

Offshore Potential Special Protection Area: Outer Thames Estuary

Draft Conservation Objectives and Advice on Operations



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Cover photograph illustrates red-throated diver in winter.

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

This advice is based on information on the potential SPA presented in Natural England and JNCC's 'Departmental Brief: Outer Thames Estuary pSPA document (Version April 2009). 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 April 2009. The Advice is generated through a coarse grading of sensitivity and exposure of site 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 an 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 site will be kept under review and will be periodically updated to reflect changes in both sensitivity and exposure.

Management actions should enable the **Annex I feature *Gavia stellata* (wintering red-throated diver) and its supporting habitat in the Outer Thames Estuary** to maintain 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 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:

The following impacts and activities will be described for both the habitat and prey species of the red-throated divers and on the red-throated divers themselves.

- i) **Physical loss** by removal (e.g. capital dredging, harvesting, coastal and marine development)
- ii) **Physical damage** by physical disturbance or abrasion (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. PCBs, pollution from oil and gas industry, shipping);
- v) **Non-toxic contamination** to prey species only by changes in turbidity (e.g. capital and maintenance dredging);
- vi) **Biological disturbance** by selective extraction of species (e.g. commercial fisheries)

Natural England is currently undertaking a risk assessment process for all existing inshore marine SPAs. JNCC and Natural England will extend this process to include the Outer Thames Estuary site.

1. Outer Thames pSPA: Draft conservation objectives and operations advice

1.1 Natural England and JNCC's roles

The Outer Thames Estuary potential pSPA as outlined in the Departmental Brief, prepared by Natural England and JNCC, lies across both English territorial waters and UK offshore waters.

The Conservation (Natural Habitats &c.) Regulations 1994 transpose the Habitats Directive into law on land and in territorial waters of Great Britain (out to 12 nautical miles from the coast). The Regulations give Natural England a statutory responsibility to advise relevant 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 transpose the Habitats Directive into law for UK offshore waters (from 12 nautical miles from the coast out to 200 nm or the 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.

For both inshore and offshore waters, the requirement to provide advice on conservation objectives and advice on operations applies once a site has been submitted by Government to the European Commission (i.e. becomes a potential SPA).

This advice is also required under the Offshore Petroleum Activities (Conservation of Habitats) Regulations (as amended in 2007); and the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) Regulations 2007.

This draft document for the Outer Thames Estuary pSPA is jointly prepared by JNCC and Natural England in fulfilment of the requirements of Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994, and Regulation 18 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007.

This document will inform the scope and nature of any 'appropriate assessments' which the Directive requires to be undertaken for plans and projects (Regulations 20, 48 & 50 of the 1994 Habitats Regulations for inshore waters; and Regulation 25 of the Offshore Regulations). Natural England and/or JNCC may also provide more detailed advice to competent authorities assessing the implications of any such plans or projects. The information provided in this document will also be a key component of any management measure or scheme which may be developed for this site, and will inform monitoring and assessments of site condition and of the features on the site.

1.2 The role of competent authorities

1.2.1 Inshore (0 – 12 nautical miles): The role of Relevant Authorities

Regulation 3 (3) of the Conservation (Natural Habitats &c.) Regulations 1994 require competent authorities to exercise their functions so as to secure compliance with the Habitats Directive. A single management scheme which the relevant authorities may draw up under Regulation 34 for the European marine site provides a framework through which this could be done and it should be based on the advice in this package. Competent authorities must, within their areas of jurisdiction, 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 SPA.

1.2.2 Offshore (12 – 200 nautical miles): The role of Competent Authorities

Regulations 22 and 23 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 require competent authorities to exercise their functions so as to secure compliance with the Habitats and Birds Directives. Competent authorities must, within their areas of jurisdiction, 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 SPA.

1.3 Activity outside the control of relevant authorities

Nothing within a Regulation 33 package will require competent 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 causes¹. Having issued Regulation 33 advice for European marine sites, Natural England and JNCC will work with competent authorities and others to agree, within a defined time frame, a protocol for evaluating all observed changes to baselines, to develop an understanding of natural change and provide further guidance as appropriate and possible. This does not, however, preclude relevant authorities from taking action to prevent deterioration to the interest features, and indeed such actions should be taken when required.

1.4 Role of conservation objectives

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 of plans or projects. The conservation objectives set out what needs to be achieved and thus deliver the aims of both the Habitats and Birds Directives.

1.5 Role of advice on operations

The advice on operations set out in Section 3 provides the basis for discussion about the nature and extent of the operations taking place within or close to the site and which may have an impact on its interest features. The advice should also be used to 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

¹ Determination of what constitutes natural change will be based on the best available information and scientific opinion at the time.

focus the attention of competent authorities and surveillance to areas that may need management measures.

This operations advice may need to be supplemented through further discussions with the competent authority and any advisory groups formed for the pSPA.

1.6 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).

2. Conservation objectives

2.1 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 Directive. An appropriate assessment will also require consideration of issues specific to the individual plan or project. The conservation objectives do not by themselves provide a comprehensive basis on which to assess plans and projects as required under

- Regulations 20-21; 24; 48-50 and 54 – 85 of the Conservation (Natural Habitats &c.) Regulations 1994;
- Regulations 25 - 29 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007;
- Regulation 5 (1 – 4) of the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001
- Regulations 6; 13(1); 18(3); 13(3); 19(3); 24 & Schedule 3 of the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland Regulations 2007).

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

Through 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 Circular 06/2005 (DEFRA Circular 01/2005) 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 European Sites under the Habitats Regulations 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 European Site was classified or designated.

2.2 Outer Thames Estuary pSPA conservation objectives

Under Regulation 33(2)(a) of the Conservation (Natural Habitats &c.) Regulations 1994 and Regulation 18 of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007, Natural England and JNCC have a duty to advise other relevant authorities and/or competent authorities as to the conservation objectives for the European marine site. The conservation objectives for the Outer Thames Estuary (potential) pSPA interest features are provided below. They should be read in the context of other advice given, particularly in:

- the Departmental brief; which provides more detailed information about the feature and evaluates its interest features according to the Birds Directive selection criteria and guiding principles;
- the summary favourable condition table, which further defines favourable condition for the interest feature.

2.2.1 The draft conservation objectives for the internationally important population of the regularly occurring Birds Directive Annex I species

Subject to natural change, maintain in favourable condition² the **internationally important populations of the regularly occurring Birds Directive Annex I species:**

- **red-throated diver** (*Gavia stellata*) and its supporting habitats and prey species

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 2.1.

² The summary favourable condition table outline in table 2.2 further defines favourable condition of the interest feature. An explanation of terms used can be found in section 2.3.1.

Table 2.1 Information on the population of red-throated diver that qualifies the Outer Thames as a pSPA under the Birds Directive.

Internationally important populations of regularly occurring Birds Directive Annex 1 species	
Species	Wintering population
red-throated diver (RTD) <i>Gavia stellata</i>	6,486 individuals ³

2.3 Background to favourable condition table

The favourable condition table is the principle source of information that Natural England and JNCC will use to assess the condition of the interest features and as such comprises indications of condition. Favourable condition tables will be drafted in detail on classification of the SPA and its adoption as a European marine site. This will involve the collation and quantification of a number of indications of condition (“Attributes”). For these draft objectives, an indication of the Attributes to be included in the condition table are given in Table 2.2 and this will form the basis for the condition monitoring process as described below.

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. 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 feature is favourable for most attributes.

All available information will need to be analysed to determine, where possible, any natural environmental trends in the condition of the red-throated diver population and its supporting habitat. 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 iterations of the advice within this document, produced by Natural England and JNCC, will revise the current assumptions about feature condition in light of any monitoring information. This will be linked with any developments in our understanding of the structure and functioning of features and the pressures to which they are exposed.

³ 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. Population estimates within the boundary are calculated using spatial analysis to estimate RTD density in 1km grid squares.

This advice also provides the basis for discussions with competent authorities, and as such the attributes and associated measures and targets may be modified over time. The aim is to develop a single agreed set of attributes that will be used as a basis for monitoring 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. To meet UK common standards, Natural England and JNCC will be committed to reporting on the attributes listed in the final version of the table. This information may be generated by Natural England or JNCC or collected by other organisations through formal agreements.

The favourable condition table will be an important, but not the only, driver with regard to assessing feature condition. Other data, such as results from compliance monitoring, (assessing the conduct of activities in relation to licence conditions, conducted by relevant/competent authorities and their statutory advisors), together with data obtained to inform appropriate assessments, will also have an important role. Development of the condition monitoring programme will be considered in discussion with the relevant/competent authorities and other interested parties, ideally as part of the management scheme process if developed. 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. The condition assessment will take into account all available information using the favourable condition table to guide the process.

Table 2.2 indication of attributes to be used in defining favourable condition for the Outer Thames pSPA

Favourable condition tables will be drafted in detail on classification of the SPA and its adoption as a European marine site

Attributes	Targets	Comments
red-throated diver population size	<ul style="list-style-type: none"> ◆ 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 known (as currently in this case), maintain the population above 50% of that at designation; loss of 50% or more unacceptable 	<p>The mean value was established using data collected between the months of October to March in 1988/89, and 2002-2007.</p> <p>The difficulty in monitoring and accurately assessing numbers of this species makes understanding natural population dynamics very difficult, therefore the objective of the 50 % threshold is required. A simple threshold system works by comparing population sizes at different times and deriving the change (expressed as a proportion of the initial population). If this change represents an absolute loss of 25%, or more, of a breeding population or 50%, or more, of a non-breeding population then the feature will be in unfavourable condition. These thresholds are limits of natural change due to changes in distribution related to natural changes in food availability, population changes due to wintering mortality, etc.</p>

Habitat extent	Maintain the area of sandbanks in the site subject to natural change: ♦ No reduction in extent of sublittoral, shallow (<20m) sandbank habitat.	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.
Prey species	Maintain the abundance and distribution of red-throated diver prey species subject to natural fluctuations	If the red-throated diver population declines, we would need to explore the reasons behind this change and attempt to associate it with the range of possible factors acting on the species and its habitats.

2.3.1 Explanation of terms used in the Conservation Objectives

Maintain - implies that the feature is regarded as being in favourable condition and will, subject to natural change; remain at its condition at designation. Understanding the functioning of large, varied, dynamic marine sites, which experience a variety of pressures resulting from historic and current activities, is difficult and consequently it is hard to define favourable condition so precisely in such sites.

If in the future it becomes evident that the condition of some areas of the features are significantly degraded, and are therefore unfavourable, then restorative management actions will need to be undertaken to restore the interest feature to favourable condition.

Restoration in the marine environment generally refers to natural recovery through the reduction or removal of detrimental physical, chemical and biological pressures, rather than intervention (as is possible with the terrestrial features).

Extent - the area covered by the habitat and communities

3. Advice on operations

Natural England has a duty under Regulation 33(2)(b) of the Conservation (Natural Habitats &c.) Regulations 1994 to advise other competent 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.

JNCC has a duty under Regulation 18 of the Conservation Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 to advise Competent 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.

3.1 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 the interest features and their supporting habitat within the Outer Thames pSPA. 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 application of advice regarding vulnerability of features to pressure categories should be undertaken in the light of expert judgement.

The advice given here will inform, but is without prejudice to, any advice given under Regulation 48 or Regulation 50 (of the Conservation (Natural Habitats &c.) Regulations 1994) and Regulation 25 and Regulation 27 (of the Offshore Marine Conservation (Natural Habitats &c.) on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

3.2 Update and review of advice

Information as to the operations which may cause deterioration of the condition of the species and its habitats for which the site has been designated, is provided in light of what Natural England and JNCC know about current activities and patterns of usage at the Outer Thames Estuary pSPA. Natural England and JNCC expect that the information on current activities and patterns of usage (which was used to derive exposure in Table 3.1) 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 / competent authorities and others takes account of changes in the usage patterns that have occurred at the site since this information was gathered. In contrast, the information provided in this advice on the sensitivity of interest features is relatively stable and will only change as a result of an improvement in our scientific knowledge. 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 knowledge of changes in activities within the site.

3.3 Plans and Projects

Under the following regulations:

- Regulation 48(1) of the Conservation (Natural Habitats, &c.) Regulations 1994,
- Regulation 25(1) of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007,
- Regulation 5 of the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 and
- Schedule 3, paragraph 2 of the Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) (England and Northern Ireland Regulations 2007,

an appropriate assessment needs to be undertaken in respect of any plan or project which:

- a. either alone or in-combination with other plans or projects would be likely to have a **significant effect** on a European Site; and
- b. is not directly connected with the management of the site for nature conservation.

A site that is being considered for **classification as an SPA** under the Birds Directive becomes a European site for the purposes of the Habitats Regulations at the point in time where it is classified. An appropriate assessment is required by law for all European Sites (Regulation 48) in the circumstances outlined above. The assessment process required by Regulation 48 of the Habitats Regulations will apply as a matter of law when considering proposals for plans or projects that may affect a classified SPA. As a matter of government policy for the purposes of considering proposals that may affect them, that process should also be applied to potential (p)SPAs.

Whilst there is no obligation in domestic law to make this assessment in respect of a site prior to it becoming a SPA or a statement of policy requiring it prior to being announced as a pSPA, it should be considered a matter of good practice for Competent Authorities, before deciding to undertake or permit a plan or project, to assess its implications for sites such as this, whose proposed details are in the public domain, in accordance with the process described in Article 6.3 of the Habitats Directive. In doing so, a Competent Authority will be reducing the likelihood of the UK jeopardising the fulfilment of its obligations under the Habitats Directive. Further, without pre-judging any review of extant consents that may be required by the Habitats Regulations or the Offshore Marine Conservation Regulations, undertaking such an assessment and determining any consents in accordance with it, will reduce the uncertainty for developers who are granted consent but have not fully implemented it by the time the site becomes an SPA.

3.4 Methods for assessment

Six broad Pressure Categories 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 (See **Table 3.1**), although these examples are not inclusive of all potentially detrimental activities.

A three-step process is used to assess the vulnerability of the site's Annex 1 feature (*Gavia stellata*) and its supporting habitats which involves:

- an assessment of the **sensitivity** of red-throated divers to operations;
- an assessment of the **exposure** of red-throated divers or their supporting habitat(s) to operations; and
- a final assessment of **current vulnerability** of the red-throated diver or its supporting habitat(s) to operations.

This approach is sufficiently robust to take into account the effects of new activities or changes in patterns of usage, and by assessing sensitivity, exposure and vulnerability independently, the reasoning behind current (and any future) advice is made clear.

All the scores of relative sensitivity, exposure and vulnerability are derived using best available scientific data and expert judgement. This method uses a coarse categorisation system, reflecting the current state of our understanding of the Annex 1 feature and the marine environment. It should be recognised that data for offshore habitats are sparse and assessments may need revision in light of new research or survey.

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

3.4.1 Sensitivity assessment

This assessment evaluates the relative sensitivity of the Outer Thames Estuary interest feature and its supporting habitat to the effects of the aforementioned pressures. The sensitivity of interest features or sub-features (and scientific understanding of sensitivity) may change over time; hence an operation that is not currently deemed 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 divers switch prey species. The subsequent shift may mean dependence on another species not previously assessed.

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features and their supporting habitat in the Outer Thames pSPA to the effects of 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 (Hiscock, 1996). 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. This assessment will include considerations of the birds behaviour, as this will be related to their sensitivity to particular impacts (e.g. divers

have a low sensitivity to wind turbine strike as they are generally displaced by windfarms and fly lower than turbine rotor height; whereas divers have a moderate to high sensitivity to fixed nets as their foraging strategy means they may follow fish into nets.

3.4.2 Exposure assessment

This has been undertaken for the Outer Thames pSPA 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 April 2009). These assessments were made on the best available advice but should be reviewed in light of additional information on activities in the area.

3.4.3 Vulnerability assessment

The vulnerability of the interest feature to external pressures is determined by integrating the sensitivity evaluation with that of exposure. Only if a feature is both sensitive *and* exposed to a human activity is it considered vulnerable (see Appendix III). 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). The process of deriving and scoring relative vulnerability is provided in Appendix A.

An assessment of the interest feature's vulnerability (Appendix B) 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 pSPA Annex 1 feature to climate change is not considered in the tables below, given the uncertainties surrounding the effects of global change on the oceans.

3.5 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;⁴
- 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.

⁴ For full a background summary to the Natura 2000 see <http://necmsstage/ourwork/marine/sacconsultation/default.aspx> and the Departmental brief: http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-11044.pdf

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

3.6. Specific advice on operations for the Outer Thames pSPA

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 pSPA. The vulnerability of the interest feature and its supporting habitat and prey species of the Outer Thames pSPA to current levels of human usage, is summarised in Table 3.1 and detailed in the Tables in appendix B.

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.

Information regarding the current commercial activities in and around the pSPA can be found in the Departmental Brief for the Outer Thames Estuary pSPA

Table 3.1. Summary of operations/pressures that may cause deterioration or disturbance of red-throated divers and their supporting habitat and prey species in the Outer Thames 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 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 SPA	Supporting habitats and prey species - Outer Thames SPA
<p>Physical loss of supporting habitat</p> <p>Removal of habitat feature (e.g. offshore development, capital dredging, 'active dredging zones')</p> <p>Smothering (e.g. by artificial structures, disposal of dredge spoil)</p>		✓
<p>Physical damage to their habitats</p> <p>Siltation (e.g. run-off, channel dredging, outfalls)</p> <p>Abrasion (e.g. anchoring, cables)</p> <p>Selective extraction (e.g. aggregate dredging)</p>		<p>✓</p> <p>✓</p>

Operations (pressures) which may cause deterioration or disturbance with example activities	red-throated diver - Outer Thames SPA	Supporting habitats and prey species - Outer Thames 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) 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, entanglement or bycatch) Selective extraction and removal of prey species (e.g. commercial and recreational fishing)	 ✓ ✓	 ✓ ✓

3.7. Detailed advice for the Outer Thames pSPA features

3.7.1. Physical loss of supporting habitat

Physical loss by removal or smothering of any of the habitats on which red-throated divers depend may result in the loss of foraging sites, therefore the reduction of the

food resource for the overwintering population, and would consequently be detrimental to the favourable condition of the interest feature. Thus the overwintering population is considered to be highly sensitive to physical loss of habitat.

Windfarm construction, marine aggregates extraction, capital and maintenance dredging of shipping channels all undertake physical removal of sandbanks from within the pSPA boundary. The northernmost extent of the pSPA 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 Estuary as a whole (RPS group 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 opened and accepted invitations to tender for a lease for this area. The successful consortium will be required to undertake a zonal assessment of their combined proposals followed by an environmental impact assessment and make an application under Section 36 of the Electricity Act 1989 for each windfarm proposal.

An approximate calculation 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%. Whilst this figure does not take into account habitat loss due to scour protection, 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%. 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 3.7.3.

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 dredging is likely to increase if shipping activity and ship sizes increases. Capital dredging within the site is planned to start this year 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 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 pSPA habitat.

Overall the vulnerability of the Annex I species within the Outer Thames pSPA and associated habitats to physical loss is considered to be moderate. See appendix B for details

3.7.2. Physical damage to their supporting habitat

Red-throated diver are known to associate with sandbank features. 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 25 and 55 grams in weight (Madsen 1957, Durinck et al. 1994; Reimchen and Douglas 1984) and sandbanks.

Sandbanks may have a functional role (as nursery, spawning, feeding or in providing shelter) in supporting these fish species. Although benthic sandbank communities are in general relatively resilient to physical damage, repeated damage to the habitats on which red-throated diver depend may result in a reduction in their value as foraging sites for the overwintering population. Therefore overall sensitivity of the red-throated divers to damage to habitat is considered to be moderate.

Marine aggregates extraction activities are not expected to significantly reduce habitat availability for divers as the areas worked are typically small. Commercial fishing activity also occurs within the pSPA including; suction dredging for cockles, set and drift-net trawling, drift gill netting, potting, long-lining and a limited amount of beam trawling for demersal species. With the exception of suction dredging and beam trawling, the capacity for these fishing activities to cause damage is low. Overall the site is considered to have low to medium exposure to physical damage. Significant long-term changes in bathymetry that could render habitat unavailable for foraging divers are not anticipated. For this reason the site is considered to have low to medium exposure to physical damage.

Overall the vulnerability of the Annex 1 species within the Outer Thames pSPA and associated habitats to physical damage is considered to be low to moderate.

3.7.3. Non physical disturbance of red-throated diver

Red-throated diver are highly sensitive to non-physical disturbance by noise and visual presence during the winter. Feeding can be disturbed by movements of objects (e.g. boats, wind turbine rotors) and increases in noise disturbance, displacing birds from their feeding grounds. Disturbance can cause birds to cease feeding or fly away and in response they could a) increase their energy requirements at their present (disturbed) feeding sites, or b) move to an alternative less favoured feeding or roosting site. Such a response affects energy budgets and food intake rates, and possibly survival. Overwintering birds, which are frequently subject to harsh weather conditions and must lay down fat reserves in order to migrate to breeding grounds, are particularly susceptible to adverse effects resulting from disturbance. Sensitivity can be considered high.

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. The calculation for the areas of the windfarm footprints relative to the area of the pSPA shows that 3.5% of the pSPA area could be made unavailable through displacement.⁵ If the entire consented London Array development is included this increases to 282.5 km² or 7.2% of the pSPA 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. As discussed in section 3.7.1, red-throated diver may habituate to wind turbines over time and therefore any habitat loss due to disturbance is not guaranteed.

⁵ Scroby Sands, Kentish Flats, Gunfleet Sands 1 & 2 plus London Array Phase 1 occupy a total area of 137.5 km² equivalent to 3.5% of SPA area

Disturbance and displacement effects may also arise from shipping (including recreational boating) and boat movements associated with marine aggregate and fishing activities. Marine aggregate 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 (RPS group 2005). 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.

Overall current exposure is considered to be medium.

Overall the vulnerability of the Annex 1 species within the Outer Thames pSPA to non-physical disturbance is considered to be high.

3.7.4 Toxic contamination of red-throated diver and their supporting habitats

A number of operators will discharge effluent upstream into the Thames estuary and into the adjacent coastal waters. Direct discharges into the site include low levels of radionuclides, and heavy metals, however significant dilution afforded to these low inputs, together with the high energy environments associated with sandbanks, mean that they have a moderate sensitivity to toxic contamination from these sources (Elliot *et al.*, 1998).

In the case of red-throated diver, the sensitivity to synthetic chemicals, such as PCBs is moderate. PCBs accumulate through the food chain in the tissues of marine organisms and could be considerable once they reach the fish on which red-throated divers feed. If marine pollution were to occur there is the potential for exposure to PCBs to change. Hotspots of PCBs include industrial estuaries and sandy environments offshore, but as PCB's are currently banned, exposure can be considered low.

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 threat to diving and feeding seabirds. Birds that breed in Scotland could be moulting in the pSPA in September and October. While moulting, they are less mobile and hence more vulnerable to oil spills as they remain at sea. Dispersants used to disperse the oil may also be harmful to the species. Sensitivity is considered to be high.

Overall, the sensitivity to toxic contamination is high.

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. This 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 from “normal” vessel traffic is considered to be very low; in addition the ‘background level’ of toxic contamination to which the site is exposed is also considered to be low. Thus overall exposure to toxic contamination is 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 ship-to-ship operations occur annually. There has been a significant increase in the number of s-t-s operations during August 2009, but this increased level is unlikely to be maintained. Although the Maritime and Coastguard Agency (MCA) 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 red throated divers it may be considered that there is an elevated risk from an oil spill at this location.

Overall the vulnerability of red-throated diver within the Outer Thames pSPA to toxic contamination is considered to be moderate.

3.7.5 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 to non-toxic contamination is considered moderate.

Non-toxic contamination through the impact from an oil spill could be significant. Oil on the feathers of birds could lead to loss of insulation, reduced buoyancy and possible drowning. Consequently RTDs may suffer the inability to feed, resulting in starvation and death. The risk of an oil spill occurring is discussed above in section 3.7.4.

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.

The overall vulnerability of the prey species to non-toxic contamination is considered low.

3.7.6. Biological disturbance

Selective extraction of prey species:

Fishing activities within the site include; suction dredging for cockles, set and drift-net trawling, drift gill netting, potting, and a limited amount of beam trawling for demersal species (mainly in troughs). DEFRA / CEFAS information indicate a variety of gears are used, with different target species and fishing intensity. 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, particularly as some fish species fill upper roles in the trophic web. In addition it has the potential to directly remove prey species. Thus the mechanisms for these pressures to impact on red-throated divers may be; a direct or indirect reduction in food availability for the overwintering population. They are therefore

judged as moderately to highly sensitive to biological disturbance through selective extraction of prey species.

The overall level of exposure of red-throated diver to prey species depletion from biological disturbance is currently considered low.

Overall vulnerability to selective extraction of prey species is low to medium.

Non-selective extraction of red-throated divers:

Non-selective extraction of red-throated diver can occur through entanglement in nets or through bird strike. Both possibilities are discussed in turn and an overall score for vulnerability is provided.

Static nets can be considered a significant risk to red-throated divers through entanglement and reduction of food availability. Entanglement in static nets (of a wide variety) is the major cause of known mortality of red-throated diver (Okill, D. 2002). According to Okill, 35.7% of all recovered dead red-throated divers could be related to a particular cause of death: 53% of these 'attributable' cases 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). The study concludes that 18.9% of recovered dead red-throated divers were attributable to entanglement. Therefore sensitivity can be considered high.

The three principal fishing methods for the inshore fishery of the proposed 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 take place throughout the estuary) represent the most serious risk to the birds themselves. Most netting occurs in the summer and autumn, beginning in June and extending into December. The wintering red-throated divers are most prevalent from November – March, which does not coincide with the main netting season (2005-2006 CEFAS). Netting is widespread across sandbanks, however this is seasonally focussed and exposure can therefore be considered low-moderate.

Impacts to red-throated diver themselves may also result from collision with wind turbines, if they fly at a height above 20m. It has been observed, however, that they generally fly below this height, with only occasional higher flights (RPS GROUP PLC 2005; Report to Kentish Flats Ltd, Environmentally Sustainable Systems Ltd, 2008). This data is indicative from the Thames region and other unpublished studies from the Thames have shown broadly similar results. Thus sensitivity is considered to be low.

The overall collision risk is believed to be low, given the size of the windfarm footprint area in comparison to the pSPA area and the fact that birds are considered to fly at rotor height only relatively rarely. In addition collision risks are low due to the displacement of red-throated diver from windfarm footprints due to non-physical disturbance (section 3.7.3). Exposure can therefore be considered low.

Overall the vulnerability of the Annex I species within the Outer Thames pSPA to biological disturbance through non-selective extraction is considered to be moderate to high predominantly due to the risk from static netting rather than collision risk.

4.1. 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 will be those to which the feature has high or moderate vulnerability *and* which lack appropriate management. For example, industries which are not location specific and not subject to prior consent procedures and/or those which can lack consistent enforcement mechanisms are more likely to cause damage/disturbance to the interest feature. However, clearly not all activities associated with such 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 high vulnerability is mitigated by consenting procedures or management. For example, for industries that are location specific, are always subject to prior consent and have clear reliable methods of enforcement, there is generally a lower likelihood of causing damage or disturbance to interest features.

Natural England is currently undertaking a risk assessment process for all of its existing inshore marine SPAs. Natural England and JNCC will extend this process to include proposed sites and will assess the risks to the Outer Thames Estuary site.

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Appendix A: Methods deriving vulnerability.

Sensitivity		Exposure		Vulnerability	
None	-	None	-	None detectable	
Low	•	Low	+	Low	
Moderate	••	Medium	++	Moderate	
High	•••	High	+++	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

		High (3)	Moderate (2)	Low (1)	None detectable (0)
Relative exposure of the interest feature	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

Appendix B

Assessment of the relative vulnerability of interest features / Annex 1 Species and its supporting habitat for the Outer Thames SPA (for key see appendix A)

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 (<i>Gavia stellata</i>)		
	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)			
Abrasion (e.g. boating, anchoring,)			
Selective extraction (e.g. aggregate dredging)	••	+ / ++	Low-Moderate
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)	••	+	Moderate
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	•••	+	Moderate
Introduction of radionuclides	DD	DD	DD
Non-toxic contamination			

Operations which may cause deterioration or disturbance	internationally important populations of the Annex I species and their supporting habitat and prey species		
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			
Selective extraction of prey species (e.g. commercial & recreational fishing)	••/•••	+	Low-Moderate
Non-selective extraction (through entanglement with static gear)	•••	+/++	Moderate-High
Non-selective extraction (through wind-turbine strike)	•	+	Low