DEPARTMENTAL BRIEF:

OUTER THAMES ESTUARY

Special Protection Area

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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.

Tidal currents

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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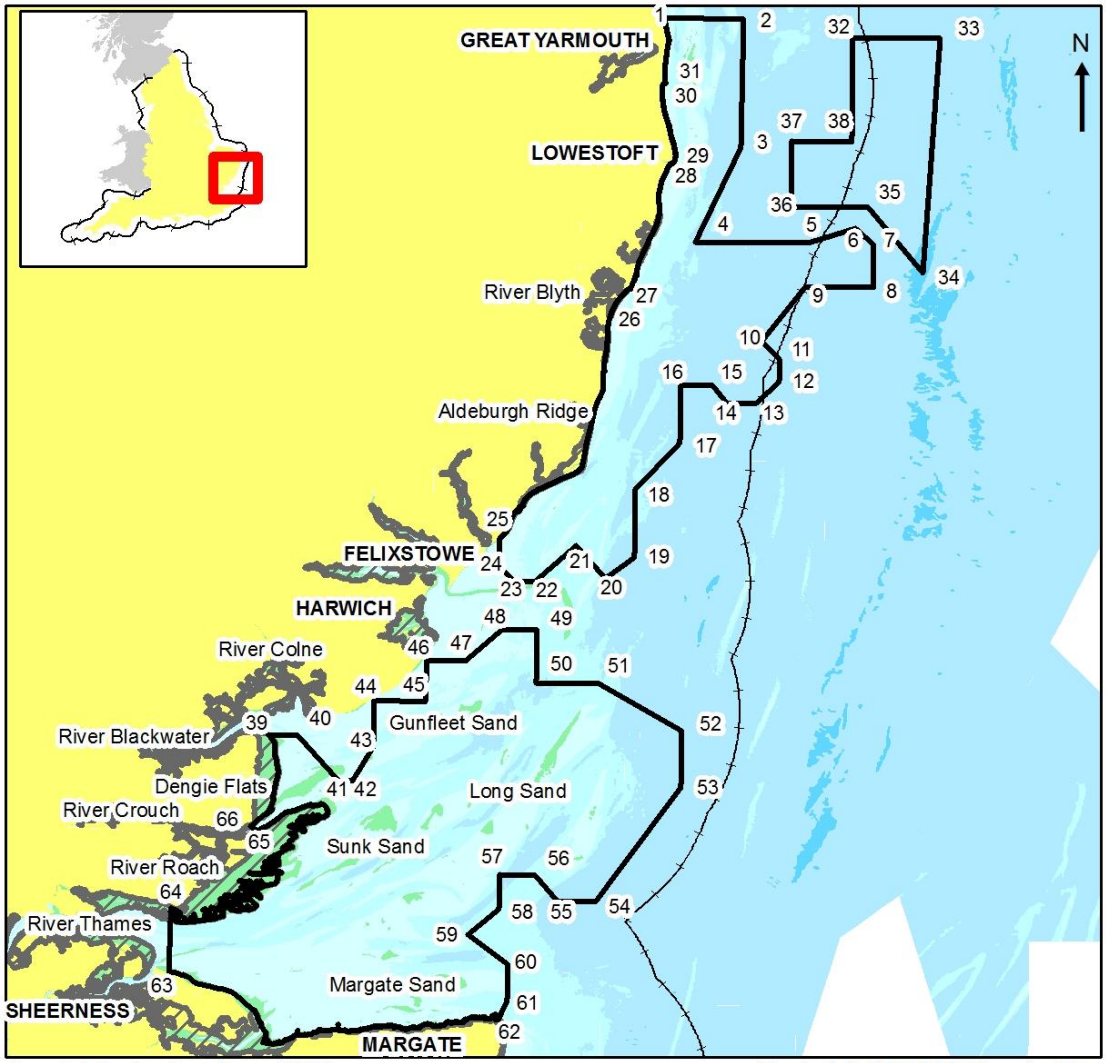
Appendix 1



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	Theme ID: 1452174
Version number: 4.5	Grid Ref:
Longitude: 1° 32' 41" E	Version: 2.4
Latitude: 51° 54' 58"N	Plotted: 30/04/2010
Projection: UTM 31N (WGS84)	Plot ID: 4.5
Area of SPA: 3792.68 sq km 379268.14 ha	

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.

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