Risk Management (FCERM) 2015-21	Environment Agency	Suffolk Wildlife Trust

2 Public Access/Disturbance

A great number of recreational visitors are attracted by area contributing to bird disturbance (e.g. human and dog disturbance to Little terns, Nightjar and Woodlark). Increased corvid predation is perceived as birds are flushed. The downward trends for these species are a concern. Trampling of heathland habitat and vegetated shingle (and Dune) habitat is an issue. Private aircraft (helicopters and planes, paramotorists) and MOD aircraft (helicopters and planes) regularly fly low over the site leading to disturbance of SPA features. Whilst wildfowling/shooting activities on site are fully assessed the impact of disturbance from unregulated shooting activity adjacent to the SPA/SAC is not fully understood.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2A	Undertake a comprehensive review of public access to heathland, incorporating existing research.	£20,000	2015	Investigation / Research / Monitoring	Local partnership, Developer Contributions Scheme (DCS)	Not yet determined	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust, EDF Energy

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2B	Investigate the impact of levels of public access/disturbance to heathland on SPA/SAC features, evaluate significance of problem in relation to other factors, and establish where resource should be allocated to address factors with greatest effect.	Not yet determined	2018	Investigation / Research / Monitoring	Local partnership	Not yet determined	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk County Council, Suffolk Wildlife Trust, EDF Energy

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2C	Informed by investigation into impacts of disturbance, implement NNR management plans to ensure heathland habitat is managed to minimise disturbance to SPA/SAC features through access management/zonation.	Not yet determined	2014-24	National Nature Reserve (NNR) management plan	Natural England (NNR running costs)	Natural England	National Trust, RSPB, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2D	Implementation of NNR management plans to ensure appropriate level of summer wardening of heathland habitats, resourcing to be informed by investigation into impacts of disturbance.	Not yet determined	2014-24	National Nature Reserve (NNR) management plan	Natural England (NNR running costs)	Natural England	National Trust, RSPB, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2E	Establish wardening on heathland areas outwith NNR, informed by investigation into impacts of disturbance and patterns of use.	£30,000	2016-20	Advice: Wardening	Local Authority	Not yet determined	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust, EDF Energy

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2F	Undertake a comprehensive review of public access to beaches, incorporating existing research.	£15,000	2014-15	Investigation / Research / Monitoring	Not yet determined	Not yet determined	Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2G	Investigate impact of public access/disturbance on beach SPA/SAC features, evaluate significance of problem in relation to other factors, and establish where resource should be allocated to address factors with greatest effect.	Not yet determined	2014-15	Investigation / Research / Monitoring	Not yet determined	Natural England	RSPB, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2H	Establish/Increase beach wardening to minimise impact of disturbance on Little terns (informed by investigation).	£15,000	2015-17	Advice: Wardening	LIFE	Local partnership	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Wildlife Trust, Suffolk Little Tern Group

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2I	Establish beach wardening to minimise impact of disturbance on vegetated shingle.	Not yet determined	2015-20	Advice: Wardening	Not yet determined	Not yet determined	National Trust, Natural England, RSPB, Suffolk Coast & Heaths AONB, Suffolk Coastal District Council, Suffolk County Council, Suffolk Wildlife Trust

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2J	Ensure impacts are assessed and that measures are in place to mitigate against impact from increased disturbance from proposed Sizewell C Development; through displacement of users away from Sizewell area (and possibly onto SPA areas) and increased population during construction in the locality. Mitigation may include provision of recreational green space at robust locations (such as new country parks), etc.	Not yet determined	2015-25	Advice: Access Strategy	Not yet determined	Not yet determined	Natural England, Suffolk Coastal District Council, Suffolk County Council, EDF Energy

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2K	Investigate and monitor levels and impact of military and civilian aircraft on SPA features, evaluate significance of problem in relation to other factors, establish how to remedy impacts and where resource should be allocated to address factors with greatest effect. Incorporate existing research.	Not yet determined	2015-18	Investigation / Research / Monitoring	Not yet determined	Not yet determined	Ministry of Defence (MoD), RSPB, Suffolk Wildlife Trust, Joint Nature Conservation Committee (JNCC), Civil Aviation Authority (CAA)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2L	Reduce disturbance of SPA bird features from military aircraft through better recognition (and ideally avoidance) of sensitive locations.	Not yet determined	2015	Advice: Education & awareness raising	Ministry of Defence (MoD)	Ministry of Defence (MoD)	Natural England, Joint Nature Conservation Committee (JNCC)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2M	Reduce disturbance of designated bird features from civilian aircraft through better recognition (and ideally avoidance) of sensitive locations and understanding of third party responsibilities under the Wildlife & Countryside Act (as amended).	Not yet determined	2014	Advice: Education & awareness raising	Not yet determined	Natural England	Civil Aviation Authority (CAA)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2N	Formalise reporting of incidents of all aircraft flying low over designated sites, disturbing wintering and breeding birds to allow Natural England to undertake appropriate enforcement action in relation to any breach of SSSI legislation.	Not yet determined	2014	Partnership agreement: Other	Not yet determined	Natural England	National Trust, RSPB, Suffolk Wildlife Trust, Suffolk Little Tern Group

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2O	Establishment of a Paramotor Working Group to improve user awareness/behaviour.	Not yet determined	2015	Advice: Education & awareness raising	Not yet determined	Natural England	RSPB, Suffolk Coast & Heaths AONB, Suffolk Little Tern Group

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2P	Produce Aviation Code of conduct for Suffolk (and possibly Norfolk) Coast to improve user awareness/behaviour.	Not yet determined	2015-16	Advice: Education & awareness raising	Not yet determined	Natural England	Natural England, Suffolk Coast & Heaths AONB, Civil Aviation Authority (CAA), Suffolk Little Tern Group

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2Q	Investigate scope for having SPAs marked on Civil Aviation Authority air maps as avoidance areas to reduce disturbance.	Not yet determined	2015	Advice: Negotiation	Not yet determined	Natural England	Joint Nature Conservation Committee (JNCC), Civil Aviation Authority (CAA)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
2R	Investigate disturbance impacts of offsite shooting activities on SPA features, notably adjacent to the Blyth and Minsmere Levels.	Not yet determined	2014-19	Investigation / Research / Monitoring	Not yet determined	Natural England	RSPB, Suffolk Wildlife Trust, British Association for Shooting and Conservation (BASC)

3 Changes in species distributions

The downward trend in population numbers of Woodlark, Nightjar, Marsh Harrier and Little Tern presents concerns. Reasons for decline (predation, disturbance, habitat management, food sources, possibly persecution, etc.) need to be better understood and mitigated as appropriate. This issue links to Public Access/Disturbance issues.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
3A	Investigation into the downward trend in population numbers of Nightjar, Woodlark and Marsh Harrier including habitat decline, predation, disturbance, etc.	Not yet determined	2015 onwards	Investigation / Research / Monitoring	Not yet determined	Natural England	Forestry Commission, National Trust, RSPB, Suffolk Wildlife Trust, British Trust for Ornithology (BTO), LIFE+ Little Tern Project, Suffolk Little Tern Group, Sandlings Bird Group

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
3B	Mitigate against Nightjar, Woodlark and Marsh Harrier population declines through active site management (habitat management, wardening, predation control, etc.).	Not yet determined	2015-20	National Nature Reserve (NNR) management plan	Not yet determined	Natural England	Forestry Commission, National Trust, RSPB, Suffolk Wildlife Trust, Sandlings Bird Group

4 Invasive species

Spartina anglica is encroaching on estuarine muds. With *Spartina* at the front, and reed encroaching at back, saltmarsh could be squeezed out.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
4A	Investigation and monitoring of *Spartina anglica* encroachment onto estuarine muds.	Not yet determined	2018	Investigation / Research / Monitoring	Not yet determined	Natural England	n/a

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
4B	Develop *Spartina anglica* management plan as appropriate following investigation.	Not yet determined	2018-20	Invasive Control Plan: Invasive Species Control Programme	Not yet determined	Natural England	n/a

5 Inappropriate pest control

Corvids and gulls are attracted by feed of nearby outdoor pig farming, predating and disturbing SPA features

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
5A	Investigate the impacts of predation on SPA features (notably crows, gulls and rats attracted to pig feed, plus other mammals (badgers and foxes) at Minsmere & Dingle). More research is needed to understand actual impact of predation on nest survival and fledgling success.	Not yet determined	2014	Investigation / Research / Monitoring	Catchment Sensitive Farming (CSF)	Natural England	RSPB, Suffolk Wildlife Trust, British Trust for Ornithology (BTO)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
5B	Negotiation with local pig farmers regarding feeding practice that reduces crow, gull and rat numbers, if they are found to be a problem.	Not yet determined	2014-19	Advice: Negotiation	Not yet determined	Natural England	n/a

6 Air Pollution: impact of atmospheric nitrogen deposition

Air pollution can impact on vegetation diversity. Modelled aerial deposits of nitrogen exceed the threshold limit above which the diversity of heathland vegetation begins to be altered and adversely impacted. Many land use practices contribute to this problem including land spreading, outdoor pigs, high nutrient inputs on fields, etc.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
6A	Control, reduce and ameliorate atmospheric nitrogen deposition.	Not yet determined	2015-20	Site Nitrogen Action Plan	Not yet determined	Natural England	Not yet determined

7 Water Pollution

Inappropriate surface and ground water quality may impact on SAC habitats and the supporting habitats of some SPA birds. The estuary water is nutrient rich with high pollutant levels. Eutrophication is having an influence on reed. Increased flood events could lead to habitat change/loss of diversity. nutrient run off from outdoor pig farming could exacerbate the issue locally. Ground water pollution on light lands from land use practices such as treatment plants, land spreading, outdoor pigs, high nutrient inputs on fields, etc, may be an issue locally. There is a lack of groundwater monitoring in place.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
7A	Establish a Ground Water site nutrient management plan including regularly monitor ammonium, nitrogen and phosphorus concentrations in ground water across site, particularly areas adjacent to outdoor pigs and farm land with high nutrient inputs. Investigate sources of high nutrient levels.	Not yet determined	2014-20	Investigation / Research / Monitoring	Not yet determined	Environment Agency	Natural England

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
7B	Establish a surface water site nutrient management plan including a robust regular monitoring regime for ammonium, nitrogen and phosphorus concentrations in water courses across site (including Estuary and ditches), particularly areas adjacent to outdoor pigs and farm land with high nutrient inputs. Investigate sources of high nutrient levels.	Not yet determined	2014-20	Diffuse Water Pollution Plan	Not yet determined	Environment Agency	Natural England (CSF)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
7C	Reduce nutrient inputs where monitoring identifies concentrations of nutrients (surface water and ground water) exceeding thresholds for Natura 2000 sites, by working with local landowners/managers, through DSF/DWP .	Not yet determined	2014-19	Advice: Education & awareness raising	Catchment Sensitive Farming (CSF)	Natural England	Environment Agency

8 Deer

High numbers of red deer are damaging reedbed (runways and wallows/loss of structure), woodland (reduced structural diversity) and heathland (erosion and reduced structural diversity) habitat. Minsmere RSPB Reserve has started a culling programme. Some areas/habitats benefit from deer browsing whilst others are damaged. There is no coordinated approach to deer control in the wider area. This issue links with Changes in species distribution and should be viewed in parallel with Public Access/Disturbance.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
8A	Investigate the need for a coordinated deer management and monitoring programme for the area.	Not yet determined	2015-16	Investigation / Research / Monitoring	Not yet determined	Natural England	Forestry Commission, National Trust, RSPB, Suffolk Wildlife Trust, The Deer Initiative, Landowner(s)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
8B	If investigation identifies the need, establish a fully coordinated deer management programme for the area, through production of a Deer Management and Monitoring strategy/plan. Actions to be monitored.	£13,000	2015-25	Non-Natural England funded site management plan	Not yet determined	Natural England	Forestry Commission, National Trust, RSPB, Suffolk Wildlife Trust, The Deer Initiative, Landowner(s)

9 Fisheries: Commercial marine and estuarine

Many different fishing pressures close to shore that may include bycatch of juveniles numbers/ disturbance of fish nursery areas that could potentially have an impact on Little tern *Sterna albifrons*. Commercial fishing activities categorised as 'amber or green' under Defra's revised approach to commercial fisheries in EMSs require assessment and (where appropriate) management. This assessment will be undertaken by EIFCA. For activities categorised as 'green', these assessments should take account of any in-combination effects of amber activities, and/or appropriate plans or projects, in the site. Where these assessments indicate management is required, appropriate measures will be introduced by the Regulator by 2016. If management measures are established to protect the feature(s), on-going work will be required by the Regulator to ensure compliance and an appropriate level of reporting to ensure sites are well managed and to enable Natural England to provide advice on the condition of features and potential condition threats.

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
9A	Where the assessments indicate management is required, introduce appropriate measures.	Not yet determined	2016	Enforcement: Byelaws	Not yet determined	Eastern Inshore Fisheries Conservation Authority (IFCA)	Natural England, Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Action	Action description	Cost estimate	Timescale	Mechanism	Funding option	Delivery lead body	Delivery partner(s)
9B	If management measures are established, ensure compliance with bye-law and provide an appropriate level of reporting to ensure sites are well managed and to enable Natural England to provide advice on the condition of features and potential condition threats. Ongoing action.	Not yet determined	2014-20	Enforcement: Byelaws	Not yet determined	Eastern Inshore Fisheries Conservation Authority (IFCA)	Centre for Environment, Fisheries and Aquaculture Science (Cefas)

Site details

The tables in this section contain site-relevant contextual information and links

Qualifying features

#UK Special responsibility

Minsmere to Walberswick Heaths & Marshes SAC	H4030 European dry heaths
	H1210 Annual vegetation of drift lines
	H1220 Perennial vegetation of stony banks
Minsmere-Walberswick SPA	A052(B) *Anas crecca*: Eurasian teal
	A021(B) *Botaurus stellaris*: Great bittern
	A081(B) *Circus aeruginosus*: Eurasian marsh harrier
	A082(NB) *Circus cyaneus*: Hen harrier
	A224(B) *Caprimulgus europaeus*: European nightjar
	A056(B) *Anas clypeata*: Northern shoveler
	A056(NB) *Anas clypeata*: Northern shoveler
	A051(B) *Anas strepera*: Gadwall
	A051(NB) *Anas strepera*: Gadwall
	A132(B) *Recurvirostra avosetta*: Pied avocet
	A195(B) *Sterna albifrons*: Little tern
	A394(NB) *Anser albifrons albifrons*: Greater white-fronted goose

Site location and links

Minsmere to Walberswick Heaths & Marshes SAC

Area (ha) **1265.52**	*Grid reference*	**TM468682**	Map link	
Local Authorities			Suffolk	
Site Conservation Objectives			European Site Conservation Objectives for Minsmere to Walberswick Heaths & Marshes SAC	

European Marine Site conservation advice	Minsmere-Walberswick Heaths and Marshes EMS
Regulation 33/35 Package	Regulation 33/35 package link
Marine Management Organisation site plan	n/a
Minsmere-Walberswick SPA	
Area (ha) **2018.92** *Grid reference* **TM476748**	Map link
Local Authorities	Suffolk
Site Conservation Objectives	European Site Conservation Objectives for Minsmere-Walberswick SPA
European Marine Site conservation advice	Minsmere-Walberswick Heaths and Marshes EMS
Regulation 33/35 Package	Regulation 33/35 package link
Marine Management Organisation site plan	n/a

Water Framework Directive (WFD)

The Water Framework Directive (WFD) provides the main framework for managing the water environment throughout Europe. Under the WFD a management plan must be developed for each river basin district. The River Basin Management Plans (RMBP) include a summary of the measures needed for water dependent Natura 2000 sites to meet their conservation objectives. For the second round of RBMPs, SIPs are being used to capture the priorities and new measures required for water dependent habitats on Natura 2000 sites. SIP actions for non-water dependent sites/habitats do not form part of the RBMPs and associated consultation.

Minsmere to Walberswick Heaths & Marsh

River basin	Anglian	Anglian RBMP
WFD Management catchment	East Suffolk	
WFD Waterbody ID (Cycle 2 draft)	GB105035046270, GB105035046271	

Minsmere-Walberswick SPA

River basin	Anglian	Anglian RBMP
WFD Management catchment	East Suffolk	
WFD Waterbody ID (Cycle 2 draft)	GB105035046270, GB105035046271, GB105035046300	

Overlapping or adjacent protected sites

Site(s) of Special Scientific Interest (SSSI)	
Minsmere to Walberswick Heaths & Marshes SAC	Minsmere-Walberswick Heaths & Marshes SSSI
Minsmere-Walberswick SPA	Minsmere-Walberswick Heaths & Marshes SSSI

National Nature Reserve (NNR)	
Minsmere to Walberswick Heaths & Marshes SAC	Suffolk Coast NNR
	Westleton Heath NNR
Minsmere-Walberswick SPA	Suffolk Coast NNR
	Westleton Heath NNR

Ramsar	
Minsmere to Walberswick Heaths & Marshes SAC	Minsmere/Walberswick
Minsmere-Walberswick SPA	Minsmere/Walberswick

Special Areas of Conservation (SAC) and Special Protection Areas (SPA)	
Minsmere to Walberswick Heaths & Marshes SAC	Minsmere-Walberswick SPA
Minsmere-Walberswick SPA	Minsmere to Walberswick Heaths & Marshes SAC

Other relevant documents and links		
	Touching the Tide	Web link
	Spartina anglica 2004 review	2004 Anglica spartina Review
	Suffolk Local Biodiversity Action Plan (Little tern)	Biodiversity Action Plan: Little Tern

Version	*Date*	*Comment*
1.0	08/10/2014	

EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Area

MINSMERE-WALBERSWICK (SUFFOLK)

The Minsmere-Walberswick proposed SPA contains areas of grazing marsh, extensive reedbeds, the estuary of the River Blyth, and areas of lowland heath and woodland. The boundaries of the site follows those of the Minsmere-Walberswick Heath and Marshes.SSSI.

Minsmere-Walberswick qualifies under Article 4.1, by supporting, in summer, nationally important breeding populations of the following Annex 1 species: 5 booming male bitterns *Botauris stellaris* (presumed to represent 5 breeding pairs; 22% of the British breeding population) ; 15 breeding female marsh harriers *Circus aeruginosus* (20% of British) ; 47 pairs of avocet *Recurvirostra avosetta* (12% of British) ; 32 pairs of little tern *Sterna albifrons* (1% of British): and 24 pairs of nightjar *Caprimulgus europaeus* (1% of British).

The site qualifies also under Article 4.1 by regularly supporting, in winter, a nationally important wintering population of hen harrier *Circus cyaneus* (15 individuals, 2% of the British wintering population).

Minsmere-Walberswick qualifies under article 4.2 by supporting, in summer, in recent years, nationally important breeding populations of three regularly occurring migratory species: 24 pairs of gadwall *Anas strepera* (4% of British); 73 pairs of teal *A. crecca* (1% of British): and 23 pairs of shoveler *A. clvpeata* (2% of British) . Also notable is a nationally important breeding population of bearded tit *Panurus biarmicus* (50 pairs, 8% of British).

The site qualifies also under Article 4.2 by supporting nationally important wintering populations of three migratory waterfowl. (average peak counts for the five year period 1985/86 to 1989/90): 100 European white-fronted geese *Anser albifrons albifrons* (2% of the British wintering population); 90 gadwall *Anas strepera* (1% of British) , and 100 shoveler *Anas clypeata* (1% of British).

Minsmere-Walberswick is also of importance for an outstandingly diverse assemblage of breeding birds of marshland and reedbed habitats, including bittern, garganey *Anas querquedula*, marsh harrier, water rail *Rallus aquaticus*, Cetti's warbler *Cettia cetti* and Savi's warbler *Locustella lusciniodes*. Also notable is an assemblage of wintering waterfowl including, in addition to species listed above, Bewick's swan *Cygnus columbianus*, wigeon *Anas penelope*, teal *Anas crecca*, avocet; spotted redshank *Tringa erythropus*; and redshank *Tringa totanus*.

During severe winter weather Minsmere-Walberswick can assume even greater national and international importance as wildfowl and waders from many other areas arrive, attracted by relatively mild climate, compared with continental areas, and the abundant food resources available.

SPA Citation
HTR December 1991

This citation / map relates to a site entered in the Register of European sites for Great Britain.
Register reference number UK900 910
Date of registration 25 AUG 1998
Signed ....
on behalf of the Secretary of State for the Environment

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Minsmere to Walberswick Heaths and Marshes
Unitary Authority/County:	Suffolk
SAC status:	Designated on 1 April 2005
Grid reference:	TM468682
SAC EU code:	UK0012809
Area (ha):	1265.52
Component SSSI:	Minsmere to Walberswick Heaths and Marshes SSSI

Site description:
Lowland dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly heather – western gorse (*Calluna vulgaris – Ulex gallii*) heath, usually more characteristic of western parts of the UK. This type is dominated by heather, western gorse and bell heather *Erica cinerea*.

Shingle beach forms the coastline at Walberswick and Minsmere. It supports a variety of scarce shingle plants including sea pea *Lathyrus japonicus*, sea campion *Silene maritima* and small populations of sea kale *Crambe maritima*, grey hair-grass *Corynephorus canescens* and yellow horned-poppy *Glaucium flavum*. A well-developed beach strandline of mixed sand and shingle supports annual vegetation. Species include those typical of sandy shores, such as sea sandwort *Honckenya peploides* and shingle plants such as sea beet *Beta vulgaris* ssp. *maritima*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Annual vegetation of drift lines
- European dry heaths
- Perennial vegetation of stony banks. (Coastal shingle vegetation outside the reach of waves)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012809
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type J

1.2 Site code UK9020309

1.3 Compilation date 201008

1.4 Update 201102

1.5 Relationship with other Natura 2000 sites

U	K	0	0	1	3	6	9	0
U	K	0	0	3	0	3	7	1

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **Outer Thames Estuary**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	201008
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
01 32 41 E	51 54 58 N

2.2 Site area (ha) 379268.14

2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
0	Marine	100.0%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A001	*Gavia stellata*			6466 I		A		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	100.0
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	
Salt marshes. Salt pastures. Salt steppes	
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	
Bogs. Marshes. Water fringed vegetation. Fens	
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Gravel, Mud, Sand

Geomorphology & landscape:

Range of mobile sediments, Tidal current stream

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Gavia stellata (North-western Europe - wintering) — 38% of the population in Great Britain peak mean over the period 1989-2006/07

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

4.3 Vulnerability

The northernmost extent of the SPA contains some areas licenced for aggregate extraction and other prospecting areas. The site contains several constructed or consented offshore windfarms. There are proposals for extensions to several such windfarms. Furthermore, there is the possibility that new windfarms will be consented under Round 3. Certain shipping channels within the site have been and will continue to be subject to maintenance dredging. There may be a requirement for capital dredging in association with newly developed and future port developments. The Thames supports important commercial fisheries (as well as estuarine and marine recreational angling). There is also a well-established cockle harvesting industry. The potential impacts of many of these existing or future activities will be addressed through the relevant licence requirements and under the provision of the Habitats Regulations (including the review of consents process). Ongoing research associated with offshore windfarm development will improve understanding of the environmental factors influencing red-throated diver distribution and the extent of apparently suitable seabed habitat within the site.

Red throated divers are highly sensitive to non-physical disturbance by noise and visual presence during the winter. Locally, significant disturbance and displacement effects are predicted to arise from noise and visual impacts from wind farm construction, maintenance traffic and visually from the turbines themselves. Disturbance and displacement effects may also arise from shipping (including recreational boating) and boat movements associated with marine aggregate and fishing activities. Marine aggregates activities tend to be temporary and localised. Dredging and shipping activities are expected to be confined to existing shipping channels, which are already known to be avoided by divers. In all these cases it is expected that activity will be lowest during the winter months (when the birds are present) due to the limitations imposed by poor weather conditions. Prince’s Channel (which runs through the southern area of the outer Thames SPA) carries a significant amount of vessel traffic in and out of ports in the inner Thames Estuary. Fisherman’s Gat is also an active commercial shipping channel. In addition, smaller vessels use the shallower inshore channels across the site. The impacts of many of these existing or future activities will be addressed through the relevant licence requirements and under the provision of the Habitats Regulations. (including the review of consents process).

A number of operators discharge effluent into freshwater input sources upstream of the site and directly into coastal waters adjacent to the site. Direct discharges into the site include low levels of radionuclides and heavy metals. Deterioration of invertebrate and small fish populations as a result of large oil and chemical spills can have a significant impact on important food resources . Oil on the surface and in the water column would present a threat to diving and feeding seabirds. There is a considerable amount of shipping traffic within the site, mostly confined within recognise shipping channels. A small level of contamination will exist as a result of normal shipping activities. There is however, always the risk of a catastrophic spillage event from normal shipping traffic and there is in additional issue of ship-to-ship (s-t-s) oil transfers just off Southwold within 12nm.

Discharges to the freshwater environment upstream of the site will be subject to the requirements of relevant licencing. All major ports such as the Port of London will have oil spill contingency plans to deal with catastrophic events. All s-t-s transfers are well managed by the Maritime and Coastguard Agency (MCA).

Fishing activities within the site include: suction dredging for cockles, set and drift-net tramelling, drift gill netting, potting and a limited amount of beam trawling. Removal of fish and larger molluscs can have a significant impact on the structure and functioning of benthic communities. Mechanisms for these activities to impact on red-throated divers may be a direct on indirect reduction in food availability. However, the overall level of exposure of red-throated divers to prey species depletion from biological disturbance is currently considered low. Any future significant changes to the way in which certain fishing activities, such as cockle suction dredging, are conducted (eg total catch, timing etc) will be assessed under the provision of the Habitats Regulations, and will in any case likely be subject to licence arrangements and by-law restrictions overseen by the Marine Management Organisation and/or local Inshore Fishery and Conservation Authority.

Entanglement in static fishing nets is an important cause of death for red-throated divers in the UK waters. Thus, static/passive fishing gear methods such as set gillnets and drift netting represent potentially the most serious direct risk from fishing activity to the birds themselves. Netting is widespread across the sandbanks, however this is seasonally focussed and occurs primarily at times of year outwith the period when the red-throated diver population is at its peak. The scale of the by-catch within the site is unknown. Therefore, consideration of any fishery management measures will need to be preceded by monitoring of the scale of the by-catch problem within the site itself.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK00 (N/A)	100.00

Outer Thames Estuary
Special Protection Area

Draft advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 (as amended) and Regulation 18 of The Offshore Marine Conservation (Natural Habitats, & c.) Regulations 2007 (as amended)

Cover photograph illustrates red-throated diver in winter.

Version 3.7 (March 2013)

Document version control

Version and date	Amendments made	Issued to and date
Thames SPA Cons Obs AOO 190509 .doc	Changes to tables 2.1 and 2.4; additions of Bas-corbiere ruling; changes to sensitivity assessment section; changes to physical loss and physical damage sections; changes to toxic contamination and biological disturbance sections	Internal draft for comment July 3rd 2009
Thames SPA Cons Obs AOO 080709	RTD data collection footnote added; changes to physical damage and non-selective extraction sections; additional references	Internal draft for comment 8th July 2009
Thames SPA Cons Obs AOO 130709	Changes to section 2.2; addition to table 2.2; changes to table 3.1; changes to selective and non-selective extraction; additions to appendix B	JNCC Comments incorporated on 13th July
Thames SPA Cons Obs AOO170709	Changes to Cons Obj table: added habitats and species; added terms used section; changes to sensitivity assessment section; format of advice section changes; physical loss and damage changes; added non-toxic contamination; divided selective and non-selective extraction	Internal draft for comment 17th July 2009
Thames SPA Cons Obs AOO 300709	Added species and habitats to section 2.2.1; example added to 3.4.1; physical damage and loss related to habitat; biological disturbance related to RTD; changes to toxic and non-toxic contamination section and selective and non-selective extraction sections.	JNCC returned 30th July 2009
Thames SPA Cons Obs AOO 310709	Minor changes and addition of references and section	Internal draft for comment July 31st 2009
Thames SPA Cons Obs AOO 050809	All changes and version for proof reading	Internal draft for comment August 5th
Thames SPA Cons Obs AOO 090909	Final (draft) version 2009	Issued for consultation September 2009
Thames SPA Cons Obs CWversion forRAs	Draft version 2011 for QA from Evidence Team, stakeholders comments not included as comments within the text	Final draft version 2011
Thames SPA Cons Obs CWMARCH2011	Final revision post workshop, standardised approach which mirrors Liverpool Bay SPA COs, following discussions with R Caldow and JNCC	Final version March 2011
ThamesSPAConsObsVersion 3.1	Following discussions re FCT and thresholds with RC & JNCC	Final version August 2011
ThamesSPAConsObsVersion 3.2 FINAL	Final version for circulation to relevant authorities	Final version August 2011
TamesSPAConsObsVersion 3.3	Further amendments following JNCC discussions and internal advice. Removal of section 3.2.1 and re-ordering of pagination following this – M	Final Version April 2012

	Knollys	
ThamesSPAConsObsVersion 3.4 FINAL FOR RAs	Final amendments before submitting to technical review panel	August 2012
ThamesSPAConsObsVersion 3.5 FINAL FOR RAs	Final with panel comment amendments	Nov 2012
ThamesSPAConsObsVersion 3.6 FINAL FOR WEB	Final draft document incorporating all comments	Jan 2013
ThamesSPAConsObsVersion 3.7 FINAL FOR WEB	Final document for NE and JNCC website	March 2013

Further information

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Summary of draft Conservation Objectives and Advice on Operations for the Outer Thames Estuary Special Protection Area (SPA)

This advice is based on information on the Special Protection Area (SPA) presented in Natural England's and the Joint Nature Conservation Committee's (JNCC) 'Departmental Brief: Outer Thames Estuary SPA document (Version May 2010)[1]. Natural England and JNCC's conservation objectives and advice on operations is site and feature specific, and has been developed using the best available scientific information and expert interpretation as at July 2012. The advice is generated through a coarse grading of sensitivity and exposure of the site's interest feature and its supporting habitat to physical, chemical and biological pressures associated with human activity. Sensitivity and exposure have been combined to provide a measure of the vulnerability of the interest feature to operations which may cause damage or deterioration, and therefore may require management.

The exact impact of any operation will be dependent upon the nature, scale, location and timing of events. This advice on operations for the Outer Thames Estuary SPA site will be kept under review and will be periodically updated to reflect changes in both sensitivity and exposure.

The conservation objective for the Outer Thames Estuary Special Protection Area is, subject to natural change[2], maintain[3] or enhance the red-throated diver population (*Gavia stellata*) and its supporting habitats in favourable condition[4]

The interest feature red-throated diver will be considered to be in favourable condition only when both of the following two conditions are met:

(i) The size of the red-throated diver population is at, or shows only non-significant fluctuation around the mean population at the time of designation of the SPA to account for natural change;

(ii) The extent of the supporting habitat within the site is maintained.
Management actions should enable the **Annex I feature *Gavia stellata* (wintering red-throated diver) and its supporting habitat in the Outer Thames Estuary** to

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1 http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-21728.pdf

2 Natural change" means changes in the species or habitat which are not a result of human influences. Human influence on the red-throated diver population is acceptable provided that it is proved to be/can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition.

3 Maintain" is used here because existing evidence suggests the feature to be in favourable condition, and the objective is for it to remain so. Existing activities are deemed to be compatible with the conservation objectives if current practices are continued at current levels and in the absence of evidence that current activities are significantly affecting the red-throated diver population or its habitat. However, it must be borne in mind that gradually damaging activities can take time to show their effects. If evidence later shows an activity to be undermining the achievement of the conservation objectives, then the red-throated diver population will be deemed to be in unfavourable condition.

4 Favourable Condition – Relates to the maintenance of the structure, function, and typical species for that feature within the site.

maintain or enhance its population and extent of supporting habitat for the foreseeable future. This will require assessment and management of human activities likely to affect these adversely, and of activities likely to impact the functioning of natural processes upon which the feature is dependent.

To fulfil the conservation objectives for the **Annex I feature *Gavia stellata* and its supporting habitat**, the relevant and competent authorities for this area are advised to manage human activities within their remit such that they do not result in deterioration or disturbance, or impede the restoration of this feature through any of the following:

i) **Physical loss** of habitat by removal (e.g. capital dredging, harvesting, coastal and marine development)

ii) **Physical damage** by physical disturbance or abrasion of habitat (e.g. extraction)

iii) **Non-physical disturbance** through noise or visual disturbance (e.g. shipping, wind turbines)

iv) **Toxic contamination** by introduction of synthetic and/or non-synthetic compounds (e.g. polychlorinated biphenyls (PCBs), pollution from oil and gas industry, shipping);

v) **Non-toxic contamination** to prey species only by changes in e.g. turbidity (e.g. capital and maintenance dredging);

vi) **Biological disturbance** by selective extraction of species (e.g. commercial fisheries) and non selective extraction (eg entanglement with netting and wind turbine strike)

The advice describes the above impacts and activities for both the habitat and prey species of the red-throated divers and on the red-throated divers themselves.

During 2011/12 Government instigated a review of the implementation of the Habitats and Wild Birds Directive. The review concluded that all conservation objectives (marine and terrestrial) should be up-to date, accessible and allow applicants to assess the impact of their proposed development against them. The report[5] requested Natural England with JNCC to develop a new approach to improve the information contained in conservation objectives. Natural England and JNCC published their intended approach in June 2012. Natural England has committed to review and update its conservation objectives for all European Marine Sites to make them more definitive and explicit from 2013 onwards, on a prioritised basis. We will use this review to update the advice contained within this document, to take account of new evidence that subsequently becomes available, and improved scientific understanding.

[5] http://www.defra.gov.uk/publications/2012/03/22/pb13724-habitats-wild-birds-directives/

Outer Thames Estuary Special Protection Area

Draft advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 and Regulation 18 of The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)

Contents **Page Number**

1. Introduction

The Outer Thames Estuary has been classified by the UK Government as a Special Protection Area (SPA) and the European Commission has been notified. The site now forms part of the Natura 2000[6] network. The Outer Thames Estuary SPA lies across both English territorial waters and UK offshore waters.

The Outer Thames Estuary SPA is subject to full protection under the Habitats and Birds Directive[7] (transposed through The Conservation of Habitats and Species Regulations 2010 (as amended)[8] and The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)[9] (referred to in this document respectively as the 'Habitats Regulations' and the 'Offshore Regulations'). Amongst other things, the Habitats Regulations and the Offshore Regulations place an obligation on relevant authorities and competent authorities respectively to put in place measures to protect the sites from damage or deterioration.

This advice is given in fulfilment of the duty of Natural England and JNCC under Regulations 35(3)[10], and 18[11] of the respective Habitats Regulations (referred to in this document as "Regulation 35/18 advice"), to provide relevant and competent authorities as to (a) the conservation objectives for the Outer Thames Estuary SPA: and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the Outer Thames Estuary SPA has been designated.

This advice constitutes one element of NE's/JNCC's advisory role in relation to this site. The current information must be used by relevant authorities[12] to explore and put in place management measures (if required), and by competent authorities[13] to fulfil their duties under the Habitats Regulations in making the necessary determinations on the impact of activities on the site. Developers may also use this advice when operating within a site, and when providing information to relevant/competent authorities as part of an application for new plans and projects. However, should relevant or competent authorities or others require any further advice, they are not limited to taking account of the conservation advice contained here, and would be expected to make further enquiries as required in order to make determinations or implement management measures. Further information/reference should be made to the Departmental Brief for the Outer Thames Special Protection Area[14].

An independent review of Natural England's marine SAC selection process carried out in 2011 made a number of recommendations as to how Defra and Natural England should modify their approach to future evidence based work[15]. This resulted

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[6] as defined under Regulation 3 of The Conservation of Habitats and Species Regulations 2010

[7] Council Directive 79/409/EEC on the conservation of wild birds

[8] http://www.legislation.gov.uk/uksi/2010/490/contents/made

[9] http://www.legislation.gov.uk/uksi/2010/491/contents/made

[10] http://www.legislation.gov.uk/uksi/2010/490/regulation/35/made

[11] http://www.legislation.gov.uk/uksi/2007/1842/regulation/18/made

[12] as defined under Regulation 7 of The Conservation of Habitats and Species Regulations 2010

[13] http://www.legislation.gov.uk/uksi/2007/1842/regulation/23/made

[14] http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-21728.pdf

[15] http://www.defra.gov.uk/publications/files/pb13598-graham-bryce-independent-review-marine-sacs-110713.pdf

in Natural England adopting the Government Chief Scientific Adviser‟s (GCSA) guidelines on using evidence[16] through the development of a suite of Evidence Standards[17]. Implementation of these standards has included Natural England working with JNCC to develop a protocol[18], which has been subject to independent expert review, setting out the processes and requirements for the development of conservation advice packages, to ensure that these fully comply with the GCSA's guidelines. Whilst the conservation advice provided here was developed prior to the finalisation of the protocol, it has been assessed for compliance with the protocol and a detailed report can be found on the Natural England website[19]

During 2011/12 Government instigated a review of the implementation of the Habitats and Wild Birds Directive. The review concluded that all conservation objectives (marine and terrestrial) should be up-to date, accessible and allow applicants to assess the impact of their proposed development against them. The report[20] requested Natural England with JNCC to develop a new approach to improve the information contained in conservation objectives. Natural England and JNCC published their intended approach in June 2012, with Natural England committing to review and update its conservation objectives for all European Marine Sites to make them more definitive and explicit. We will be consulting with stakeholders on the approach, as well as how we can make our Regulation 35/18 advice more accessible and easier to use. The review of conservation advice will then begin in 2013 on a prioritised basis. We will use this review to update the advice contained within this document, to take account of new evidence that subsequently becomes available, and improved scientific understanding.

2. Roles and Responsibilities

2.1 The role of Natural England and JNCC

The Conservation of Habitats and Species Regulations 2010 (as amended) transpose the Habitats Directive into law on land and in territorial waters of Great Britain (out to 12 nautical miles from the baseline). The Regulations give Natural England a statutory responsibility to advise relevant and competent authorities on the conservation objectives and operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the sites have been designated, for European marine sites in England.

The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) transpose the Habitats Directive into law for UK offshore waters (from 12 nautical miles from the coast out to 200 nm or the UK Continental Shelf). These Regulations give JNCC a statutory responsibility to advise competent authorities of the conservation objectives for offshore Special Areas of Conservation and to advise them of operations which may adversely affect the integrity of the site.

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16 http://www.bis.gov.uk/assets/goscience/docs/g/10-669-gcsa-guidelines-scientific-engineering-advice-policy-making.pdf
17 http://www.naturalengland.org.uk/ourwork/research/default.aspx
18 http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx
19 http://publications.naturalengland.org.uk/publication/3233957?category=3212324

This advice is also required under the Offshore Petroleum Activities 2001 (Conservation of Habitats) Regulations (as amended); and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

Natural England and JNCC will provide additional advice for each site to Relevant and competent authorities in order for them to fulfil their duties under the Habitats Regulations, for example when a Competent Authority wishes to assess the implications of any plans or projects on a candidate Special Area of Conservation (cSAC), Special Area of Conservation (SAC), or Special Protection Area (SPA).

2.2 The role of relevant and competent authorities

2.2.1 Inshore (0 – 12 nautical miles):

The Habitats Regulations require relevant and competent authorities to exercise their functions so as to secure compliance with the Habitats Directive. Under Regulation 36[21] of the Habitats Regulations relevant authorities may use this advice to draw up a management scheme for the SPArelevant authorities must, within their areas of competence, have regard to both direct and indirect effects on interest features of the site. This may include consideration of issues outside the boundary of the site.

2.2.2 Offshore (12 – 200 nautical miles):

Regulations 22, 23, 25 and 27[22] of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) outline the responsibilities of competent authorities to ensure compliance with the Habitats Directive. Regulation 22 requires competent authorities to consider appropriate conservation measures for Annex I habitats and Annex II species present within the SAC. Regulation 23 requires competent authorities to take appropriate steps to avoid the deterioration or disturbance of interest features for which the Offshore SAC is designated. Regulation 25 requires competent authorities to consider if a plan or project could be likely to have a significant effect on a European Offshore Marine Site and, if necessary, undertake an appropriate assessment for the plan or project. Regulation 27 requires competent authorities to review existing consents, permissions or authorisations and if necessary, affirm, modify or revoke them, undertaking an appropriate assessment where necessary. Competent authorities must, within their areas of competence, have regard to both direct and indirect effects on interest features of the site. This may include consideration of issues outside the boundary of the SAC.

2.2.3 Activity outside the control of relevant/competent authorities

Nothing within Regulation 35/18 advice will require relevant authorities to undertake any actions or ameliorate changes in the condition of interest features if it is shown that the changes result wholly from natural causes. Having issued Regulation 35/18 advice for this site, Natural England and JNCC will work with relevant and competent authorities and others to agree, within a defined time frame, a protocol for evaluating observed changes in the site’s condition and to develop an understanding of natural change and provide further guidance as appropriate and possible. This does not, however, preclude relevant and competent authorities from taking any appropriate action to prevent deterioration to the interest features, and indeed such actions should be undertaken when required.

[21] http://www.legislation.gov.uk/uksi/2010/490/regulation/36/made
[22] http://www.legislation.gov.uk/uksi/2007/1842/contents/made

2.3 The role of conservation objectives

The conservation objectives set out what needs to be achieved for the site to make the appropriate contribution to the conservation status of the features for which the site is designated and thus deliver the aims of the Habitats and Birds Directives.

Conservation objectives are the starting point from which management schemes and monitoring programmes may be developed as they provide the basis for determining what is currently or may cause a significant effect, and they inform the scope of appropriate assessments.

In addition to providing such advice, this advice will inform the scope and nature of any 'appropriate assessment' which the Directive requires to be undertaken for plans and projects (Regulations 61 and 63 and by Natural England under Regulation 21 of the Habitats Regulations).

2.4 The role of advice on operations

The advice on operations set out in Section 4 of this document provides the basis for discussion about the nature and extent of the operations taking place within or sufficiently close to have an impact on the site and which may have an impact on its interest features. The advice should also be used to help identify the extent to which existing measures of control, management and forms of use are, or can be made, consistent with the conservation objectives, and thereby focus the attention of relevant authorities and surveillance to areas that may need management measures.

This advice on operations may need to be supplemented through further discussions with the relevant authorities and any advisory groups formed for the site.

2.5 Precautionary principle

All forms of environmental risk should be tested against the precautionary principle which means that where there are real risks to the site, lack of full scientific certainty should not be used as a reason for postponing measures that are likely to be cost effective in preventing such damage. It does not however imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998).

3. Conservation objectives

3.1 Background to conservation objectives

The conservation objectives and definitions of favourable condition for features on the site may inform the scope and nature of any 'appropriate assessment' under the Habitats Regulations[23,24]. An appropriate assessment will also require consideration of issues specific to the individual plan or project.

The scope and content of an appropriate assessment will depend upon the location, size and significance of the proposed project. Natural England and JNCC will advise on a case by case basis.

Following an appropriate assessment, competent authorities are required to ascertain the effect on the integrity of the site. The integrity of the site is defined in paragraph 20 of ODPM (Office of the Deputy Prime Minister) Circular 06/2005 (DEFRA Circular 01/2005)[25] as 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. The determination of favourable condition is separate from the judgement of effect upon integrity. For example, there may be a time-lag between a plan or project being initiated and a consequent adverse effect upon integrity becoming manifest in the condition assessment. In such cases, a plan or project may have an adverse effect upon integrity even though the site remains in favourable condition, at least in the short term.

The conservation objectives for this site are provided in accordance with paragraph 17 of ODPM Circular 06/2005 (DEFRA Circular 01/2005) which outlines the appropriate assessment process. The entry on the Register of European Sites gives the reasons for which a site was classified or designated.

The target for population size is set to take account of the way in which populations fluctuate naturally and the degree of uncertainty in estimating population size. This is done so that in future condition monitoring, a population size estimate that falls within the known natural fluctuations in population size, or has a degree of uncertainty around it that renders it indistinct from the estimate of population size at the time of classification (i.e. the baseline population), can be distinguished from one that does not. This distinction serves to identify those circumstances in which the evidence is consistent with an interpretation that any apparent decline in a population below that at classification is simply a reflection of margins of error in measurement and/or due to a natural fluctuation which is part of a normal and established pattern which can be attributed to natural phenomena such a food availability, weather conditions etc.. In such circumstances it would be inappropriate to trigger further investigation into the causes of the apparent decline or the implementation of remedial actions to reverse it. In contrast, where the decline is of a magnitude that takes it beyond these limits then it is quite possible that, being beyond "expected variation", there is a non-natural cause. Classification of the feature as being in unfavourable condition would then trigger investigation of the cause of the population decline and perhaps trigger

[23] The Conservation of Habitats and Species Regulations 2010: Regulation 61 and 63 by a competent authority and Regulation 21 by Natural England.
[24] Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended): Regulation 25 and 27 by a competent authority.
[25] http://www.communities.gov.uk/documents/planningandbuilding/pdf/147570.pdf

remedial management actions if the decline can be attributed to a particular cause (or causes) that can be managed so as to reduce their impact in the future.

This assessment is distinct from that carried out when considering the significance of a specific anthropogenic impact which can be shown to (or is predicted to) reduce a population from its baseline value to a new lower level.

3.2 Outer Thames Estuary SPA conservation objectives

The formal conservation objectives (as at July 2011) for Outer Thames Estuary SPA interest features are provided below. These are high-level objectives for the site features, and Natural England and JNCC may refine them in the future as our understanding of the features improves and further information becomes available, such as survey work.

They should be read in the context of other advice given, particularly:

(i) the Departmental Brief[26] which provides more detailed information about the site and evaluates its interest features according to the Birds Directives selection criteria and guiding principles;
(ii) the favourable condition table (Appendix A) providing information on how to recognise favourable condition for each of the features and which will act as a basis from which the monitoring programme will be developed; and

(iii) the attached maps (Appendix B) which show the known locations of the interest features

3.2.1 Red-throated diver – *Gavia stellata*

Red-throated diver is listed in Annex I to the Birds Directive and is assessed against stage 1(1) of the SPA selection guidelines (Stroud *et al.* 2001)[27]; using the relevant national population estimate the wintering population of red-throated divers in Great Britain is estimated to be 17,116 individuals (O'Brien et al. 2008), representing between 10-19% (depending on the areas included) of the NW Europe non-breeding population. The Great Britain population estimate is derived from shore-based observations together with more specific aerial surveys. Surveys from aeroplanes (and boats) have been responsible for identifying much larger numbers wintering in British coastal waters than previously known (O'Brien *et al*. 2008). Recent evolution of aerial survey methods, using both High Resolution still photography and High Definition video, has revealed that previous estimates of red-throated diver numbers are likely to be under-estimates (APEM 2010).

In the UK, wintering red-throated divers are associated with inshore waters, often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al*., 1995; Stone *et al.*, 1995). Knowledge of red-throated diver distribution in the UK was transformed during the 2000s following the advent of aerial and boat surveys for offshore development, particularly renewables development (e.g. Percival *et al.*, 2004; O'Brien *et al*. 2008). The bulk of the UK distribution is in east England, the area between Kent and North Yorkshire supporting 59% of the UK total estimate; 44% of the UK total is in the Greater Thames alone (O'Brien *et al.* 2008), with variable distribution between surveyed sites (APEM 2011).

[26] http://publications.naturalengland.org.uk/file/3264082
[27] http://jncc.defra.gov.uk/page-1405

Liverpool Bay is currently the only other marine area in the UK classified as a SPA for red-throated divers.

Red-throated divers use the Outer Thames Estuary SPA in wintering numbers of European importance (6,466 individuals, 38% of the GB population, 1989 – 2006/07).

Table 3.1 The conservation objectives for the Outer Thames Estuary SPA interest feature: internationally important population of the regularly occurring Birds Directive Annex I species: red-throated diver (*Gavia stellata*)

Subject to natural change[28], maintain[29] or enhance the red-throated diver population and its supporting habitats in favourable condition[30] Relevant habitats include shallow coastal waters and areas in the vicinity of sub-tidal sandbanks The number of red-throated diver using these habitats is given in Table 3.2 below.

The interest feature red-throated diver will be considered to be in favourable condition only when both of the following two conditions are met:

(i) The size of the red-throated diver population is at, or shows only non-significant fluctuation around the mean population at the time of designation of the SPA to account for natural change;

(ii) The extent of the supporting habitat within the site is maintained.

The favourable condition table (Appendix A) further defines favourable condition for the interest features of the site.

[28] Natural change" means changes in the species or habitat which are not a result of human influences. Human influence on the red-throated diver population is acceptable provided that it is proved to be/can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition.

[29] Maintain" is used here because existing evidence suggests the feature to be in favourable condition, and the objective is for it to remain so. Existing activities are deemed to be compatible with the conservation objectives if current practices are continued at current levels and in the absence of evidence that current activities are significantly affecting the red-throated diver population or its habitat. However, it must be borne in mind that gradually damaging activities can take time to show their effects. If evidence later shows an activity to be undermining the achievement of the conservation objectives, then the red-throated diver population will be deemed to be in unfavourable condition.

[30] Favourable Condition – Relates to the maintenance of the structure, function, and typical species for that feature within the site.

Table 3.2 Information on the population of red-throated diver that qualifies the Outer Thames Estuary as an SPA under the Birds Directive.

Internationally important populations of regularly occurring Birds Directive Annex 1 species	
Species	**Wintering population**
Red-throated diver *Gavia stellata*	6,466 individuals[31]

3.2.2 Explanatory information for the red-throated diver conservation objectives

Key supporting habitats and distribution

In the UK, wintering red-throated divers are associated with shallow inshore waters (between 0-20m deep and less frequently in depths of around 30m), often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al*., 1995; Stone *et al.*, 1995). There is some evidence of association with areas of salinity change (e.g. where low salinity river water meets higher salinity sea water: Skov & Prins 2001; Skov *et al.* 2011). Such areas tend to fluctuate with state of tide, volume of river flow and wind conditions.

Other physical and hydrographic factors determining the distribution of red-throated divers have been established for part of the Outer Thames Estuary SPA (Skov *et al.* 2011). This modelling work identified different areas of high habitat quality at different tidal flow phases with variables including current velocity, water levels, eddies, upwellings and shipping found to be important at different tidal stages. As an active fish-feeder (Guse *et al.* 2009 and references therein), the distribution and concentrations of red-throated divers will at least partly be determined by the presence, abundance, and availability of their prey species, which is likely to be linked to at least some of the environmental parameters tested by Skov *et al.* (2011).

Key food

The red-throated diver is considered to be an opportunistic feeder and dietary studies have revealed several different fish species are consumed depending upon the area studied, including members of the cod family, herring, gobies and sand eels (Guse *et al*. 2009 and references therein). The sandbanks of the Outer Thames Estuary

[31] The wintering population estimate was generated from aerial survey data, collected mainly by WWT (Wildfowl and Wetlands Trust) Consulting, commissioned by a number of organisations including UK Government and a consortium of wind energy companies. Other data were collected by the JNCC Marine SPA Team, and by the Natural Environmental Research Institute, Denmark. Data were collected between the months of October to March in 1988/89, and 2002-2007. **JNCC has absolute confidence in the integrity of the data provided.** Population estimates within the boundary are calculated using spatial analysis to estimate RTD density in 1km grid squares. This is the revised figure following the re-drawing (shrinking) of the boundary as a result of the public consultation.

support the nursery and feeding grounds for many fish species, including the small fish that red-throated divers feed on.

Behaviour and Impacts

In a review of the sensitivity of 26 species of 'seabird' to the development of offshore windfarms, Garthe & Huppop (2004) found that red-throated divers had the second highest species sensitivity index score. Furness & Wade (2012) similarly ranked the species of primary concern with regard to disturbance /displacement from offshore wind farms. There is evidence that red-throated divers are displaced from the footprint of offshore windfarms and surrounding sea areas up to 2km distant from the outermost turbines due most likely to the presence of the turbines and the activities of maintenance vessels. Petersen *et al*. (2006) showed a marked post construction avoidance of the Horns Rev offshore windfarm, including also the 2km and 4km zones around it. A similar, though less pronounced avoidance response to the Nysted offshore windfarm by red-throated divers was also recorded (Petersen *et al.* 2006), and emerging data from Kentish Flats offshore wind farm suggest a decreasing displacement effect with distance from the turbine footprints (Percival 2010). Inappropriately sited developments could displace significant numbers of the GB wintering population. Other forms of renewable energy, such as tidal barrages, could also impact on the species' wintering numbers and distribution for disturbance and habitat loss reasons.

Red-throated divers are especially sensitive to disturbance at sea (Garthe & Huppop 2004; Furness & Wade 2012) and usually avoid boats (Schwemmer *et al.* 2011).

Red-throated divers are highly sensitive to the effects of disturbance associated both directly with marine aggregate extraction, and also the resultant increases in shipping activity. As Red-throated divers are highly exposed to marine aggregate extraction areas, they have been assessed as being highly vulnerable to changes to turbidity, sedimentation and impacts to the benthos or associated fish communities (Cook & Burton 2010).

Red-throated divers moult their flight feathers during September and October when they may become flightless for a short period and are vulnerable to oil pollution at this time (Camphuysen, C.J. 1989, Williams et al 1994).

Red-throated diver populations are vulnerable to increased adult mortality as it is a long-lived species with low breeding productivity. Studies have shown entanglement in various types of static fishing gear, netting and marine litter as one of the most frequently identified causes of death in NW European and GB waters (Okill 2002, Erdmann *et al.* 2005, Weston & Caldow 2010). However early indications from a 2011/12 study by Natural England and the Kent and Essex IFCA in the Outer Thames Estuary SPA suggest that occurrence of red-throated diver entanglement in fishing gear is low. Further data is being collected over the 2012/13 winter. At a broader geographic scale, bycatch of red-throated divers in the Baltic Sea and North Sea is estimated to be of the order of 'hundreds' from a population of >100,000 (Zydelis *et al.* 2009).

Herring are key prey species for the red-throated diver (Guse *et al.* 2009). The species may thus also be sensitive to aspects of dredging activity that negatively impact on herring populations, such as increases in sediment deposition (Cook & Burton 2010).

Commercial extraction of the red-throated diver's main fish prey species, as target and/or bycatch species, could impact the birds, but again the extent of this in the Outer Thames Estuary SPA is not well understood.

3.3 Background to favourable condition table

The favourable condition table is the principle source of information that Natural England and JNCC will use to monitor and assess the condition of an interest feature and as such comprises indicators of condition. The favourable condition table can be found at Appendix A.

On many terrestrial European sites, we know sufficient information about the required condition of qualifying habitats to be able to define favourable condition with confidence. In contrast, understanding the functioning of large, varied, dynamic marine and estuarine sites, which experience a variety of pressures resulting from historic and current activities, is much more difficult, consequently it is much harder to define favourable condition so precisely in such sites. In general the conservation objectives provided are based on a *working* assumption that the *current* condition of the features is favourable for most attributes.

Where there are more than one year's observations on the condition of marine features, all available information will need to be analysed to determine, where possible, any natural environmental trends at the site. This will provide the basis for judgements of favourable condition to be determined in the context of natural change. Where it becomes clear that certain attributes may indicate a cause for concern, and if further investigation indicates this is justified, restorative management actions will need to be taken. The aim of such action would be to return the interest feature to favourable condition from any unfavourable state. Future editions of the advice within this document will revise the current assumptions about feature condition in light of ongoing and future monitoring. This will be linked with any developments in our understanding of the structure and functioning of features and the pressures they are exposed to.

This advice also provides the basis for discussions with relevant authorities, and as such the attributes and associated measures and targets may be modified over time. The aim is to have a single agreed set of attributes that will be used as a basis for monitoring in order to report on the condition of features. Condition monitoring of the attributes may be of fairly coarse methodology, underpinned by more rigorous methods on specific areas within the site. Common Standards Monitoring (JNCC 2004) requires mandatory monitoring of some attributes of a designated feature, while other attributes are considered discretionary (or site-specific) and are incorporated to highlight local distinctiveness. Monitoring of both bird populations and the extent of habitats are fundamental to assessing the condition of bird features (JNCC 2004), and are therefore identified as "**mandatory attributes"** in the Favourable Condition Tables (Appendix A). It is not possible to make a robust assessment of the condition of a feature without assessing the mandatory attributes. **For bird features the general rule is that all mandatory attributes must meet their targets for the feature to be in favourable condition**. Priority will be given to measuring attributes that are at risk from anthropogenic pressure and for which changes in management may be necessary. This information may be generated by Natural England/JNCC or collected by other organisations through agreements.

The condition monitoring programme will be developed through discussion with the relevant / competent authorities and other interested parties, ideally as part of the management scheme process. Natural England and JNCC will be responsible for collating the information required to assess condition, and will form a judgement on the condition of each feature within the site.

Targeted monitoring of the attributes identified in the favourable condition table will be an important, but not the only, basis for assessing the condition of the features. Additional sources of information may also be selected to inform our view about the integrity and condition of the site. For example, a part of risk based monitoring activity data (as collected by the relevant/competent authorities and their statutory advisers) could give an indication as to the levels of pressure that may impact on the site features. Any other relevant data, such as data on site integrity, results from compliance monitoring, (for example assessing the conduct of activities in relation to regulations and licence conditions), together with data obtained to inform appropriate assessments, licence applications etc. will also have an important role in informing assessments of feature condition.

Information about the size of the red-throated diver population on the site will also need to be interpreted in the context of any wider changes in the population of this species at a national or biogeographic region level.

4. Advice on operations

4.1 Background

Natural England and JNCC have a duty under Regulation 35(3)(b) of the Habitats Regulations and 18 of the Offshore Marine Conservation Regulations to advise other relevant authorities as to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated.

The process of deriving and scoring relative vulnerability is provided at Appendix C. A summary of the operations which may cause deterioration or disturbance is given at Appendix D, and detailed in Appendix E. Further explanation of the sensitivity of the interest features follows with examples of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of operations. This enables links to be made between the categories of operation and the ecological requirements of the features.

4.2 Purpose of advice

The aim of this advice is to enable all relevant authorities to direct and prioritise their work on the management of activities that pose the greatest potential threat to the favourable condition of interest features at Outer Thames Estuary SPA. The advice is linked to the conservation objectives for interest features and will help provide the basis for detailed discussions between relevant authorities enabling them to formulate and agree a management scheme for the site should one be deemed necessary.

The advice given here will inform, but is given without prejudice to, any advice provided under Regulation 61 or Regulation 63 on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

4.3 Methods for assessment

To develop this advice on operations Natural England has used a three step process involving:

- an assessment of the **sensitivity** of the interest features or their component sub-features to operations;

- an assessment of the **exposure** of each interest feature or their component sub-features to operations; and

- a final assessment of **current vulnerability** of interest features or their component sub-features to operations.

This three step process builds up a level of information necessary to manage activities in and around the site in an effective manner. Through a consistent approach, this process enables Natural England to both explain the reasoning behind our advice and identify to competent and relevant authorities those operations which pose the most current threats to the favourable condition of the interest features on the site.

All the scores of relative sensitivity, exposure and vulnerability are derived using best available scientific information and informed scientific interpretation and judgement. The process uses sufficiently coarse categorisation to minimise uncertainty in information, reflecting the current state of our knowledge and understanding of the marine environment.

Six broad Pressure 'Categories of Operation' which may cause i) deterioration of natural habitats or the habitats of species, or ii) disturbance of species, (either alone or in-combination), are considered in this document:

- Physical Loss
- Physical Damage
- Non-physical disturbance
- Toxic contamination
- Non-toxic contamination
- Biological disturbance

Example sources of pressures are provided (Appendix D), although these examples are not inclusive of all potentially detrimental activities.

4.3.1. Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features and their supporting habitat in the Outer Thames Estuary SPA to the effects of six broad categories of human activities.

In relation to this assessment, sensitivity has been defined as the "intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor and the time taken for its subsequent recovery" (Hiscock 1996, MarLIN, 2003). For example, a very sensitive species or habitat is one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'high' intolerance) and is expected to recover only over a very long period of time, i.e. >10 or up to 25 years ('low' recoverability). In the case of the SPA, this assessment considers the sensitivity of the red-throated diver population as well as the species and habitats on which that population depends. This includes its prey species and supporting habitats e.g. the condition of the sandbanks is important because they support the food chain on which the divers depend.

The sensitivity assessments are based on current information but may develop with improvements in scientific knowledge and understanding. The sensitivity of interest features or sub-features (and scientific understanding of sensitivity) may change over time; hence an operation that is not currently considered to have a negative effect may be identified as having one in the future. For example the dependence on a particular prey species may change if that species' abundance declines and the birds switch prey species. The subsequent shift may mean dependence on another prey species not previously assessed.

4.3.2. Exposure assessment

This has been undertaken for the Outer Thames Estuary SPA by assessing the relative exposure of the interest features and their supporting habitat on the site to the effects of broad categories of human activities currently occurring on the site (as at July 2012). These assessments were made on the best available information and advice but should be reviewed in light of additional information on activities in the area.

4.3.3. Vulnerability assessment

The third step in the process is to determine the vulnerability of interest features or their component sub-features to operations. This is an integration of sensitivity and exposure. Only if a feature is both sensitive *and* exposed to a human activity is it considered vulnerable (see Appendix C). In this context, therefore, 'vulnerability' has been defined as the exposure of the habitat, community or individual (or individual colony) of a species to an external factor to which it is sensitive (Hiscock, 1996). An assessment of the interest feature's vulnerability (Appendix E) helps to guide site management decisions by highlighting potentially detrimental activities that may need to be managed (or continue to be managed) by the competent authorities.

The vulnerability of the SPA Annex I feature to climate change is not considered in the annexes below, given the uncertainties surrounding the effects of global change on the oceans.

4.4 Format of advice

The advice is provided within six broad categories of operations that may cause deterioration of natural habitats or the habitats of species, or disturbance of species. This approach therefore:

- enables links to be made between human activities and the ecological requirements of the habitats or species, as required under Article 6 of the Habitats Directive;[32]

[32] For full a background summary to the Natura 2000 see http://necmsstage/ourwork/marine/sacconsultation/default.aspx and

- provides a consistent framework to enable relevant authorities to assess the effects of activities and identify priorities for management within their areas of responsibility; and

- is appropriately robust to take into account the development of novel activities or operations which may cause deterioration or disturbance to the interest features of the site and should have sufficient stability to need only infrequent review and updating by Natural England and JNCC.

These broad categories provide a clear framework against which relevant and competent authorities can assess activities under their responsibility.

4.5 Update and review of advice

Information as to the operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated, is provided in light of what Natural England knows about current and recent activities and patterns of usage at Outer Thames Estuary SPA. Natural England and JNCC expects that the information on activities and patterns of usage will be refined as part of the process of developing the management scheme and through discussion with the relevant and competent authorities. As part of this process the option of identifying a number of spatial zones with different activity levels may be appropriate. It is important that future consideration of this advice by relevant authorities and others takes account of changes in the usage patterns that have occurred at the site, over the intervening period, since the information was gathered. In contrast, the information provided in this advice on the sensitivity of interest features or sub-features is relatively stable and will only change as a result of an improvement in our scientific knowledge, which will be a relatively long term process. Advice for sites will be kept under review and will be periodically updated through discussions with relevant and competent authorities and others to reflect significant changes in our understanding of sensitivity together with the potential effects of plans and projects on the marine environment.

5. Specific advice on operations for the Outer Thames Estuary SPA

The following sections provide information to help relate general advice regarding the sensitivity and exposure of the specific interest feature (the overwintering population of red-throated diver, *Gavia stellata*) and its supporting habitat to operations and activities within and adjacent to the Outer Thames Estuary SPA.

This advice relates to the vulnerability of the interest features and sub-features of the Outer Thames SPA to current levels of human usage, as summarised in Appendix D and detailed in Appendix E.

Further explanation of the sensitivity of the interest feature and supporting habitats follows, with examples of its exposure and therefore its vulnerability to damage or disturbance from the listed categories of pressures. This enables links to be made between the categories of operation and the ecological requirements of the features.

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the Departmental brief: http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-11044.pdf

Information regarding the current commercial activities in and around the SPA can be found in the Departmental Brief[33] for the Outer Thames Estuary SPA.

5.1. Detailed advice for the Outer Thames Estuary SPA features

5.1.1. Physical loss of supporting habitat

In the UK, wintering red-throated divers are associated with shallow (between 0-20m deep (less frequently in depths of around 30m)) inshore waters, often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al*., 1995; Stone *et al*., 1995). Red-throated divers are known to be associated with sandbank features, although the exact use of different habitats within the Outer Thames Estuary is complex, and related to both physical and hydrographic variables (Skov *et al.* 2011).

The link between the birds and benthic habitats is not well understood but it probably reflects the association between some of their prey species (small fish such as gadoids, sprat, herring and sandeel between approximately 10 and 25 cm in length; Guse *et al 2009.*, and references therein) and sandbanks (Kaiser *et al*. 2004). Sandbanks may have a functional role (as nursery, spawning, or feeding grounds or in providing shelter) in supporting these fish species. Eddies and upwellings, perhaps reflecting biologically productive components of the marine environment and thus attractive to fish, have been shown to be important on certain tidal phases for explaining red-throated diver distribution in the Outer Thames Estuary (Skov *et al.* 2011).

Physical loss by removal or by smothering of any of the habitats on which red-throated divers depend may result in the loss of foraging sites and therefore the reduction of the food resource for the overwintering population. This would consequently be detrimental to the favourable condition of the interest feature. **Thus the overwintering population is considered to be highly sensitive to physical removal of habitat and moderately sensitive to smothering.** The sensitivity for smothering is considered moderate rather than high because habitats can recover after time with smothering whereas physical removal is likely to destroy the habitat.

Offshore development construction, marine aggregates extraction, capital and maintenance dredging of shipping channels all undertake physical removal of sand from within the SPA boundary. The northernmost extent of the SPA boundary (Norfolk) crosses the 12nm zone and contains some aggregates licences (from 2008) and prospecting areas. The environmental statement for the London Array Windfarm located in the southern area of the SPA (partially overlapping Margate & Long Sands SAC) considered that the resulting habitat loss from the development is very small, and is not considered significant in the context of habitat availability for divers within the SPA and the Thames Estuary as a whole (RPS Group PLC 2005).

The Round 3 development programme for offshore wind farms includes an area overlapping with the northern extent of the SPA. The Crown Estate has awarded a lease to develop the Norfolk Zone (Zone 5) to a consortium known as East Anglia Offshore Wind. This consortium will be required to undertake a zonal assessment of their combined proposals followed by an environmental impact assessment and make an application through the Planning Inspectorate for each windfarm proposal.

[33] http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-11044.pdf

An approximate calculation of turbine base diameter relative to the entire extent of the SPA, indicates that direct physical loss of habitat due to the footprint of windfarm turbines (taking into account Kentish Flats, Gunfleet Sands, Scroby Sands, London Array and the Round 3 zone off Suffolk) would be substantially less than 0.01% of the total SPA area. Whilst this figure does not take into account habitat loss due to scour protection around the turbines or over inter-array and grid connection cables, in the context of the SPA area the total figure for direct habitat loss due to turbine footprints and scour protection is still likely to fall below 1% of the total SPA area (the total area of the Outer Thames Estuary SPA is 379,268.14 ha). Direct loss due to the turbine footprint must be considered alongside 'effective' or indirect loss of habitat (which could be temporary), due to divers avoiding the windfarm area. This is addressed under non physical disturbance in section 5.1.3.

Furthermore, although net habitat loss may be small, it is important to recognise that some habitat areas will be of more importance to red-throated divers than others. Within the Outer Thames Estuary area, Kentish Flats and London Array offshore wind farms are situated in habitat typically described as being of 'high' or 'very high' quality (Skov *et al.* 2011). Displacement from such habitat may lead to density-dependent effects (e.g. increased feeding competition) elsewhere within the SPA.

Black Deep and Fisherman's Gat have never been dredged; the Princes Channel was dredged in 2008 for the first time in 40 years and there will be an ongoing maintenance dredging requirement. Maintenance and / or capital dredging is likely to increase if shipping activity and ship sizes increases. Capital dredging within the site is planned for Shellhaven, a new container port that is being developed on the site of a former oil refinery. In addition planned capital dredging of the Medway Approach Channel will fall partly within the site.

Based on the overall extent of supporting sandbank habitat and the distribution and extent of activities the overall exposure to physical loss due to removal can be considered to be low. This is because although the impacts described above may be relatively geographically dispersed, when considered cumulatively they represent only a small area of the SPA habitat. However, the quality of supporting habitat, as determined by modelling of environmental predictor variables against known diver distributions, is a key consideration in the ultimate effect of such habitat removal (Skov *et al.* 2011). The existing and prospective aggregate extraction areas within the site as well as ongoing maintenance dredging requirements of shipping lanes and potential future capital dredging means that **exposure to physical loss due to smothering can be considered to be moderate.**

Overall the **vulnerability of the Annex I species** within the Outer Thames Estuary SPA and associated habitats to **physical loss** due to both physical removal and smothering is considered to be **low to moderate**.

5.1.2. Physical damage to their supporting habitat

Benthic sandbank communities are in general relatively resilient to physical damage. However, repeated damage to the habitats (through changes in suspended sediment or physical disturbance caused by selective extraction, anchoring or bottom-towed fishing gear) could adversely affect the ability of the habitats to recover, leading to permanent damage and ultimately to loss of prey species. This may result in a reduction in the value of sandbank habitats as foraging sites for the overwintering population of red-throated diver. Therefore, **the overall sensitivity of the red-throated divers to damage to their supporting habitat is considered to be moderate**.

Few ships anchor in the Outer Thames. Marine aggregate extraction activities are mostly in the northern extent of the SPA with some new licence areas in the northerly part of the southern section. Activities are not expected to significantly reduce habitat availability for divers as the areas worked are typically limited spatially and temporally. Commercial fishing activity within the SPA includes: suction dredging for cockles, set and drift-net trammelling, otter trawling, drift gill netting, potting, long-lining and a limited amount of beam trawling for demersal species. While the capacity for the majority of these gear types to cause physical damage to the seabed habitat is low, the interaction between suction dredging, beam trawling and to a lesser extent demersal otter trawling gear components and the seafloor can result in physical disturbance and potentially damage, depending on the intensity of the activity and sediment composition of the habitat (JNCC and Natural England 2011). Significant long-term changes in bathymetry caused by bottom-towed fishing gear that could render habitat unavailable for foraging divers are not anticipated. **The site is therefore considered to have low exposure to physical damage.**

Overall the **vulnerability of the Annex I species** within the Outer Thames Estuary SPA and associated habitats to physical damage is considered to be **low** for siltation, abrasion and selective extraction.

5.1.3. Non physical disturbance of red-throated diver

Red-throated divers are highly sensitive to non-physical disturbance by noise and visual presence during the winter (Garthe & Huppop 2004). They can be disturbed by wind turbine rotors, boat movements, and general activity. Disturbance can cause birds to reduce or cease feeding in a given area or to fly away from an area (i.e. be displaced). Either response could decrease their energy intake rate at their present (disturbed) feeding site or alternative feeding site, which may be less favoured. The latter response would also increase energy expenditure during flight and perhaps during subsequent foraging in less favourable habitat (or favourable habitat with greater intra-specific competition). Both disturbance and displacement can in principle affect the energy budgets and possibly survival of birds. Stillman *et al*. (2007) note that the impacts of disturbance during the non-breeding season on migratory wildfowl should be measured in terms of its effects on two factors: i) the storage of fat reserves needed to fuel migration in spring and to breed successfully after the birds have reached the breeding grounds; and ii) the number of birds that die during the non-breeding season. Impacts on both factors are likely to be a particular problem for diving birds which engage in an energetically expensive mode of foraging (de Leeuw 1997). **Sensitivity can be considered high.**

Disturbance and displacement of prey species arising from construction noise from wind farms could cause disruption to their lifecycles, as herring and sprat are thought to be a prey resource and are sensitive to noise. Benthopelagic fish species have some sensitivity to both construction and operational noise from windfarms. However, the level of certainty regarding the zone of impact and precise response is limited, with estimates of physiological responses, injury and death reported at varying distances from construction/operation. These appear to be more significant as a result of construction noise than operation, within 150m of the source, although impacts may occur up to 1000m away.[34]

[34] http://www.offshorewindfarms.co.uk/Assets/BIOLAReport06072006FINAL.pdf

Locally, significant disturbance and displacement effects are predicted to arise from noise and visual impacts from wind farm construction, maintenance traffic and visually or aurally from the turbines themselves. The calculation for the areas of the consented windfarm footprints relative to the area of the SPA shows that 3.5% of the SPA area could be made unavailable through displacement.[35] If the entire consented London Array development is included this increases to 282.5 km^2 or 7.2% of the SPA area which could potentially be unavailable to red-throated diver. The development of London Array beyond phase 1 is subject to the satisfactory outcome of an ornithological review process demonstrating that there would be no adverse effect on the red-throated diver population from the second phase of the development. Red-throated divers may habituate to wind turbines and therefore any habitat loss due to displacement may diminish over time. However, as yet, survey work has provided little or no evidence of habituation by divers (Petersen & Fox 2007; Percival 2010).

Disturbance and displacement effects may also arise from shipping (including recreational boating) and boat movements associated with marine aggregate and fishing activities (Cook & Burton 2010). Marine aggregates activities tend to be temporary and localised. Dredging and shipping activities are expected to be confined to existing shipping channels, which are already known to be avoided by divers. In the majority of cases it is expected that activity will be lowest during the winter months (when the birds are present) due to the limitations imposed by poor weather conditions (RPS Group PLC 2005). Prince's Channel (which runs through the southern area of the Outer Thames Estuary SPA) carries a significant amount of vessel traffic in and out of ports in the inner Thames Estuary. Fisherman's Gat is also an active commercial shipping channel. In addition, smaller vessels use the shallower inshore channels across the site.

Overall current exposure is considered to be medium.

Overall the **vulnerability of the Annex I species** within the Outer Thames Estuary SPA to **non-physical disturbance** is considered to be **high**.

5.1.4. Toxic contamination of red-throated diver and their supporting habitats

Synthetic compounds such as PCBs can bioaccumulate/ biomagnify through the food chain in the tissues of marine organisms and concentrations could be considerable once they reach the fish on which red-throated divers feed. Thus, **sensitivity to synthetic chemicals such as PCBs is considered moderate.**

Hotspots for synthetic compounds include industrial estuaries and sandy environments offshore, but **as PCBs are currently banned, exposure can be considered low.** If marine pollution were to occur there is the potential for exposure to PCBs to change.

Large oil and chemical spills affecting shallow sandbank habitats can have a detrimental effect on bird populations. Deterioration of invertebrate and small fish populations can have a significant impact on important food sources. Oil on the surface and in the water column would present a direct threat to diving and feeding seabirds particularly during their moulting times, when they are less mobile and

[35] Scroby Sands, Kentish Flats, Gunfleet Sands 1 & 2 plus London Array Phase 1 occupy a total area of 137.5 km^2 equivalent to 3.5% of SPA area

remain at sea. Oil on the feathers of birds could lead to loss of insulation, reduced buoyancy and possible drowning. Consequently red-throated divers may suffer the inability to feed, resulting in starvation and death. Dispersants used to disperse the oil may also be harmful to the species. **Sensitivity to non-synthetic compounds is therefore considered to be high.**

Prince's Channel (which runs through the southern area of the Outer Thames Estuary SPA) carries a significant amount of vessel traffic in and out of ports in the inner Thames Estuary. Fisherman's Gat is also an active commercial shipping channel. In addition, smaller vessels use the shallower inshore channels across the site. This additional small vessel activity means that the risk of contamination by accidental spillages of fuel or cargo is increased, and a small level of contamination will exist as a result of normal shipping activities. Large ports in the area also increase the risk of exposure.

Although the *risk* of a catastrophic event due to vessel traffic (oil tankers, ships with toxic contaminants, etc.) exists, the probability of such an event occurring as a result of "normal" vessel traffic is considered to be very low; in addition the 'background level' of toxic contamination to which the site is exposed in also considered to be low.

However, there are ship-to-ship oil transfers occurring just off Southwold within 12nm. Ship-to-ship (s-t-s) transfers consist of a transfer of a cargo of oil (heavy fuel oil or crude oil, etc.) from one vessel to another. Large tankers are unable to gain access to the Russian/Baltic states and hence smaller tankers bring oil from the region and transfer this oil to larger tankers. From here the large tankers ship the oil internationally. Approximately 15-20 of these s-t-s operations occur annually. Although the Maritime and Coastguard Agency manage the s-t-s operations very well, accidental oil spills can happen at any time and due to the proximity of the s-t-s operations to the SPA it may be considered that there is an elevated risk from an oil spill at this location.

Overall the **vulnerability of the Annex I species (red-throated diver)** within the Outer Thames Estuary SPA to **toxic contamination** is considered to be **low-moderate**.

5.1.5. Non-toxic contamination of red-throated divers and their supporting habitats

Non-toxic contamination through nutrient loading, organic loading and changes to the thermal regime could impact on prey species and distribution. **The sensitivity** of the prey species of red-throated diver, and therefore of the divers themselves**, to non-toxic contamination is considered moderate.**

The dilution effect for this form of contamination (which could also include increased turbidity and changes to the salinity) may reduce the **exposure, which is considered low.**

Overall the **vulnerability** of the prey species and **of the Annex I species (red-throated diver)** within the Outer Thames SPA to non-toxic contamination is considered to be **low**.

5.1.6. Biological disturbance

Introduction of microbial pathogens and non-native species

Sensitivity to the introduction of microbial pathogens and non-native species is considered to be low for red-throated divers, as is their exposure to them in the Outer Thames Estuary SPA. **Vulnerability is therefore low.**

Selective extraction of prey species

Within the site, a variety of fishing gears are used with variable intensity to harvest different quota and non-quota species (CEFAS 2006; des Clers 2010; MMO 2012). Fishing activities include: suction dredging for cockles, set and drift-net trammelling, drift gill netting, potting, and a limited amount of beam and otter trawling for demersal species (mainly in troughs). Limited long-lining and pair-trawling also occurs within the site. Removal of fish species and larger molluscs can have significant impacts on the structure and functioning of benthic communities over and above the physical effects of fishing methods on the seabed, particularly as some fish species fill upper roles in the trophic web (Jennings & Kaiser 1998; Kaiser *et al*. 2006). Moreover, certain types of fishing have the potential to directly remove divers' prey species, either as target species or as bycatch. Thus, the mechanisms for these pressures to impact on red-throated divers may be an indirect or direct reduction in food availability for the overwintering population. **Red-throated divers are judged to be moderately sensitive to biological disturbance through selective extraction of prey species,** as they are known to be 'opportunistic feeders' taking a broad range of fish species, and their diet compositions seem to depend on availability rather than on food specialisation (Guse *et al*., 2009).

The exposure to selective extraction of red-throated divers' prey species by fishing (i.e. the amount of their prey species taken by fishing vessels as target or bycatch) is not clearly understood but **in general is considered low** due to differences in the average size composition of the fish eaten by divers and caught in commercial quantities by fishers, making **vulnerability to selective extraction low.**

Non-selective extraction of red-throated divers

The primary potential causes of non-selective extraction of divers are entanglement in static fishing gear or wind turbine strike.

Entanglement in static nets, fishing lines and general marine litter (of a wide variety) is a major cause of known mortality of red-throated divers (Okill 2002; Schirmeister 2003; Camphuysen 2008). In a study by Okill (2002), the mortality of 35.7% of all recovered ringed red-throated divers could be related to a particular cause of death: 53% of these 'attributable' deaths were caused by accidental capture in fishing nets (fish farms, discarded netting and static nets set for a variety of fish including herring, salmon and skate). It was concluded that 18.9% of all deaths of ringed red-throated divers were attributable to entanglement. Although the sample sizes on which these percentages were based are small, these figures, coupled with the relatively frequent occurrence of red-throated divers amongst netting casualties in other studies (Manville 2005) suggests that their **sensitivity to entanglement can be considered high.**

The three principal fishing methods for the inshore fishery within the SPA are suction dredging, single and multi-rig otter trawling and static netting. Static/passive fishing gear methods (such as set gill nets and drift netting), which are used throughout the estuary therefore pose the most serious risk to the birds themselves.

Kent and Essex IFCA in partnership with Natural England have been carrying out observations on red-throated diver bycatch within the Outer Thames Estuary SPA. Results from the first winter of monitoring (2011/12) showed that drift netting in the area was not a significant source of mortality for red-throated divers; zero bycatch of the species was recorded. IFCA observations showed that fishing effort for drift netting was low over winter and that fixed netting was not common practice in the area. Further observations are to be carried out over the 2012/13 winter period to increase the evidence base on bycatch and fishing methods within the area.

Information from other sources (e.g. CEFAS 2006; des Clers 2010) indicates that most netting activity, which is widespread across sandbanks, occurs in the summer and autumn, beginning in June and extending into December. In contrast, the wintering red-throated divers are most prevalent from November to March, with peak numbers occurring in January and February[36]. In light of current evidence, **exposure, and subsequently vulnerability, of red-throated divers within the site to non-selective extraction by fishing gear is therefore considered low**

There are many studies which have documented that birds which collide with rotating wind turbine blades are highly likely to be severely injured or killed (reviewed in Drewitt & Langston 2008). Red-throated diver populations are sensitive to increased adult mortality as it is a long-lived species with relatively low annual adult mortality and low breeding productivity. Thus, **sensitivity to non selective extraction through wind turbine strike can be considered high.**

Impacts to red-throated diver may result from collision with wind turbines, if they fly at a height above 20m. It has been observed, however, that they generally fly below the height at which they would be at risk of colliding with rotating turbine blades (Garthe & Huppop, 2004; RPS GROUP PLC 2005; Environmentally Sustainable Systems Ltd, 2008). Cook *et al.* (2012) modelled red-throated diver altitudes from 19 study sites, concluding only 2% of birds in flight were at collision risk height, with high confidence in the result.

In addition, exposure to collision risks is likely to be lowered due to the displacement of red-throated divers from windfarm footprints due to non-physical disturbance (section 5.1.3). These studies, coupled with the current size of the windfarm footprint areas in comparison to the area of the SPA, indicate that the **exposure to non-selective extraction through wind turbine strike is currently low. Vulnerability is therefore moderate.** Any habituation of divers to offshore windfarms in the future or further expansion of such developments may alter this assessment.

Overall the **vulnerability of the Annex I species (red-throated diver)** within the Outer Thames Estuary SPA to **biological disturbance** is considered to be **low-moderate.**

[36] They can be high in December too but tend to be lower in October and November (see Webb et al 2009, JNCC report on the Outer Thames http://www.jncc.gov.uk/page-4923)

6. Risk Assessment

JNCC and Natural England consider 'risk' to be the likelihood of deterioration of the feature due to an activity. It is the vulnerability of the feature to an activity, assessed against the level of management of that activity.

High-risk activities are those to which the feature is highly or moderately vulnerable, and for which there is insufficient management. For example, industries or activities which are not location specific and not subject to prior consent procedures or reliable enforcement are more likely to cause damage/disturbance to the interest feature. These industries include fishing. However, clearly not all activities associated with these industries are detrimental to interest features.

Low-risk activities will be those where there is no feature vulnerability (i.e. the activity does not interact with the feature) or where the moderate or high vulnerability is mitigated by management measures. For example, industries that are location specific are always subject to prior consent (often including explicit environmental impact assessment) and have clear reliable methods of enforcement; there is generally a lower likelihood of causing damage or disturbance to interest features.

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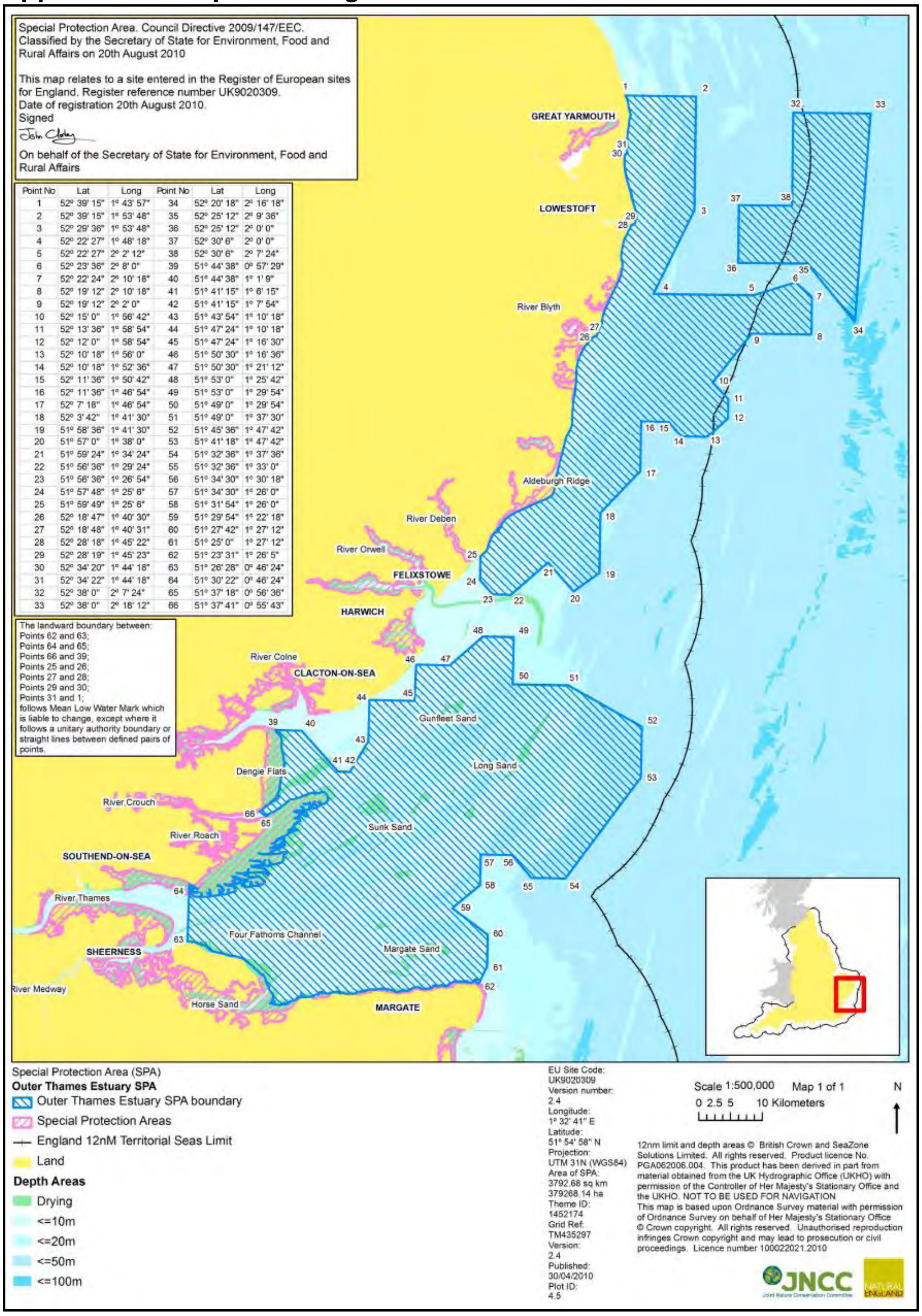
Appendix A
Favourable Condition Table (FCT) for Outer Thames Estuary SPA

Attributes	Measure	Targets	Comments
Red-throated diver population size (Mandatory attribute)	Estimated population size derived from standardised site condition monitoring programme	Maintain population on the site subject to natural fluctuations. There should be no permanent decline, only non-significant fluctuation around the mean to account for natural change: where the limits of natural fluctuations are not well known maintain the population above 50% of that at designation; loss of 50% or more is unacceptable	Survey data used as the basis for deriving the SPA population comprised many incomplete surveys covering different sections of the final SPA boundary in different winters between the months of October to March in 1988/89, and 2002-2007. Derivation of the SPA population size required these partial datasets to be combined. Accordingly, there is limited understanding of the magnitude of inter-annual natural variation in population size across the entire SPA. In the absence of good knowledge of natural fluctuation in population size, the threshold for favourable condition is set, in line with standard practice, as being a population that exceeds 50% of the designated wintering population size. This target will be used to inform future assessments of favourable condition. Improved understanding of the natural dynamics of this population over time will be used to refine the target population size.
Habitat extent (Mandatory attribute)	Area of supporting habitat	No significant decrease in the extent of supporting habitat available for red-throated diver.	Changes in extent will need to take account of the dynamic nature of the sandbank, but a trend of reduction in extent may indicate long-term changes in the physical conditions influencing the feature, whether it be natural processes or anthropogenically driven. Further studies of diver distribution within the site, building on Skov *et al.* (2011) will inform understanding of the habitat usage by the species and help refine the measure and target in future.

Appendix B : Maps showing interest features of the Outer Thames Estuary SPA



Appendix C: Methods deriving vulnerability.

Sensitivity	
None	-
Low	•
Moderate	••
High	•••

Exposure	
None	-
Low	+
Medium	++
High	+++

Vulnerability
None detectable
Low
Moderate
High

Additional Category for insufficient information = DD (Data Deficient)

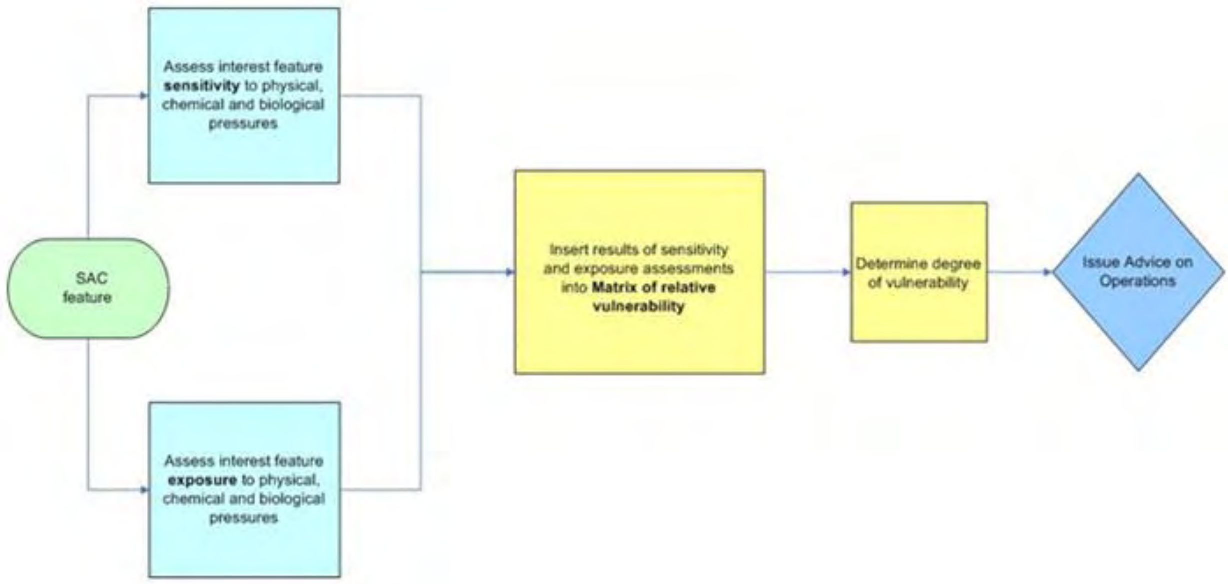
The relative vulnerability of an interest feature or sub-feature is determined by multiplying the scores for relative sensitivity and exposure, and classifying that total into categories of relative vulnerability.

Relative sensitivity of the interest feature

Relative exposure of the interest feature		High (3)	Moderate (2)	Low (1)	None detectable (0)
	High (3)	9	6	3	0
	Medium (2)	6	4	2	0
	Low (1)	3	2	1	0
	None (0)	0	0	0	0

Categories of relative vulnerability	
High	6-9
Moderate	3-5
Low	1-2
None detectable	0

An assessment of interest features' vulnerability helps to guide site management decisions by highlighting potentially detrimental activities that may need to be managed (or continue to be managed) by the relevant authorities.



Appendix D. Summary of operations/pressures that may cause deterioration or disturbance of red-throated diver s and their supporting habitat and prey species in the Outer Thames Estuary SPA at current levels of use

The advice below is not a list of prohibitions but rather a checklist for operations/pressures that may need to be subject to some form of management measure(s) or further measures where actions are already in force. Examples of activities under relevant authority jurisdiction are also provided. Operations marked with a ✓ indicate those to which red throated divers are considered to be **vulnerable** either directly or indirectly as a result of effects on their prey species and supporting habitat.

Operations (pressures) which may cause deterioration or disturbance with example activities	red-throated diver - Outer Thames Estuary SPA	Supporting habitats and prey species - Outer Thames Estuary SPA
Physical loss of supporting habitat		
Removal of habitat feature (e.g. offshore development, capital dredging, 'active dredging zones')		✓
Smothering (e.g. by artificial structures, disposal of dredge spoil)		✓
Physical damage to their habitats		
Siltation (e.g. run-off, channel dredging, outfalls)		✓
Abrasion (e.g. anchoring, cables)		✓
Selective extraction (e.g. aggregate dredging)		✓

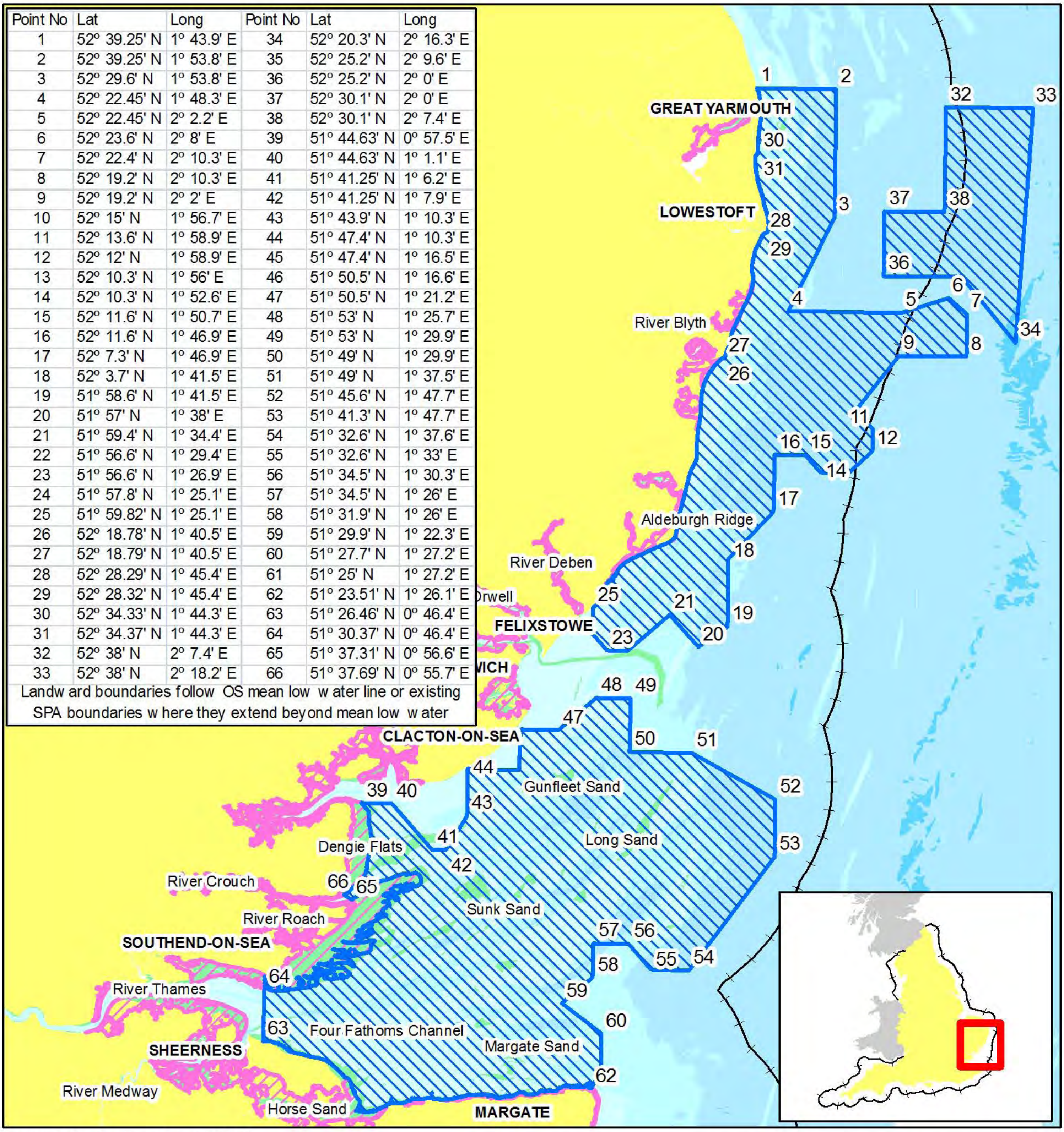
Operations (pressures) which may cause deterioration or disturbance with example activities	red-throated diver - Outer Thames Estuary SPA	Supporting habitats and prey species - Outer Thames Estuary SPA
Non-physical disturbance		
Noise (e.g. boat activity)	✓	✓
Visual (e.g. recreational activity)	✓	
Toxic contamination		
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	✓	✓
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	✓	✓
Introduction of radionuclides	✓	✓
Non-toxic contamination		
Changes in nutrient loading (e.g. agricultural run-off, outfalls)		✓
Changes in organic loading (e.g. mariculture, outfalls)		✓
Changes in thermal regime (e.g. power stations)		✓

Operations (pressures) which may cause deterioration or disturbance with example activities	**red-throated diver - Outer Thames Estuary SPA**	**Supporting habitats and prey species - Outer Thames Estuary SPA**
Changes in turbidity (e.g. run-off, dredging)		✓
Changes in salinity (e.g. water abstraction, outfalls)		✓
Biological disturbance		
Introduction of microbial pathogens		
Introduction of non-native species and translocation		✓
Non-selective extraction / removal of bird species (e.g. accidental turbine strike)	✓	
Non-selective extraction / removal of bird species (e.g. entanglement or bycatch)	✓	
Selective extraction and removal of prey species (e.g. commercial and recreational fishing)		✓

Appendix E Assessment of the relative vulnerability of interest features / Annex I Species and its supporting habitat for the Outer Thames Estuary SPA to different categories of operation (for key see appendix C). This aims to provide a 'high level' view of the operations which occur in the Outer Thames SPA and the likely vulnerability of the site's features to these activities. A more detailed assessment of each activity that is likely to occur in the site is provided in the Outer Thames SPA risk review.

Operations which may cause deterioration or disturbance	**internationally important populations of the Annex I species and their supporting habitat and prey species**		
	red-throated diver (Gavia stellata)		
	Sensitivity	Exposure	Vulnerability
Physical loss of supporting habitat			
Removal (e.g. harvesting,offshore development)	●●●	+	Moderate
Smothering (e.g. by artificial structures, disposal of dredge spoil)	●●	++	Moderate
Physical damage to habitat			
Siltation (e.g. run-off, channel dredging, outfalls)	●●	+	Low
Abrasion (e.g. boating, anchoring,)	●●	+	Low
Selective extraction (e.g. aggregate dredging)	●●	+	Low
Non-physical disturbance			
Noise (e.g. boat activity)	●●●	++	High
Visual (e.g. recreational activity)	●●●	++	High
Toxic contamination			
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	●●	+	Low
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	●●●	+	Moderate
Introduction of radionuclides	**DD**	**DD**	**DD**

Operations which may cause deterioration or disturbance	internationally important populations of the Annex I species and their supporting habitat and prey species		
Non-toxic contamination			
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	••	+	Low
Changes in organic loading (e.g. mariculture, outfalls)	••	+	Low
Changes in thermal regime (e.g. power stations)	••	+	Low
Changes in turbidity (e.g. run-off, dredging)	••	+	Low
Changes in salinity (e.g. water abstraction, outfalls)	••	+	Low
Biological disturbance			
Introduction of non-native species and translocations	•	+	Low
Selective extraction of prey species (e.g. commercial & recreational fishing)	••	+	Low
Non-selective extraction (through entanglement with static gear)	•••	+	Moderate
Non-selective extraction (through wind-turbine strike)	•••	+	Moderate
Introduction of microbial pathogens	•	+	Low



Point No	Lat	Long	Point No	Lat	Long
1	52° 39.25' N	1° 43.9' E	34	52° 20.3' N	2° 16.3' E
2	52° 39.25' N	1° 53.8' E	35	52° 25.2' N	2° 9.6' E
3	52° 29.6' N	1° 53.8' E	36	52° 25.2' N	2° 0' E
4	52° 22.45' N	1° 48.3' E	37	52° 30.1' N	2° 0' E
5	52° 22.45' N	2° 2.2' E	38	52° 30.1' N	2° 7.4' E
6	52° 23.6' N	2° 8' E	39	51° 44.63' N	0° 57.5' E
7	52° 22.4' N	2° 10.3' E	40	51° 44.63' N	1° 1.1' E
8	52° 19.2' N	2° 10.3' E	41	51° 41.25' N	1° 6.2' E
9	52° 19.2' N	2° 2' E	42	51° 41.25' N	1° 7.9' E
10	52° 15' N	1° 56.7' E	43	51° 43.9' N	1° 10.3' E
11	52° 13.6' N	1° 58.9' E	44	51° 47.4' N	1° 10.3' E
12	52° 12' N	1° 58.9' E	45	51° 47.4' N	1° 16.5' E
13	52° 10.3' N	1° 56' E	46	51° 50.5' N	1° 16.6' E
14	52° 10.3' N	1° 52.6' E	47	51° 50.5' N	1° 21.2' E
15	52° 11.6' N	1° 50.7' E	48	51° 53' N	1° 25.7' E
16	52° 11.6' N	1° 46.9' E	49	51° 53' N	1° 29.9' E
17	52° 7.3' N	1° 46.9' E	50	51° 49' N	1° 29.9' E
18	52° 3.7' N	1° 41.5' E	51	51° 49' N	1° 37.5' E
19	51° 58.6' N	1° 41.5' E	52	51° 45.6' N	1° 47.7' E
20	51° 57' N	1° 38' E	53	51° 41.3' N	1° 47.7' E
21	51° 59.4' N	1° 34.4' E	54	51° 32.6' N	1° 37.6' E
22	51° 56.6' N	1° 29.4' E	55	51° 32.6' N	1° 33' E
23	51° 56.6' N	1° 26.9' E	56	51° 34.5' N	1° 30.3' E
24	51° 57.8' N	1° 25.1' E	57	51° 34.5' N	1° 26' E
25	51° 59.82' N	1° 25.1' E	58	51° 31.9' N	1° 26' E
26	52° 18.78' N	1° 40.5' E	59	51° 29.9' N	1° 22.3' E
27	52° 18.79' N	1° 40.5' E	60	51° 27.7' N	1° 27.2' E
28	52° 28.29' N	1° 45.4' E	61	51° 25' N	1° 27.2' E
29	52° 28.32' N	1° 45.4' E	62	51° 23.51' N	1° 26.1' E
30	52° 34.33' N	1° 44.3' E	63	51° 26.46' N	0° 46.4' E
31	52° 34.37' N	1° 44.3' E	64	51° 30.37' N	0° 46.4' E
32	52° 38' N	2° 7.4' E	65	51° 37.31' N	0° 56.6' E
33	52° 38' N	2° 18.2' E	66	51° 37.69' N	0° 55.7' E

Landward boundaries follow OS mean low water line or existing SPA boundaries where they extend beyond mean low water

Special Protection Area (SPA)

Outer Thames Estuary SPA

Outer Thames Estuary SPA boundary

Special Protection Areas

England 12nM Territorial Seas Limit

Land

Depth Areas

Drying

<=10m

<=20m

<=50m

<=100m

EU Site Code: UK9020309
Version number: 2.4
Longitude: 1° 32' 41" E
Latitude: 51° 54' 58" N
Projection: UTM 31N (WGS84)
Area of SPA: 3795.03 sq km 379502.61 ha
Theme ID: 1452174
Grid Ref: TM435297
Version: 2.4
Published: 30/04/2010
Plot ID: 4.5

Scale 1:750,000 Map 1 of 1

0 5 10 20 Kilometers

N

NATURAL ENGLAND

DEPARTMENTAL BRIEF:

OUTER THAMES ESTUARY

Special Protection Area

Natural England
Northminster House
Peterborough
PE1 1UA

Joint Nature Conservation Committee
Monkstone House
City Road,
Peterborough
Cambs PE1 1JT

MAY 2010

CONTENTS

LIST OF TABLES

APPENDICES

SUMMARY

The Outer Thames Estuary SPA qualifies for the following reason:

- The site regularly supports more than 1% of the GB population of one species listed in Annex 1 of the EC Birds Directive - see table 1.

Table 1. Summary of qualifying ornithological interest in Outer Thames Estuary SPA

Species	Count period	% of population	Interest type
Red-throated diver *Gavia stellata*	6,466 individuals – wintering 1989 – 2006/07	38% GB	Annex 1

1. SITE STATUS AND BOUNDARY

The criteria for the selection of sites as SPAs within the UK are set out within the SPA selection guidelines published by the Joint Nature Conservation Committee (JNCC 1999). JNCC selected about 50 Areas of Search around the whole UK – areas that were known or suspected to be internationally important for various species of water bird – and conducted surveys in all of them in order to identify the most suitable territories for these species.

The Outer Thames Estuary has been identified by Natural England as potentially qualifying as a Special Protection Area, based on data collected from aerial surveys during the period from January 1989 to winters of 2005/06 and 2006/07 and analysed by the Joint Nature Conservation Committee (JNCC) Seabirds and Cetaceans Team. These data demonstrate that the SPA regularly supports wintering red-throated divers *Gavia stellata* in numbers of European importance (>1% of the GB population of this species).

JNCC has determined a protocol whereby data describing the distribution of red throated divers can be analysed and a boundary drawn that represents the optimal solution between protecting a significant proportion of the population in a wider area (given their distribution) and avoiding the inclusion of areas which are apparently of lesser importance to the species (see section 3.3). As a result of the relatively high abundance of red throated diver in the Outer Thames, and their distribution across the wider area, the boundary setting protocol has resulted in the density threshold used in the Outer Thames (0.62 birds km^{-2}) being high compared to other sites selected for this species in the UK (i.e. Liverpool Bay: 0.21 birds km^{-2}) and elsewhere in Europe. However, while this process may result in markedly different numbers and indeed different average densities of birds within different SPAs, the boundaries have been defined consistently across sites using the same method.

The total area of the Outer Thames Estuary SPA is 379,268.14 ha.

1.1 Boundary of the SPA

The boundary of the SPA (see map at Appendix 1) has been proposed using the analyses of aerial survey data carried out by the Joint Nature Conservation Committee (JNCC) Seabirds and Cetaceans Team.

The SPA is divided into three areas: the main part of the site is the outer part of the estuary (east of a line north from Sheerness, Kent to Shoebury Ness, Essex); a separate area extending south along the coast of E Norfolk (from Caister-on-Sea) to Woodbridge, Suffolk and lying mainly within the 12 nautical mile zone, except for two small areas which extend slightly into the 12 nm zone offshore from about Lowestoft; and a third area lying slightly further north and partly within 12 nm, but also with a larger area extending well beyond the 12 nm zone).

Within the two areas that are adjacent to the coast, on the basis of the aerial survey data, along most of its length the landward boundary of the SPA will follow the Mean Low Water mark or the seaward boundaries of existing SPAs, whichever is the furthest seaward. Exceptions to this occur in near shore areas where aerial survey data were lacking or analysis of the aerial survey data indicated that diver density was low, and there was supporting evidence of low diver abundance in the land-based counts of red throated diver collected under the Wetland Bird Survey (WeBS) scheme. These exceptions occurred along the coast between Sales Point, at the north end of Dengie Flats, and circa Walton on the Naze (turning points 39 and 46 – see Appendix 1) and across the mouth of the River Crouch between Foulness Point and Holliwell Point (turning points 65 and 66 – see Appendix 1).

Consequently, the landward boundary of the Outer Thames Estuary SPA will directly abut the seaward boundaries of (from north to south), North Denes SPA, Benacre to Easton Bavents SPA, Minsmere – Walberswick SPA, Alde-Ore Estuary SPA, Orfordness – Havergate SPA, Dengie SPA, Foulness SPA, Southend and Benfleet Marshes SPA, Thames Estuary and Marshes SPA, Medway Estuary and Marshes SPA and The Swale SPA (see http://www.jncc.gov.uk/page-2599). Intertidal mud banks and sandbanks separated from the mainland coast by subtidal areas at mean low water are within the SPA boundary, except where they are within the boundaries of existing SPAs or SPAs.

2. LOCATION AND HABITATS

The Thames Estuary is located in the southern part of the North Sea on the east coast of England, between the counties of Essex (on the north side) and Kent (on the south) and extends as a broad opening into the North Sea. The SPA boundary extends from a central point mid-river just east of Southend on the Essex side and on the Kent side from a point just east of Sheerness to approximately just east of Herne Bay. To the north of this area two separate parts of the site extend southwards along the coasts of east Norfolk and Suffolk and offshore from the Lowestoft area. The seaward boundary of the SPA lies partly within the 20m depth contour and marginally (along the outer eastern edge) within the 20-50 m depth contour.

The Outer Thames Estuary SPA consists of areas of shallow and deeper water, high tidal current streams and a range of mobile sediments. Large areas of mud, silt and gravelly sediments form the deeper water channels, the main ones of which form the approach route to the ports of London and as such are continually disturbed by shipping and maintenance dredging. Sand in the form of sandbanks separated by troughs predominates in the remaining areas and the crests of some of the banks are exposed at mean low water. In the northern part of the site the main sandbanks are (north to south) Middle Cross Sand, Scroby Sands, Helm Sand, Newcombe Sand, Aldeburgh Napes, Aldeburgh Ridge, North Ship Head and Bawdsey Bank; in the southern part of the site the main sandbanks are Red Sand, Kentish Flats, West and East Barrow, Sunk Sand, Shingles, Long Sand, Margate Sand and Kentish Knock.

The seabed in the area of the Norfolk and Suffolk coast is of a similar composition to that in the main estuary with large shallow areas of mud, sand, silt and gravely sediments but, in the absence of main port areas within this area, there is consequently less disturbance through shipping or dredging.

<u>Tidal currents</u>
The Thames Estuary is subject to two distinct tidal influences. North Sea tides enter the estuary from the northeast and are responsible for the formation of sandbanks running in a northeast – southwest direction in the northern part of the estuary. The second tidal influence is from the English Channel, these tides enter the southern part of the estuary around the north Kent coast and influence the formation of banks lying in an east – west orientation in the southern part of the estuary.

The tidal current off Norfolk and Suffolk flows parallel to the coast and there is a net southerly movement of sediment.

Water temperature.
During winter periods the waters of the southern North Sea are some of the coldest areas of the UK. However, sea-surface temperatures increase southwards from 5 to 7˚C in February. This is the result of a current of relatively warmer water extending up from the English Channel and prevents water temperatures from dropping below 5˚C. In August, temperatures range from 14 to 16.5˚C, reflecting the site's proximity to the warm European landmass. At this time of year the water within the estuary is well mixed and shows no stratification whereas further out into the North Sea temperatures are 2-3˚C lower than the surface temperatures in the estuary.

Fish species
The estuary supports populations of fish of commercial importance, the most important are: thornback ray *Raja clavata*, sea bass *Dicentrarchus labrax*, Dover sole *Solea solea*, plaice *Pleuronectes platessa,* Atlantic cod *Gadus morhua*, herring *Clupea harengus*, whiting *Merlangius merlangus*, horse mackerel *Trachurus trachurus* and sprat *Sprattus sprattus*. The sandbanks of the Thames estuary provide important nursery and feeding grounds for many fish species including, herring, whiting, plaice and sprat and, on the outer banks, Atlantic cod and sand eels *Ammodytes* sp. The Thames estuary is an important spawning and/or nursery ground for herring, plaice, sole, sea bass and sprat. Herring and sprat are amongst the most frequently recorded prey species of red-throated divers, these together with gobies (Gobiidae), sand eels and various flatfish form the bulk of the diet of the wintering diver population.

2.1 Commercial activities in the Thames Estuary.

Commercial fishing
The Thames Estuary supports important commercial fisheries, as well as estuarine and marine recreational angling. Approximately 180 commercial fishing boats operate within the area of the estuary, fishing for species such as sole, cod, bass, ray, sprats, plaice, herring and eels. The most important commercially fished species in the Thames is the Dover Sole *Solea solea*, although the Greater Thames, including Medway and Blackwater estuaries, supports a herring *Clupea harengus* fishery that is recognised as distinct to this region. Sole and herring have spawning grounds within the estuary, and rays, particularly thornback rays or roker *Raja clavata* migrate from deeper waters into the Thames Estuary to spawn in the summer. There is also a well-established cockle industry, believed to be the largest in the UK. Other shellfish species harvested in the estuary include mussels and native and Pacific oysters and parts of the estuary are designated Shellfish Waters.

Shipping and ports
The Port of London is one of the UK's largest ports, serving 30% of the UK population. Over 80 terminals situated along the Thames are geared to handle every type of cargo for import and export, including container cargo and bulk cargo. The Port of London Authority (PLA) is the body with responsibility for ensuring safe navigation in the tidal Thames. It plays a regional, national and international economic role by providing a gateway for trade with Continental Europe and the rest of the world. Part of the PLA's operations is to ensure that shipping channels and berths are maintained or, in some limited cases, created. This either requires occasional maintenance dredging of existing channels that have suffered from

siltation or capital dredging where a new channel or berth is required. These activities extend out into the deep water approach channels in the outer estuary. The main approach channels from the north east are via Barrow Deep or Black Deep and the Knock John Channel. From the east, vessels can cross Long Sand through Fisherman's Gat, entering the Black Deep, or can pass to the south of Long Sand through Princes Channel. The proposed approach channel to the consented London Gateway Port (Dubai Ports World) will pass through the site.

The port of Felixstowe is the UK's largest container port and is capable handling the world's largest container ships. It is currently undergoing considerable expansion, with construction under way at Felixstowe South and consent granted for new capacity on the opposite bank at Bathside Bay. These developments will serve to reinforce the Port of Felixstowe's dominance as a hub port that serves the UK and northern European trans-shipment trades and competes with continental ports such as Antwerp, Rotterdam and Zeebrugge. It is served by an approach channel that is capable of accommodating vessels with a draught of 14 metres although as vessels increase in size it is possible that the channel will have to be deepened further. The approach channels are maintained by Harwich Haven Authority which recycles some of the dredged sediment to maintain the mudflats and saltmarshes of the Stour and Orwell Estuaries SPA and Ramsar Site. Some dredged spoil is, however, deposited offshore at its Inner Gabbard disposal site. Access to the Port of Ipswich is also facilitated through this dredged channel. The Port of Lowestoft a little further up the coast serves as a major centre for servicing the offshore oil and gas industry, and the construction and shipment of wind-energy turbines. New port capacity at Great Yarmouth is currently under construction and is expected to accommodate container traffic in various forms.

Along the north Kent coast the boundary of the proposed SPA also includes parts of the navigation channels to the Medway ports which are not part of the Port of London, these include the ports of Sheerness and Thamesport container terminal.

Aggregate extraction

Aggregate extraction from the sea bed occurs from a number of licensed areas within the greater Thames region and offshore from Great Yarmouth (Anglian Offshore Region). The Thames licence areas are situated to the north east of the greater Thames site boundary and towards the southern part of the Suffolk site boundary. The Anglian Offshore Region aggregate licence areas are located east of the northern part of the Suffolk site boundary, extending eastwards into the offshore component of the site. The marine minerals licenses within and adjacent to the whole site are held by five extraction companies.

Windfarms

The Outer Thames Estuary contains a number of offshore windfarm sites. Kentish Flats has been operational since July 2005 and there are a number of proposed sites under development. These are: Gunfleet Sands I and II (currently under construction 2008/09), London Array (construction expected to commence 2011), Thanet (construction expected to commence spring 2009) and Greater Gabbard (construction expected to start summer 2009). All of these sites will also have submarine cables laid down and connected to the National Grid. In addition to this, there is a possibility that some subsea tele-communications cables may cross the site. Off the Norfolk Coast Scroby Sands Wind Array, comprising 30 turbines, has been operational since 2004. The southern end of the wind farm is within the SPA area.

Coastal industry
There are no industries along the coastline bordering the area of search with significant discharges directly into the sea. However, direct discharge into the sea comes from treated sewage outfalls. Along the Kent coastline, these are operated by Southern Water and along the Essex, Suffolk and Norfolk coastline they are operated by Anglian Water.

Discharge in the form of a thermal plume arises from Sizewell B nuclear power station. Bradwell nuclear power station in Essex was decommissioned in 2002.

Recreational use
The coastal areas of the Thames Estuary and the Suffolk and Norfolk coasts are predominantly flat and low lying, with numerous small villages and towns which have built up around the coastal economies of fishing, boat building, yachting and tourism. The area attracts large numbers of visitors and tourists each year, who along with some of the local population, engage in a number of marine activities including sailing, boat trips, bird watching, sea angling, water sports and scuba diving. The majority of these activities are restricted to the inshore waters of the estuaries and coast, although there are a large number of yacht clubs within the site which use waters further offshore.

3. ASSESSMENT OF ORNITHOLOGICAL INTEREST

3.1 Survey Information

This section includes details of the surveys undertaken and results of qualifying species numbers and distribution.

Aerial survey data collected using standard methods by the Nature Conservancy Council, Joint Nature Conservation Committee, Wildfowl and Wetlands Trust and the Natural Environmental Research Institute in the Greater Thames were analysed in order to assess whether the site might qualify as a Special Protection Area under the EU Birds Directive (1979) for its aggregations of inshore waterbirds. Existing guidelines for selecting sites for inshore waterbird aggregations were used to make this assessment (Webb & Reid 2004).

3.2 Red-throated Diver - *Gavia stellata*

Although not regarded as threatened within the EU, the conservation status of this species is regarded as unfavourable because of declines in the European breeding population between 1970-1990. The population is now considered stable though depleted.

The Great Britain population of wintering red-throated diver was previously estimated to be around 4,850 birds (Danielsen *et al.* 1993). A more recent estimate has been derived from shore-based observations together with more specific aerial and boat surveys (O'Brien *et al.* 2008). These surveys from boats and planes have been responsible for identifying much larger numbers wintering in British coastal waters than previously known. The Great Britain wintering population is now estimated to be around 17,000 individuals although the true number of red-throated divers wintering around the UK is likely to be higher (O'Brien *et al.* 2008).

The GB wintering population is aggregated in substantial numbers in several areas, from the Moray Firth in the north to NE Norfolk to Kent in the south and almost 50% of this population occurs in the wider Outer Thames Estuary. It is considered that the wintering population is largely made up of birds which breed in the UK, Greenland, Iceland and Scandinavia. There is little indication that breeding birds from northwest Russia winter in British waters.

Lack (1986) found the distribution to be fairly even along the east coast, with perhaps slightly fewer in the south compared to the north. The species is less abundant around western coasts and has a patchy distribution, though it is still common, especially off western Scotland (Moser *et al.*, 1986; Stone *et al*., 1995).

Concentrations have been recorded in Cardigan Bay, the Moray Firth, the Clyde and Forth Estuaries, the Aberdeenshire coast, the Suffolk/Essex coast, as well as close to Tiree (Moser *et al.*, 1986; Barrett & Barrett 1985; Pollitt *et al.* 2000; Thorpe, 2002). Aerial and boat transect surveys in 2002/3 identified a significant concentration in the Outer Thames Estuary (Percival *et al.*, 2004). Shore-based observations from the North Norfolk Coast have identified winter (December-January) peaks during 1992-1995 of up to 820 individuals (Taylor *et al.*, 1999) and this is may be indicative of a further significant concentration.

In the UK, wintering red-throated divers are associated with shallow (between 0-20m deep (less frequently in depths of around 30m)) inshore waters, often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al*., 1995; Stone *et al.*, 1995). There is some evidence of association with areas of salinity change (e.g. where low salinity river water meets higher salinity level sea water). Such areas tend to fluctuate with state of tide, volume of river flow and wind conditions. Their diet is principally small fish of a variety of species (particularly of the cod family, herring and sprats) and there is evidence to suggest that in some areas, the higher numbers of birds are associated with shoals of sprats.

Red-throated divers moult their flight feathers during September and October when they may become flightless for a short period and are vulnerable to oil pollution at this time. They are an extremely shy species and the initial results of monitoring from some operational offshore wind farms has shown displacement of 80-100% of divers from the development footprint and surrounding buffer area. This displacement is thought to be due to disturbance caused by the turbines and boat-based maintenance activities. Inappropriately sited developments could displace significant numbers of the GB wintering population. In a review of the sensitivity of 26 species of ‘seabird’ to the development of offshore windfarms, Garthe & Huppop (2004) found that the red-throated divers had the second highest species sensitivity index score. Other forms of renewable energy, such as tidal barrages, could impact on the species wintering numbers and distribution. Red-throated Divers are especially sensitive to disturbance at sea (Garthe & Huppop 2004) and usually avoid boats. Entanglement in static fishing gear is one of the main causes of death in NW European and GB waters (Okill 2002, Erdmann *et al.* 2005). Impacts on the prey species of sediment dredging and dumping activities could be detrimental although this requires more research to determine the scale of impact.

Consents for developments which are likely to have a significant effect on the SPA such as those resulting in increased pollution, removal and disturbance of substrate and turbidity leading to difficulty in locating and catching prey would be subject to appropriate assessment and the tests of the Conservation of Habitats and Species Regulations 2010. The same provisions would also assist in the regulation of the use of types of fishing gear likely to cause significant mortality.

Although the wintering population is clearly aggregated in a discrete number of areas around the UK coast, these aggregations are, in comparison with other species, loose and spatially extensive. It has been argued that SPAs are not an appropriate mechanism for protecting wintering populations of this species. However, in view of the aggregated nature of the discrete populations and their vulnerability to disturbance together with the scale of development proposals affecting the main wintering areas, it can be concluded that SPA classification to protect these wintering populations is an appropriate and necessary special conservation measure.

During the surveys of the Greater Thames Estuary area, five species and three unidentified species of inshore waterbird comprised the overwhelming majority of species recorded. Other species or unidentified species groups were represented only by fewer than five individuals and are not considered here. Very large numbers of red-throated and unidentified divers were estimated to occur in the region, and peak seasonal counts ranged between 937 in January 1989 and 11,089 in January 2003, with a mean of peak estimated counts of 8,130 individuals or 48% of the GB wintering population. Red-throated divers occurred throughout the entire area of the Outer Thames Estuary, but at greatest density and with greatest frequency off the coast of Suffolk and over sandbanks in the centre of the estuary and those extending toward the coast of south Essex and part of north Kent.

A large number of divers (7201) were recorded as 'unidentified diver' rather than to species level. Apart from eight great northern divers and eight black-throated divers, all positively identified divers were red-throated divers. In the absence of any clear reason as to why there might be a different bias between species composition within the identified and unidentified components of the dataset, it was judged that the sample of positively identified divers reflects the balance within the unidentified portion. Consequently, analyses were performed on combined red-throated and unidentified diver records and assumed to pertain to red-throated divers; the small amount of error (0.7%) relating to other diver species among the unidentified divers was deemed acceptable. Other waterbird species were found within the estuary occasionally in large numbers, but numbers did not exceed qualifying levels for Stage 1 of the UK SPA selection guidelines

Wintering red-throated divers occur throughout the Outer Thames SPA. Red-throated divers use the SPA in wintering numbers of national importance (6,466 individuals, 38% of the GB population, 1989 – 2006/07).

3.3 Methodology for boundary setting

Identifying most suitable territories for birds at sea presents particular challenges, in particular the absence of distinct physical features or habitat boundaries which can be used to delineate possible areas. Identification of potential SPAs at sea therefore relies on defining areas on the basis of where the birds themselves are distributed. The basic principle is that the areas where the birds occur at the highest average densities or the greatest frequency are the 'most suitable territories'. Where the distribution of a given species in a given area varies continuously from the maximum density to zero, without obvious breaks or a cut-off point, defining areas of sufficiently high density to be included in a potential SPA requires a density threshold to be defined.

The boundary for red-throated diver within the Outer Thames SPA is based on identifying a density threshold using data from 37 days of survey over the Greater Thames from between January 1989 and March 2005 and analysed by Webb *et al*. (2005). Additional aerial surveys were carried out during the winters of 2005/06 and 2006/07, covering previously surveyed areas and new areas, beyond the possible SPA seaward boundary.

Raw density data for red-throated diver was combined from all aerial surveys, and a smoothed grid of red-throated diver density was generated using a mathematical technique known as Kernel Density Estimation. This method results in a grid of relative density (rather than absolute density), the grid values in each cell were adjusted by the same amount so that their sum equalled the known population size for each survey area and an estimated or predicted number of birds in each cell is generated. This grid of predicted bird numbers was used as the basis to examine the relationship between the number of grid cells (area) that might be included within the SPA boundary and the number of birds that would be protected within that area.

Starting with the cell with the highest estimated number of birds, cells were considered in a sequence of descending order according to the number of birds that they were predicted to contain until all the cells had been selected. A graph was drawn showing the relationship between the cumulative number of birds and the number of cells considered as more and more cells were added to the total. Having derived the cumulative curve, the next stage is to find the point on the graph which represents the optimum balance between number of cells (i.e. area selected) and number of birds.

Although the curve is smooth, it is not an even curve. A 'Maximum Curvature' method (MC) was applied, using a mathematical description of the relationship between number of birds and area to find the point where the relationship between number of birds and area changes at the greatest rate as the cells are progressively added, that is to find the point where the graph curves at the greatest rate. The point of maximum curvature was taken as the optimum density in the relationship between number of birds and the size of the area selected. The point of maximum curvature is found by fitting a mathematical model to the curve of predicted number of birds and area of the grid cells used. The best fit was always obtained from a double exponential model. The curvature at each point was calculated using the second differentials of the increase in number and the increase in area. The density at the point of maximum curvature could then be read from the resulting table of outputs. Only the cells selected up to this point were included within the proposed site. A boundary was then drawn to enclose those cells. In order to produce a boundary without too many "turning points", which would be difficult to map and to use, some subjective judgement was required to simplify the boundary and reduce the number of turning points, striking a balance between ensuring that all selected cells are included while minimising the inclusion of additional areas.

The boundary has been drawn in order to optimise the number of birds within the site in relation to the size of the sea area. To encompass all of the sea areas that have been shown by the aerial surveys to support any birds would have resulted in an even larger site. As it stands, the boundary represents an attempt to maximise the population afforded protection while excluding additional areas where bird density is lower and the conservation gain from affording protection is less clear.

The Maximum Curvature method is scale-independent and makes no assumptions about the relative value of number of birds and size of area; it only describes the curvature. However, the method is affected by the total number of grid squares in the area of search, so the grid squares used in the analysis were also constrained by excluding squares with zero bird density and those outwith the maximum limit of sightings in the raw data. A full account of the methodology by which the boundary was defined is set out in JNCC Marine SPA Team (2009).

3.4 Interests which do not currently meet the SPA selection criteria

Breeding little *Sterna albifrons*, sandwich *S. sandvicensis* and common terns *S. hirundo* are classified or potentially qualifying features of the Alde-Ore Estuary SPA, Benacre to Easton Bavents SPA, Blackwater Estuary SPA, Breydon Water SPA, Colne Estuary SPA, Foulness SPA, Great Yarmouth North Denes SPA, Hamford Water SPA, Medway Estuary and Marshes SPA and Minsmere-Walberswick SPA, all of which are near or adjacent to the Outer Thames SPA. From what is known about the general feeding ecology of these species it is likely that some of these birds feed within the site as currently proposed. Furthermore, there is some evidence including land-based observation of terns feeding, and evidence (for little tern) from survey work undertaken for the Scroby Sands offshore wind farm (Econ 2008).
There is also some evidence that non-breeding Little gull also exceeds the qualifying threshold in the Outer Thames area. However, further data are needed before it can be determined whether qualifying numbers of these species use the SPA either during the breeding season or while on passage, whether there is sufficient regularity of site usage, and the locations of 'hotspots' within (or beyond) the current SPA boundary.

It is common practice in the UK to identify the main component species that characterise a waterfowl assemblage (as well as those species that are of European importance in their own right and selected under stages 1(1) or 1(2) of the SPA selection guidelines (JNCC, 1999)). Such species are identified under stage 1(3) of the SPA selection guidelines (JNCC, 1999) because they are regularly occurring migratory species present in numbers exceeding 1% of the GB population or 2,000 individuals (Stroud *et al*, 2001). Aside from red-throated diver *Gavia stellata*, at this time no such species have been identified as particularly important components of the assemblage of waterfowl that uses the Outer Thames SPA in the non-breeding season.

A programme of further data collation, collection and assessment regarding the populations of these other species within the Outer Thames SPA is both necessary and anticipated. This will improve the evidence base upon which future decisions regarding amendments to the qualifying features of the SPA can be made.

4. ASSESSMENT AGAINST SPA SELECTION GUIDELINES

4.1 Stage 1.

Under stage 1 of the SPA selection guidelines (JNCC, 1999), sites eligible for selection as a potential SPA must demonstrate one or more of the following:

1) an area used regularly by 1% or more of the Great Britain population of a

species listed in Annex I of the Birds Directive (79/409/EEC as amended) in any season;

2) an area used regularly by 1% or more of the biogeographical population of a regularly occurring migratory species (other than those listed in Annex I) in any season;

3) an area used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season is eligible for selection as a potential SPA.

The Conference of the Contracting Parties to the Ramsar Convention has defined the term 'regularly' as used in the Ramsar site selection criteria, and this definition also applies to the SPA selection guidelines (JNCC, 1999). A wetland regularly supports a population of a given size if:

i) the requisite number of birds is known to have occurred in two-thirds of the seasons for which adequate data are available, the total number of seasons being not less than three; or

ii) the mean of the maxima of those seasons in which the site is internationally important, taken over at least five years, amounts to the required level (means based on three or four years may be based on provisional assessments only).

The Outer Thames Estuary SPA qualifies under stage 1(1) because it regularly supports greater than 1% of the GB population of one species (red-throated diver) listed in Annex I. The JNCC Marine SPA Team (2009) estimated from aerial survey data from surveys between January 1989 and winter 2006/07 that the Outer Thames Estuary SPA supported an average peak of 6,466 individual red-throated divers in winter.

4.2 Stage 2.

Under Stage 2 of the SPA selection guidelines, the Outer Thames Estuary SPA is assessed as follows:

Table 2. Assessment of the bird interest against stage 2 of the SPA selection guidelines

Feature	Qualification	Assessment
1. Population size and density	✓	The Outer Thames Estuary SPA is the most important wintering site in the UK for red-throated divers.
2. Species range	✓	The site is main wintering area in Great Britain for red-throated diver which occurs off all coasts of Great Britain but there are no significant concentrations closer to this site than Liverpool Bay or western Scotland.
3. Breeding success	-	Not applicable as this site is selected only for its importance for birds in the non-breeding season.

4. History of occupancy	✓	Aerial surveys undertaken in recent years have shown that significant numbers of red-throated divers have been present in the estuary over a period of at least 15 years; also earlier records exist from shore-based observers of small numbers: most birds are in areas beyond the range of areas normally counted through wetland bird surveys (WeBS).
5. Multi-species area	-	The site supports one qualifying species listed on Annex 1 of the EC Birds Directive.
6. Naturalness	✓	As most of this site is beyond mean low water mark, the habitat within the SPA is likely to be in a relatively natural state except for the localised impacts on areas where maintenance dredging, oil and gas exploration, wind farm construction and commercial fishing take place.
7. Severe weather refuge	-	No data are available to determine whether the site functions as a severe weather refuge.

5. COMPARISON WITH OTHER SITES IN THE UK

A comparison of the Outer Thames Estuary SPA is made below against other SPAs in the UK selected for wintering red-throated divers.

Table 3. Comparison with other UK SPAs that support wintering red-throated divers

Site	**Mean peaks - Number and Period**	**% of population**
Outer Thames Estuary SPA	***6466 (1989 – 2006/07)***	***38%***
Liverpool Bay SPA	922 (2001/2 - 2006/07)	5.4%

Footnote. An area of search within the Firth of Forth has also identified a figure of 88 red throated divers (count data from 1991/92 – 1995/96) i.e. 1.8% of the GB wintering population.

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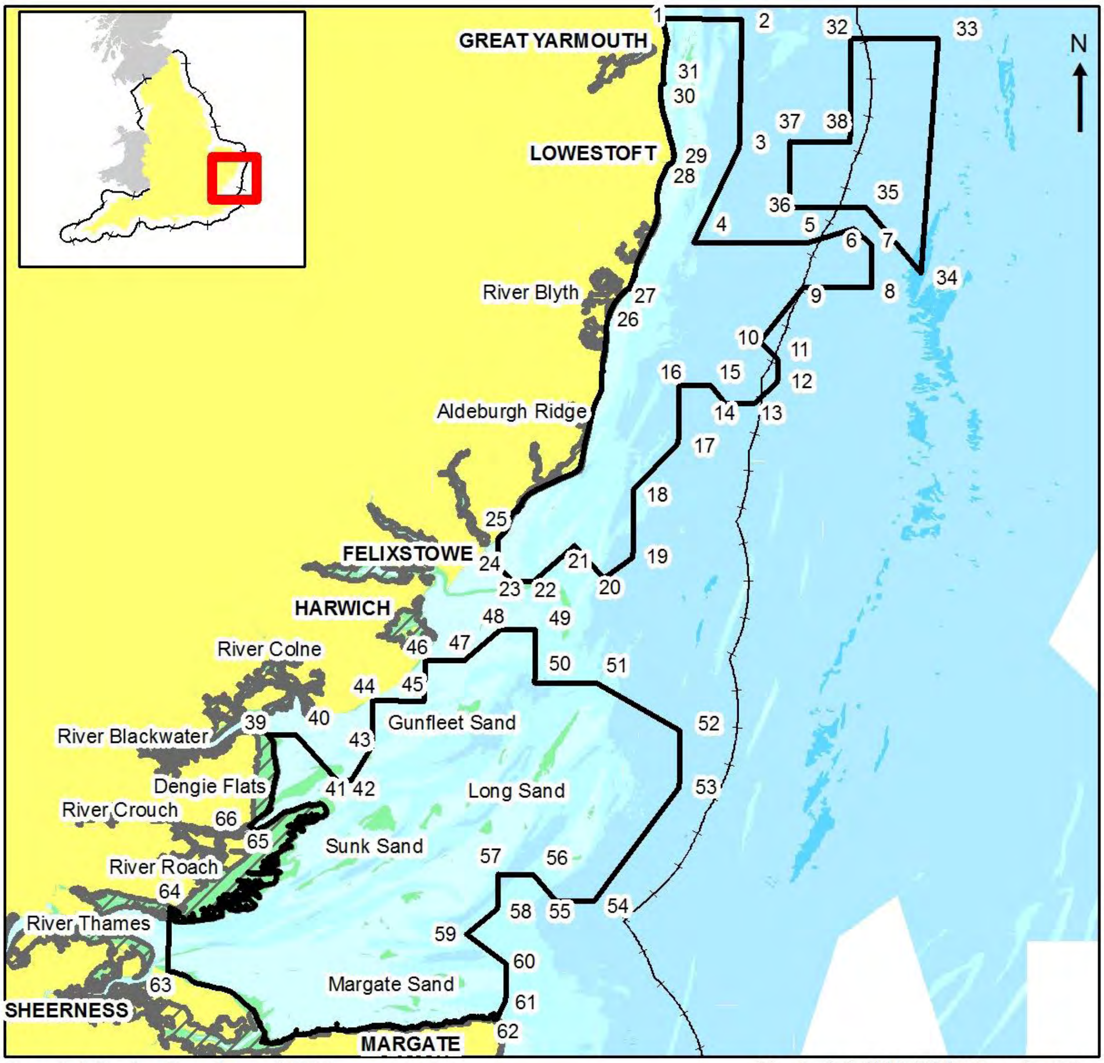
Appendix 1



Special Protection Area (SPA)

Outer Thames Estuary

Outer Thames Estuary SPA

Special Protection Areas

England 12nM Territorial Seas Limit

Scale 1:1,000,000 Map 1 of 1

0 5 10 20 Kilometers

Depth Areas

Drying

<=10m

<=20m

<=50m

<=100m

Land

NATURAL ENGLAND

EU Site Code: UK0
Version number: 4.5
Longitude: 1° 32' 41" E
Latitude: 51° 54' 58"N
Projection: UTM 31N (WGS84)
Area of SPA: 3792.68 sq km 379268.14 ha

Theme ID: 1452174
Grid Ref:
Version: 2.4
Plotted: 30/04/2010
Plot ID: 4.5

Point No	Latitude	Longitude	Point No	Latitude	Longitude
1	52º 39' 15"	1º 43' 57"	34	52º 20' 18"	2º 16' 18"
2	52º 39' 15"	1º 53' 48"	35	52º 25' 12"	2º 9' 36"
3	52º 29' 36"	1º 53' 48"	36	52º 25' 12"	2º 0' 0"
4	52º 22' 27"	1º 48' 18"	37	52º 30' 6"	2º 0' 0"
5	52º 22' 27"	2º 2' 12"	38	52º 30' 6"	2º 7' 24"
6	52º 23' 36"	2º 7' 60"	39	51º 44' 38"	0º 57' 29"
7	52º 22' 24"	2º 10' 18"	40	51º 44' 38"	1º 1' 9"
8	52º 19' 12"	2º 10' 18"	41	51º 41' 15"	1º 6' 15"
9	52º 19' 12"	2º 1' 60"	42	51º 41' 15"	1º 7' 54"
10	52º 15' 0"	1º 56' 42"	43	51º 43' 54"	1º 10' 18"
11	52º 13' 36"	1º 58' 54"	44	51º 47' 24"	1º 10' 18"
12	52º 12' 0"	1º 58' 54"	45	51º 47' 24"	1º 16' 30"
13	52º 10' 18"	1º 55' 60"	46	51º 50' 30"	1º 16' 36"
14	52º 10' 18"	1º 52' 36"	47	51º 50' 30"	1º 21' 12"
15	52º 11' 36"	1º 50' 42"	48	51º 52' 60"	1º 25' 42"
16	52º 11' 36"	1º 46' 54"	49	51º 52' 60"	1º 29' 54"
17	52º 7' 18"	1º 46' 54"	50	51º 49' 0"	1º 29' 54"
18	52º 3' 42"	1º 41' 30"	51	51º 49' 0"	1º 37' 30"
19	51º 58' 36"	1º 41' 30"	52	51º 45' 36"	1º 47' 42"
20	51º 57' 0"	1º 37' 60"	53	51º 41' 18"	1º 47' 42"
21	51º 59' 24"	1º 34' 24"	54	51º 32' 36"	1º 37' 36"
22	51º 56' 36"	1º 29' 24"	55	51º 32' 36"	1º 33' 0"
23	51º 56' 36"	1º 26' 54"	56	51º 34' 30"	1º 30' 18"
24	51º 57' 48"	1º 25' 6"	57	51º 34' 30"	1º 25' 60"
25	51º 59' 49"	1º 25' 6"	58	51º 31' 54"	1º 25' 60"
26	52º 18' 47"	1º 40' 30"	59	51º 29' 54"	1º 22' 18"
27	52º 18' 48"	1º 40' 31"	60	51º 27' 42"	1º 27' 12"
28	52º 28' 18"	1º 45' 22"	61	51º 25' 0"	1º 27' 12"
29	52º 28' 19"	1º 45' 23"	62	51º 23' 31"	1º 26' 5"
30	52º 34' 20"	1º 44' 18"	63	51º 26' 28"	0º 46' 24"
31	52º 34' 22"	1º 44' 18"	64	51º 30' 22"	0º 46' 24"
32	52º 37' 60"	2º 7' 24"	65	51º 37' 18"	0º 56' 36"
33	52º 37' 60"	2º 18' 12"	66	51º 37' 41"	0º 55' 43"

The landward boundary of the Outer Thames Estuary follows Ordnance Survey mean low water line, which is liable to change, or the seaward boundaries of Benacre to Easton SPA, Minsmere – Walberswick SPA, Alde-Ore Estuary SPA, Dengie SPA, Foulness SPA, Benfleet and Southend Marshes SPA, The Swale SPA and Thanet Coast and Sandwich Bay SPA.
Points 30 – 31 are where a straight line crosses the entrance to Great Yarmouth harbour
Points 28 – 29 are where a straight line crosses the entrance to Lowestoft harbour
Points 26 – 27 are where a straight line crosses the mouth of the River Blyth
Points 65 – 66 are where a straight line crosses the mouth of the Crouch Estuary
Points 63 – 64 are where a straight line crosses the River Thames

Appendix 2

EC Directive 79/409 on the Conservation of Wild Birds Special Protection Area (SPA)

Name: Outer Thames Estuary

Counties/Unitary Authorities: The SPA lies entirely in UK territorial waters adjacent to the following counties of Norfolk, Suffolk, Essex and Kent.

Boundary of the SPA: See SPA map. The landward boundary of the SPA generally follows mean low water mark or the boundaries of existing and potential SPAs, whichever is the furthest seaward. Intertidal mudbanks and sandbanks separated from the mainland coast by subtidal areas at mean low water are within the SPA boundary, except where they are within the boundaries of existing SPAs or SPAs.. The seaward boundary lies mostly within the 20m depth contour and marginally along the eastern edge of the proposed boundary extends beyond the 20-50 m contour.

Size of SPA: The SPA covers an area of 379,268.14 ha.

Site description: The Thames Estuary is located in the southern part of the North Sea on the east coast of England, between the counties of Norfolk (on the north side) and Kent (on the south) and extends as a broad opening into the North Sea. The SPA boundary is divided into three areas: the main part of the site is the outer part of the estuary (east of a line north from Sheerness, Kent to Shoebury Ness, Essex); a separate area extending south along the coast of E Norfolk (from Caister-on-Sea) to Woodbridge, Suffolk and lying mainly within the 12 nautical mile zone, except for two small areas which extend slightly into the 12 nm zone offshore from about Lowestoft; and a third area lying slightly further north and partly within 12 nm, but also with a larger area extending well beyond the 12 nm zone). The seaward boundary of the SPA lies partly within the 20m depth contour and marginally into the 20-50 m depth contour.

The Outer Thames Estuary SPA consists of areas of shallow and deeper water, high tidal current streams and a range of mobile sediments. Large areas of mud, silt and gravelly sediments form the deeper water channels, the main ones of which form the approach route to the ports of London and as such are continually disturbed by shipping and maintenance dredging. Sand in the form of sandbanks separated by troughs predominates in the remaining areas and the crests of some of the banks are exposed at mean low water. In the northern part of the site the main sandbanks are (north to south) Middle Cross Sand, Scroby Sands, Helm Sand, Newcombe Sand, Aldeburgh Napes, Aldeburgh Ridge, North Ship Head and Bawdsey Bank; in the southern part of the site the main sandbanks are Red Sand, Kentish Flats, West and East Barrow, Sunk Sand, Shingles, Long Sand, Margate Sand and Kentish Knock.

The seabed along the coast of Norfolk and Suffolk coast is of a similar composition to that in the main estuary with large shallow areas of mud, sand, silt and gravely sediments but, in the absence of main port areas within this area, there is less disturbance through shipping or dredging. The main sandbanks in this area are (from north to south) Dunwich Bank, Sizewell Bank, Aldeburgh Napes, Aldeburgh Ridge and Whiting Ridge.

European Site Conservation Objectives for Sandlings Special Protection Area Site Code: UK9020286

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- **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 population of each of the qualifying features, and,**
- **The distribution of the qualifying features within the site.**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A224 *Caprimulgus europaeus*; European nightjar (Breeding)

A246 *Lullula arborea*; Woodlark (Breeding)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where this is available) will also provide a framework to inform the management of the European Site under the provisions of Articles 4(1) and 4(2) of the Wild Birds Directive, and the prevention of deterioration of habitats and significant disturbance of its qualifying features required under Article 6(2) of the Habitats Directive.

These Conservation Objectives are set for each bird feature for a Special Protection Area (SPA). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 30 June 2014 (Version 2). This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014. Previous references to additional features identified in the 2001 UK SPA Review have also been removed.

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type A

1.2 Site code UK9020286

1.3 Compilation date 200108

1.4 Update

1.5 Relationship with other Natura 2000 sites

1.6 Respondent(s) International Designations, JNCC, Peterborough

1.7 Site name **Sandlings**

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	200108
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
01 26 33 E	52 04 44 N

2.2 Site area (ha) 3391.8

2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK403	Suffolk	100.00%

2.6 Biogeographic region

Alpine	Atlantic	Boreal	Continental	Macaronesia	Mediterranean
	X				

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

		Population				Site assessment			
		Resident	Migratory						
Code	Species name		Breed	Winter	Stage	Population	Conservation	Isolation	Global
A224	*Caprimulgus europaeus*		109 P			B		C	
A246	*Lullula arborea*		154 P			B		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	
Salt marshes. Salt pastures. Salt steppes	
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	1.5
Bogs. Marshes. Water fringed vegetation. Fens	0.9
Heath. Scrub. Maquis and garrigue. Phygrana	14.6
Dry grassland. Steppes	11.5
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	0.1
Other arable land	
Broad-leaved deciduous woodland	10.6
Coniferous woodland	57.6
Evergreen woodland	
Mixed woodland	1.4
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	1.8
Total habitat cover	**100%**

4.1 Other site characteristics

Soil & geology:

Geomorphology & landscape:

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

During the breeding season the area regularly supports:

Caprimulgus europaeus — 3.2% of the GB breeding population
Count as at 1992

Lullula arborea — 10.3% of the GB breeding population
Count as at 1997

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

4.3 Vulnerability

Sandlings SPA comprises six SSSIs. Sandlings Forest SSSI, the largest of these, is dominated by commercial forestry. Within the forest, large areas of open ground suitable for woodlark and nightjar were created by storm damage in 1987. Maintenance of open areas in the future relies on clear felling as the main silvicultural practice and the maintenance of some areas earmarked for woodlark and nightjar habitat. These objectives are included in the East Anglia Forest District Strategic Plan.

On the heathland SSSIs, lack of traditional management has resulted in the heathland being subjected to sucessional changes with the consequent spread of bracken, shrubs and trees. This is being addressed through habitat management work under the Countryside Stewardship Scheme and Tomorrows Heathland Heritage, and is resulting in the restoration of more typical heathland habitat favourable to both nightjar and woodlark.

Human influences on the site include the frequent presence of travellers' caravans. This is a longstanding problem, and a variety of mechanisms are utilised to keep them from the heathland; the digging of trenches and construction of earth barriers around the borders of sites is proving effective.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK04 (SSSI/ASSI)	100.0

EC Directive 79/409 on the Conservation of Wild Birds

Citation for Special Protection Area (SPA)

Name: Sandlings

Unitary Authority/County: Suffolk

Consultation proposal: All or parts of Blaxhall Heath Site of Special Scientific Interest (SSSI), Leiston - Aldeburgh SSSI, Sandlings Forest SSSI, Snape Warren SSSI, Sutton & Hollesley Heaths SSSI and Tunstall Common SSSI have been recommended as a Special Protection Area because of their European ornithological importance. In particular, for their breeding populations of Nightjars *Caprimulgus europaeus* and Woodlarks *Lullula arborea*.

Site description: The Sandlings SPA lies near the Suffolk Coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath being subject to successional changes, with the consequent spread of bracken, shrubs and trees, although recent conservation management work is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities, with dependant invertebrate and bird communities of conservation value. Woodlark *Lullula arborea* and Nightjar *Caprimulgus europaeus* have also adapted to breeding in the large conifer forest blocks, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.

Size of SPA: The SPA covers an area of 3,391.80 ha.

Qualifying species:

The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex 1 species	Count and Season	Period	% of GB population
Nightjar *Caprimulgus europaeus*	109 males - breeding	Count as a 1992	3.2% GB
Woodlark *Lullula arborea*	154 pairs - breeding	Count as at 1997	10.3% GB

Bird figures from:

Morris, A., Burges, D., Fuller, R.J., Evans, A.D. & Smith, K.W. 1994. The status and distribution of nightjars *Caprimulgus europaeus* in Britain in 1992. A report to the British Trust for Ornithology. *Bird Study* **41**: 181-191.

Wotton, S.R. & Gillings, S. 2000. The status of breeding woodlarks in Britain in 1997. *Bird Study* **47**: 212-224.

Status of SPA

Sandlings was classified as a Special Protection Area on 10 August 2001.

European Site Conservation Objectives for Orfordness – Shingle Street Special Area of Conservation Site Code: UK0014780

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- **The extent and distribution of qualifying natural habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1150. Coastal lagoons*
H1210. Annual vegetation of drift lines
H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves

* denotes a priority natural habitat or species (supporting explanatory text on following page)

This is a European Marine Site

This site is a part of the Alde Ore & Butley European Marine Site. These conservation objectives should be used in conjunction with the Regulation 35 Conservation Advice Package, for further details please contact Natural England's enquiry service at enquiries@naturalengland.org.uk, or by phone on 0845 600 3078, or visit the Natural England website at:
http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx

*** Priority natural habitats or species**

Some of the natural habitats and species listed in the Habitats Directive and for which SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Directive and the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Directive. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features as required by the provisions of Article 6(1) and 6(2) of the Directive.

These Conservation Objectives are set for each habitat or species of a Special Area of Conservation (SAC). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in Article 1 of the Habitats Directive.

Publication date: 30 June 2014 – version 2. This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014.

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name:	Orfordness – Shingle Street
Unitary Authority/County:	Suffolk
SAC status:	Designated on 1 April 2005
Grid reference:	TM440486
SAC EU code:	UK0014780
Area (ha):	Suffolk
Component SSSI:	Alde-Ore Estuary SSSI

Site description:
Orfordness is an extensive shingle structure consisting of a foreland, a 15 km-long spit and a series of recurves running from north to south. It supports some of the largest and most natural sequences in the UK of shingle vegetation affected by salt spray. The southern end has a particularly fine series of undisturbed ridges, with zonation of communities determined by the ridge pattern. Pioneer communities with sea pea *Lathyrus japonicus* and false oat-grass *Arrhenatherum elatius* grassland occur. Locally these are nutrient-enriched by the presence of a gull colony; elsewhere they support rich lichen communities.

Drift-line vegetation occurs on the sheltered, western side of the spit, at the transition from shingle to saltmarsh, as well as on the exposed eastern coast. The drift-line community is widespread and comprises sea beet *Beta vulgaris* ssp. *maritima* and orache *Atriplex* spp.

The site also includes a series of percolation lagoons that have developed in the shingle bank adjacent to the shore at the mouth of the Ore estuary. The salinity of the lagoons is maintained by percolation through the shingle, although at high tides sea water can overtop the shingle bank. The fauna of these lagoons includes typical lagoon species, such as the cockle *Cerastoderma glaucum*, the ostracod *Cyprideis torosa* and the gastropods *Littorina saxatilis tenebrosa* and *Hydrobia ventrosa*. The nationally rare starlet sea anemone *Nematostella vectensis* is also found at the site.

The adjacent estuarine and intertidal habitats are designated separately as the Alde, Ore and Butley Estuaries SAC.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Annual vegetation of drift lines
- Coastal lagoons*
- Perennial vegetation of stony banks. (Coastal shingle vegetation outside the reach of waves)

Annex I priority habitats are denoted by an asterisk (*).

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0014780
Date of registration: 14 June 2005
Signed: Trevor Salmon
On behalf of the Secretary of State for Environment, Food and Rural Affairs

The seabed and waters of the site provide an important habitat in the non-breeding season for red-throated divers *Gavia stellata* which visit the area to feed on the fish populations.

Qualifying species:
The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain population of the following species listed in Annex I in any season:

Annex I species	Count and season	Period	% of GB population
Red-throated diver *Gavia stellata*	6,466 individuals –wintering peak mean	1989 – 2006/07	38%

Principal bird data sources:

Cranswick, P.A., Hall, C., & Smith, L. 2003. *Aerial surveys of birds in proposed strategic areas for offshore windfarm development, round 2: preliminary report, winter 2002/03.* The Wildfowl and Wetlands Trust, Slimbridge.

O'Brien, S.H., Söhle, I., Dean, B.J., Webb, A. & Reid, J.B. 2008. *A further assessment of the numbers and distribution of inshore waterbirds using the Greater Thames during the non-breeding season using additional data from 2005-2007.* JNCC Report.

Percival, S., Cranswick, P., Hartley, C., Ford, J., Harding, I., Dodds, P. & Percival, T. 2004. *Thames Estuary proposed offshore wind farm. Progress report on ornithological surveys August 2002 – December 2003.* Ecology Consulting, Durham.

Webb, A., McSorley, C.A., Dean, B.J., O'Brien, S., Reid, J.B., Cranswick, P.A., Smith, L. & Hall, C. 2005. *An assessment of the numbers and distribution of inshore aggregations of waterbirds using the Greater Thames during the non-breeding season.* JNCC Report No.374, Peterborough.

Webb, A. & Reid, J.B. 2004. *Guidelines for the selection of marine SPAs for aggregations of inshore non-breeding waterbirds*. Unpublished consultation paper. JNCC. http://www.jncc.gov.uk/PDF/comm04P05.pdf

Appendix 3

Screening of Leiston Neighbourhood Plan policies

Policy	Brief description	Likely to have a significant effect?	Reason
Physical limits boundary			
Land at Policy PL1: Leiston town physical limits boundary	Development proposals will focussed/supported within the physical limits boundary subject to compliance with other policies in the plan. Development outside the boundary will not be permitted unless: • they are in accordance with SCDC Local Plan Policy DM3; or • they relate to necessary utilities infrastructure and where no reasonable alternative location is available.	Yes	The provision of new housing in Leiston would likely result in an increase in human population. This may lead to increased visitor pressure upon European sites in the local area, from recreation activities.
Housing needs and capacity			
Policy H1: Housing strategy	New residential development will be principally within one of the four allocated areas or the built-up area, subject to the provisions of PL1 and other material considerations. New development is subject to there being enough used water capacity, either at Leiston Water Recycling Centre or by alternative means.	Yes	The provision of new housing in Leiston would likely result in an increase in human population. This may lead to increased visitor pressure upon European sites in the local area, from recreation activities.

Policy H2: Housing mix	In line with SCDC Local Plan Strategic Policy SP3, developments of 5 or more must provide a mix of dwelling sizes (as a percentage of the overall number of dwellings in the development) as follows: • 1-bed = 10-15% • 2-bed = 30-35% • 3-bed = 30-40% • 4+bed = 15-20%	No	This will not in itself affect any European sites.
Policy H3: Residential density and design	Within Leiston Town settlement boundary, developments of 2 or more dwellings must be at a density that is consistent with existing developments in the immediate vicinity. Developments should be designed with sufficient off-street parking and usable private, green space.	No	This will not in itself affect any European sites.
Policy H4: Low carbon residential development	Proposed developments that are carbon neutral (or almost) will be strongly supported. Proposals must demonstrate energy saving and CO_2 reduction measures that at least match, preferably exceed, current regulations.	No	This will not in itself affect any European sites. It will have general environmental benefits.
Policy H5: Dwellings appropriate for the needs of older people	Development of 5 or more dwellings must have a min. 25% of 1, 2 and 3-bed dwellings that are to Lifetime Homes Standards.	No	This will not affect any European sites.
Residential and commercial site allocations			
Policy SA1: Land at Highbury Cottages	Planning permission will be granted for development of housing on 7.5ha of land at Highbury Cottages, subject to various criteria as detailed within the Neighbourhood Plan.	Yes	The large number of new dwellings will lead to a larger human population within Leiston, which could have effects upon European sites in the vicinity, in particular, The Sandlings SPA which is a short, approximate 2.5km distance away.

Policy SA2: Land at Red House Lane	Planning permission will be granted for residential development on 2ha of land at Red House Lane, subject to various criteria as detailed within the Neighbourhood Plan.	Yes	Development of this site is likely to lead to increased human population in the area which may affect European sites, The Sandling SPA, in particular, which is less than 1.5km away.
Policy SA3: Land to the rear of St Margaret's Crescent	Planning permission will be granted for residential development on 5ha of land to the rear of St Margaret's Crescent, subject to various conditions as detailed in the Neighbourhood Plan.	Yes	Additional homes is likely to mean an increase in human population. This may lead to increased visitor pressure on nearby European sites.
Policy SA4: Land at Abbey Road	Planning permission will be granted for 2.6ha of land at Abbey Road, subject to various criteria as detailed in the Neighbourhood Plan.	Yes	The location of the development is close enough that it may lead to increased recreational pressure upon European sites, in particular, Minsmer-Walberswick SPA, Ramsar and Minsmere to Walberswick Heaths and Marshes SAC.
Community infrastructure			
Policy IN1: Provision of beach huts for local community use	Development of new beach huts at Sizewell will be supported if a mechanism is introduced to provide for either of the following: • ensure new huts are reserved for use by community of Leiston-cum-Sizewell; or • ensure first refusal on purchase or lease of a hut is given to residents of Leiston-cum-Sizewell.	No	This will not affect any European sites
Policy IN2: Provision of a new community centre and facilities, Victory Road	The Council will strongly support the development of a community centre on land adjacent the Recreation Ground in Victory Road which may also be suitable for limited residential development. If the Recreation Ground community centre cannot be delivered, the Council will look favourably upon alternative locations for the centre.	No	This will not in affect any European sites. It provides alternative recreation facilities and may therefore draw recreational/visitor pressure from the local community away from nearby European sites.

Policy IN3: Provision of community facilities at the Recreation Ground, Victory Road.	Provision of the following features at the Recreation Ground will be strongly supported: • further play equipment • outdoor gym equipment • zip wire • extension of the skateboard park	No	This will not in affect any European sites. It provides alternative/exciting recreation facilities and may therefore draw recreational/visitor pressure from the local community away from nearby European sites.
Green open spaces			
Policy LG1: Protection and maintenance of local green spaces	Recreation Ground on Victory Road is a designated Local Green Space. Development on Local Green Spaces will not be permitted unless: • proposal is of limited nature and is required to enhance an identified Local Green Space; or • the proposal is for local community infrastructure	No	This will not affect any European sites
LG2: Greens and verges	Development proposals must demonstrate how they contribute to, and enhance the role of greens and verges in Leiston	No	This will not affect any European sites. If it provides alternative recreation/local green space, it may reduce visitor pressure upon nearby European sites.
Transport and movement			
Policy TM1: Dedicated access for cyclists and pedestrians	Proposals to provide dedicated access for cyclists and pedestrians will be encouraged.	No	This will not in itself affect any European sites although it is possible that new or enhanced cycle/walk routes in the direction of European sites would lead to increased visitor pressure.
Policy TM2: Residential parking standards	For new residential developments, minimum parking standards will apply for the provision of off-road parking. Proposals that include the loss of off-road parking spaces will generally be refused.	No	This will not affect any European sites.

Policy TM3: Parking garages	Proposals resulting in the loss of communal parking garages will not be permitted unless an alternative is provided.	No	This will not affect any European sites.
Policy TM4: Improvement of access to Leiston household waste recycling facility	Improvement of access to the existing Household Waste Recycling Facility at Lovers Lane will be strongly supported.	No	This will not affect any European sites.
Flooding			
Policy FL1: Addressing localised flooding matters	New developments must ensure they do not worsen foul/surface water flooding to existing properties.	No	This will not affect any European sites.
Leiston town centre			
Policy TC1: Leiston town centre	Leiston town centre is the preferred location for the following: • major new shopping; • commerce; • entertainment and leisure; • health; • community uses.	No	This will not affect any European sites. The development of alternative attractions as listed in Policy TC1 may draw visitors into the town centre and relieve some of the visitor pressure from nearby European sites.
Policy TC2: Redevelopment of land at High Street, Leiston town centre	Planning permission will be granted for mixed use development of land at High Street, Leiston, subject to various criteria as set out in the Neighbourhood Plan.	No	This will not affect any European sites. The development of alternative retail/leisure attractions may draw visitors into the town centre and relieve some of the visitor pressure from nearby European sites.
Policy TC3: Town centre parking	Parking provision off the High Street will be subject to the requirements of Policy TC2. Development of existing car parking sites will generally be refused unless alternative parking is provided elsewhere that is at least as easily accessible for the town centre.	No	This will not affect any European sites

Policy TC4: Town centre environmental improvements	Environmental improvements will be sought to floorspace and street furniture in • High Street; and • Sizewell Road New shop fronts and advertisements to be to a high standard of design and materials	No	This will not affect any European sites
Employment and skills			
Policy EMP1: General employment areas	On industrial estates/General Employment Areas, planning permission will normally be granted for Class B1, B2 and B8 developments.	No	This will not affect any European sites
Policy EMP2: Provision for adult training and education	Proposals to develop premises that address the need for training and education in Leiston will be supported.	No	This will not affect any European sites
Self-catering tourist accommodation			
Policy ACC1: Land off King George's Avenue	Planning permission will be granted for the provision of touring caravan facilities at land off King George's Avenue.	Yes	This may attract more tourists to the area which may result in increased visitor pressure (e.g. vegetation trampling and compaction, litter, dg fouling, noise and visual disturbance) upon nearby European sites.