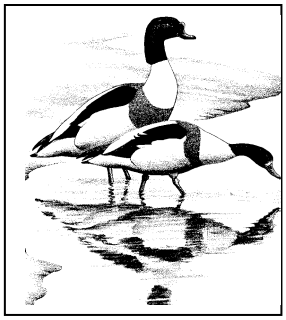
SWALE AND MEDWAY

European marine site

English Nature's advice given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

Issued 23 January 2001



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English Nature's advice for Swale and Medway European marine site given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

Preface

This document provides English Nature's advice to other relevant authorities as to (a) the conservation objectives and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for the Swale and Medway European marine site. This advice has been prepared to fulfill our obligations under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994.

European marine sites are defined in the Conservation (Natural Habitats &c.) Regulations 1994 as any part of a European site covered (continuously or intermittently) by tidal waters or any part of the sea in or adjacent to Great Britain up to the seaward limit of territorial waters. European sites include Special Areas of Conservation (designated under the Habitats Directive, which support certain natural habitats and species of European importance), and Special Protection Areas (designated under the Birds Directive which support significant numbers of internationally important wild birds). In many instances these designations may coincide and our advice is being prepared to cover both the SAC and SPA interests where this occurs.

The European marine site contains two Special Protection Areas (SPAs). The Swale and The Medway Estuary and Marshes are both Special Protection Areas and the marine components of both of these sites qualify as European marine sites. However, for simplicity and the purposes of this advice, the marine components of both SPAs are treated as a single European marine site - The Swale and Medway European marine site.

This 'Regulation 33 package' is designed to help relevant and competent authorities, who have responsibilities to implement the Habitats Directive, to:

- understand the international nature conservation importance of the site, underlying physical processes and the ecological requirements of the habitats and species involved;
- advise relevant authorities as to the conservation objectives for the site and operations which may cause deterioration or disturbance
- set the standards against which the condition of the site's interest features can be determined and undertake compliance monitoring to establish whether they are in favourable condition; and
- develop, if deemed necessary, a management scheme to ensure that the features of the site are maintained.

In addition, the Regulation 33 package will provide a basis to inform the scope and nature of 'appropriate assessment' required in relation to plans and projects (Regulations 48 & 50 and by English Nature under Regulation 20). English Nature will keep this advice under review and may update it every six years or sooner, depending on the changing circumstances of the European marine site. In addition, we will provide more detailed advice to competent and relevant authorities to assess the implications of any given plan or project under the Regulations, where appropriate, at the time a plan or project is being considered. If as a result of the UK SPA Network Review (led by JNCC) interest features are added to this European marine site or the site boundaries change, English Nature will amend this advice, as appropriate.

Tim Bines
General Manager 23 January 2001

Contents

Preface 1

Acknowledgments 7

1. Introduction 9
   - 1.1 Natura 2000 9
   - 1.2 English Nature's role 9
   - 1.3 The role of relevant authorities 10
   - 1.4 Activity outside the control of relevant authorities 10
   - 1.5 Responsibilities under other conservation designations 11
   - 1.6 Role of conservation objectives 11
   - 1.7 Role of advice on operations 11

2. Qualifying species within the SPA under the EU Birds Directive 13

3. Interest features of the European marine site 15
   - 3.1 Background and context 15
   - 3.2 Reductions in organic inputs 16
   - 3.3 Evolution of estuary geomorphology 16
   - 3.4 General description 17
   - 3.5 Marine component of The Swale SPA 17
     - 3.5.1 Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species 17
   - 3.6 Marine component of The Medway SPA 18
     - 3.6.1 Internationally important populations of the regularly occurring Annex 1 species 18
     - 3.6.2 Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species 19

4. Conservation objectives for SPA interest features 21
     - 4.1.1 The conservation objective for the internationally important populations of regularly occurring migratory bird species 21
     - 4.1.2 The conservation objective for the internationally important assemblage of waterfowl. 21
   - 4.2 Conservation Objectives for the marine component of The Medway Estuary and Marshes SPA 22
     - 4.2.1 The conservation objective for the internationally important populations of the regularly occurring Annex 1 bird species 22
     - 4.2.2 The conservation objective for the internationally important populations of regularly occurring migratory bird species 22
     - 4.2.3 The conservation objective for the internationally important assemblage of waterfowl. 23

5. Favourable condition table 29

6. Advice on operations 39
   - 6.1 Purpose of advice 39
   - 6.2 Methods for assessment 39
     - 6.2.1 Sensitivity assessment 39
     - 6.2.2 Exposure assessment 40
     - 6.2.3 Vulnerability assessment 40
   - 6.3 Format of advice 40
   - 6.4 Update and review of advice 41
   - 6.5 Summary of advice on operations 41

6.5.1 Internationally important assemblage including nationally and internationally important populations of regularly occurring migratory species 41
6.6 Summary of advice on operations 42
6.6.1 Internationally important populations of regularly occurring Annex 1 species 42
6.6.2 Internationally important assemblage including nationally and internationally important populations of regularly occurring migratory species 42
6.7 Plans and Projects 42
6.8 Review of consents 43
6.9 Interest feature and sub-feature specific advice on operations 49

7. Bibliography 59

8. Glossary 61

Appendix I Matrix of relative vulnerability

Appendix II Feature and sub-feature specific advice on operations

Appendix III List of Relevant Authorities

Appendix IV English Nature's 'Habitats regulations guidance note 1: The Appropriate Assessment (Regulation 48)'

List of Figures and Tables

Figure 1 **Location map of The Swale SPA**

Figure 2 **Location map of The Medway Estuary and Marshes SPA**

Figure 3.1 **Map showing sub-features of the Swale part of the European marine site**

Figure 3.2 **Map showing sub-features of the Medway part of the European marine site**

Table 1 **Information on populations of bird species qualifying under the Birds Directive using the marine component of The Swale SPA at the time the SPA was classified**

Table 2 **Information on populations of bird species qualifying under the Birds Directive using the marine component of The Medway Estuary and Marshes SPA at the time the SPA was classified**

Table 3 **Favourable condition table for the marine component of The Swale SPA**

Table 4 **Favourable condition table for the marine component of The Medway Estuary and Marshes SPA**

Table 5 **Summary of operations which may cause deterioration or disturbance to the interest features of the marine component of The Swale SPA**

Table 6 **Summary of operations which may cause deterioration or disturbance to the interest features of the marine component of The Medway Estuary and Marshes SPA**

Table 7 **Assessment of relative exposure of interest features and sub-features of the marine component of The Swale SPA to different categories of operations based on the current level of activities (as of July 2000)**

Table 8 **Assessment of relative exposure of interest features and sub-features of the marine component of The Medway Estuary and Marshes SPA to different categories of operations based on the current level of activities (as of July 2000)**

Table 9 **Assessment of the relative vulnerability of interest features and sub-features of the marine component of The Swale SPA to different categories of operations**

Table 10 Assessment of the relative vulnerability of interest features and sub-features of the marine component of The Medway Estuary and Marshes to different categories of operations

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English Nature's advice for Swale and Medway European marine site given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

1. Introduction

1.1 Natura 2000

The European Union Habitats[1] and Birds[2] Directives are international obligations which set out a number of actions to be taken for nature conservation. The Habitats Directive aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements, and sets out measures to maintain or restore, natural habitats and species of European Union interest at favourable conservation status[3]. The Birds Directive protects all wild birds and their habitats within the European Union, and there are special measures for migratory birds and those that are considered rare or vulnerable.

The Habitats and Birds Directives include requirements for the designation of conservation areas. In the case of the Habitats Directive these are Special Areas of Conservation (SACs) which support certain natural habitats or species, and in the Birds Directive, Special Protection Areas (SPAs) which support wild birds of European Union interest. These sites will form a network of conservation areas across the EU to be known as "Natura 2000". Where SACs or SPAs consist of areas continuously or intermittently covered by tidal waters or any part of the sea in or adjacent to Great Britain up to the limit of territorial waters, they are referred to as European marine sites.

Further guidance on European marine sites is contained in the Department of the Environment Transport and Regions/Welsh Office document: *European marine sites in England & Wales: A guide to the Conservation (Natural Habitats &c.) Regulations 1994 and to the preparation and application of management schemes.*

1.2 English Nature's role

The Conservation (Natural Habitats &c.) Regulations 1994 translate the Habitats Directive into law in Great Britain. It gives English Nature a statutory responsibility to advise relevant authorities as to the conservation objectives for European marine sites in England and to advise relevant authorities as to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the sites have been designated. This information will be a key component of any of the management schemes which may be developed for these sites.

This document is English Nature's advice for the Medway and Swale European marine sites. Following consultation and acceptance by English Nature Council, this document is issued in fulfilment of Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994 (the

1 Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

2 Council Directive 79/409/EEC on the conservation of wild birds

3 A habitat or species is defined as being at favourable conservation status when its natural range and the areas it covers within that range are stable or increasing and the specific structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future.

'Regulation 33 package'). Copies of key references quoted in this document are held at the English Nature local office, in Kent.

In addition to providing such advice, the Regulation 33 package informs on the scope and nature of 'appropriate assessment' which the Directive requires to be undertaken for plans and projects (Regulations 48 & 50 and by English Nature under Regulation 20). English Nature may also provide more detailed advice to competent and relevant authorities to assess the implications of any such plans or projects.

1.3 The role of relevant authorities

The Conservation (Natural Habitats &c.) Regulations 1994 require all competent authorities to exercise their functions so as to secure compliance with the Habitats Directive. This European marine site is managed through existing SSSI mechanisms under the Wildlife and Countryside Act 1981, as amended 1985. However, relevant authorities may, if deemed necessary, draw up a management scheme under Regulation 34 for the European marine site component of the Medway and Swale SPAs. If such a management scheme is developed, it would provide the framework through which relevant authorities exercise their functions so as to secure compliance with the Habitats Directive and must be based on the advice in this package. Irrespective of this decision, relevant authorities must, within their areas of jurisdiction, have regard to both direct and indirect effects on an interest feature of the site as well as cumulative effects. This may include consideration of features and issues outside the boundary of the European marine site and above the highest astronomical tide.

Relevant authorities should ensure that all plans for the area integrate with any management scheme for the European marine site. Such plans may include shoreline management plans, ChaMPs (Coastal Habitat Management Plans), local Environment Agency plans, SSSI management plans, local BAP plans and sustainable development strategies for estuaries. This must occur to ensure that there is only a single management scheme through which all relevant authorities exercise their duties under the Conservation (Natural Habitats &c.) Regulations 1994.

Relevant authorities also need to have regard to changing circumstances of the SPA and may therefore need to modify the way in which they exercise their functions so as to maintain the favourable condition of interest features concerned in the long term. There is no requirement for relevant authorities to take any actions outside their statutory functions.

Under certain circumstances, where another relevant authority is unable to act for legal reasons, or where there is no other relevant authority, English Nature is empowered to use its by-law making powers for Marine Nature Reserves (MNR) for use in European marine sites.

1.4 Activity outside the control of relevant authorities

Nothing within this Regulation 33 package will require relevant authorities to undertake any actions or ameliorate changes in the condition of interest features if it is shown that the changes result wholly from natural causes[4]. This also applies if the changes, although causing deterioration or disturbance to the interest features, are the result of human or natural events outside their control. Having issued Regulation 33 advice for European marine sites, English Nature will work with relevant authorities and others to agree, within a defined time frame, a protocol for evaluating all observed changes to baselines and to develop an understanding of natural change and provide further guidance as appropriate and possible.

1.5 Responsibilities under other conservation designations

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

In addition to their SPA status, parts of the Medway and Swale are also designated and subject to agreements under other conservation legislation (e.g. SSSIs notified under the Wildlife and Countryside Act 1981 as amended 1985). The obligations of relevant authorities and other organisations under such designations are not affected by the advice contained in this document.

1.6 Role of conservation objectives

Section 4 of this document sets out the conservation objectives for the Swale and Medway European marine site. They 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 for informing on 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 the Habitats Directive.

1.7 Role of advice on operations

The advice on operations, set out in Section 6 and Appendix II, 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. It is given on the basis of the working assumption that sites were in favourable condition at the time they were identified. In the 2000 to 2006 reporting period an assessment of the condition of the site will be made to support this assumption, and ensure that favourable condition is being maintained. The advice should also be used to identify the extent to which existing measures of control, management and use are, or can be made, consistent with the conservation objectives and thereby focus the attention of relevant authorities and surveillance to areas that may need management measures.

This operations advice may need to be supplemented through further discussions with any management and advisory groups for the European marine site.

2. Qualifying species within the SPA under the EU Birds Directive

The boundaries of the Swale Special Protection Area (SPA) and the Medway Estuary and Marshes SPA are shown in Figures 1 and 2.

The Swale SPA qualifies under Article 4.2 of the EU Birds Directive by supporting:

- Internationally important populations of regularly occurring migratory species; and
- An internationally important assemblage of waterfowl.

Medway Estuary and Marshes SPA qualifies under Article 4.1 of the EU Birds Directive by supporting:

- Internationally important populations of regularly occurring Annex 1 species.

It also qualifies under Article 4.2 of the EU Birds Directive in that it supports:

- Internationally important populations of regularly occurring migratory species; and
- An internationally important assemblage of waterfowl.

Swale SPA was classified as an SPA in 1985 and extended in 1993 and it is that citation on which this advice is based. The Medway Estuary and Marshes SPA was classified in 1993, and the citation prepared for that classification has been used to develop this advice.

3. Interest features of the European marine site

The Swale SPA and the Medway Estuary and Marshes SPA include both marine areas (ie. land covered continuously or intermittently by tidal waters) and land which is permanently sub-tidal. The marine parts of the SPAs are termed European marine sites. The extent of the Swale and the Medway European marine site is illustrated in Figures 3.1 and 3.2. The seaward boundary of the European marine site is concurrent with that of the SPAs. The landward boundary of the European marine sites is the upper boundary of the SPA, or where that extends above land covered continuously or intermittently by tidal waters it is at the limit of the marine habitats.

Where SPA qualifying species occur within the European marine site they are referred to as interest features. Sub-features (habitats) have also been identified to highlight the ecologically important components of the European marine site for each interest feature. The interest features and sub-features for the Swale and Medway European marine site are described below and the sub-features are mapped at Figure 3.1 and 3.2 to show their distribution and extent.

3.1 Background and context

A major aim of the Birds Directive is to take special measures to conserve the habitats of qualifying birds in order to ensure their survival and reproduction within the European Union. A key mechanism in achieving this is the classification by Member States of the most suitable sites as SPAs.

English Nature's conservation objectives at a site level focus on maintaining the condition of the habitats used by the qualifying species. Habitat condition will be delivered through appropriate site management including the avoidance of damaging disturbance. In reporting on Favourable Conservation Status, account will need to be taken both of habitat condition and the status of the birds on the SPA.

Accordingly, English Nature will use annual counts, in the context of five year means for qualifying species, together with available information on population and distribution trends, to assess whether an SPA is continuing to make an appropriate contribution to the Favourable Conservation Status of the species. Count information will be assessed in combination with information on habitat condition, at the appropriate time within the reporting cycle, in order to report to the European Commission.

English Nature's advice focuses on the qualifying species for which the SPA was originally classified despite the fact that numbers and species composition may have changed on this site since that time. Such population and species composition changes are being documented through the UK SPA Network Review, led by JNCC, which will provide advice to Ministers on any changes required in SPA citations. Depending on the review and decisions from DETR, English Nature may reissue this advice.

In addition to focusing on avoiding deterioration to the habitats of the qualifying species, the Habitats Directive also requires that actions are taken to avoid significant disturbance to the species for which the site was designated. Such disturbance may include alterations in population trends and/or distribution patterns. Avoiding disturbance to species requirements is mentioned in the favourable condition table underpinning the conservation objectives for the SPA. In this context, five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

Attention is, however, also directed to the inclusion of disturbance in the advice on operations provided in section 6. Where disturbance is highlighted in such advice, relevant authorities need to avoid damaging disturbance to qualifying species when exercising their functions under the Directive.

3.2 Reductions in organic inputs

Under the Urban Waste Water Treatment (UWWT) Directive all coastal discharges above a certain volume must have secondary treatment installed by the end of 2000. Secondary treatment of sewage will significantly reduce organic loading and to a lesser extent reduce concentrations of dissolved nutrients. The effects of these reductions on coastal features and the birds they support are difficult to predict. On the one hand, it might be expected that there would be a redistribution of feeding birds or a reduction in the overall capacity of a coastal area to support bird populations. On the other hand, where bird populations are currently adversely affected by eutrophication, cleaner discharges may contribute to improving site condition.

English Nature supports the cleaning up of coastal discharges. On balance, the overall ecological benefits of cleaner discharges are likely, in general, to outweigh any subsequent local decline in bird numbers, although there is presently insufficient knowledge to accurately predict the effects in general or for individual SPA sites. Consequently, English Nature, with input from the Countryside Council for Wales and the Environment Agency, is commissioning a related research project to study the relationship between birds and organic nutrient levels, the overall effects on the ecosystem and thereby the effects of the clean-up programme under the UWWT and Bathing Water Directives.

Under the Habitats Regulations, if significant effects are likely from such activities, the competent authority (in this case the Environment Agency) will be required to undertake an appropriate assessment to determine whether there is an adverse effect on site integrity.

3.3 Evolution of estuary geomorphology

Sea level rise in the Medway is estimated as being as high as 8mm per year (IECS, 1993). The squeeze of coastal habitats between rising seas and built sea defences is a concern in the Medway and Swale, as elsewhere around the coast. In the period from 1973 to 1988, 21.3% of the saltmarsh in the Medway and 14.6% of that in the Swale was lost to tidal erosion (Burd, 1992). There is a lack of information on how the extent and profile of the intertidal mudflats has changed in recent decades. It is hoped that recently developed remote sensing techniques will make detailed mapping of the intertidal terrain practicable.

Science is divided over the longer term evolution of the estuary. One scenario is provided by IECS (1993). This is that large scale erosion began in the nineteenth century, induced by commercial extraction of mud from the estuary. It suggests that the sediment budget of the Medway is now approximately in balance, and that it may be moving into an accreting phase. Another scenario is provided by Kirby (1990 and 1994). This suggests that erosion started earlier within the Medway, closer to 1700, and that it was induced by natural, though unidentified events. He estimates that the estuary is losing 1 million cubic metres of sediment a year.

Thus the future of the estuary is unclear. We cannot be sure of what balance between saltmarsh and mudflat is sustainable.

Local bird counts suggest that every large block of saltmarsh in the Medway and Swale is used by waterfowl roosting at high tide. It is probable that the mudflats are also fully exploited as feeding grounds by waterfowl, and that the available feeding area is a limiting factor on populations of the SPA bird species. The targets expressed in table 2 of this guidance are for maintenance of the area of both saltmarsh and mudflat.

Nevertheless, whilst maintenance or increase of the extent of either saltmarsh or mudflat would be positive in itself, it could be at the expense of the other. If adjustment of the balance between mudflat and saltmarsh made the morphology of the intertidal more sustainable, this would be seen as an enhancement if the new balance fully accommodated the SPA bird populations. The conversion of saltmarsh to mudflat, or vice versa, may be acceptable in nature conservation terms. Loss of either habitat to other landforms, unsuitable for the SPA bird species, would be unacceptable. The targets for

maintenance of the extent of mudflat and saltmarsh will be reviewed as our knowledge of the estuary improves.

3.4 General description

In recognition that bird populations may change as a reflection of national or international trends or events, this advice on the bird interests of the European marine site focuses on the condition of the habitats necessary to support the bird populations. Sub-features are identified which describe the key habitats within the European marine site necessary to support the birds that qualify within the SPA. Detailed information and targets for habitat condition are listed in the favourable condition tables in Section 5. Bird usage of the site varies seasonally, with different areas being favoured over others at certain times of the year. However, annual counts for qualifying species will be used by English Nature, in the context of five year peak means, together with available information on UK population and distribution trends, to assess whether these SPAs are continuing to make an appropriate contribution to the Favourable Conservation Status of species across Europe.

Bird communities are highly mobile and exhibit patterns of activity related to tidal water movements and many other factors. Different bird species exploit different parts of a marine area and different prey species. Changes in the habitat may therefore affect them differently. The important bird populations at this site require a functional estuary system which is capable of supporting intertidal habitats suitable for feeding, roosting and nesting. The most important factors related to this are:

- Current extent and distribution of suitable feeding and roosting habitat (e.g. saltmarsh, mudflats);
- Sufficient prey availability (e.g. small fish, crustaceans and worms);
- Minimal levels of disturbance;
- Water quality necessary to maintain intertidal plant and animal communities (represented in the favourable condition table as food availability); and
- Water quantity and salinity gradients necessary to maintain saltmarsh conditions suitable for bird feeding and roosting (represented in the favourable condition table as food availability and vegetation characteristics).

3.5 Marine component of The Swale SPA

3.5.1 Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species

Britain's wildfowl belong to north-west European populations and the waders to East Atlantic flyway populations. Sites which hold more than 1% of these populations of migratory species are regarded as internationally important for those species and meet the SPA criteria. When the Swale SPA was extended, in 1993, data indicated that it held internationally important populations of four migratory species, dark-bellied brent goose, wigeon, grey plover and redshank.

A site may also be considered internationally important for the total numbers of its assemblage of waterfowl. Where a site holds more than 20,000 waterfowl it meets the SPA criteria. The Swale is one of the most important estuaries in the UK for its total number of wintering waterfowl. In addition to its internationally important populations, the Swale qualified at the time of its extension by holding an average annual peak of 57,600 waterfowl. This total includes all the internationally important, regularly occurring, migratory or Annex 1 wintering species, as well as those present in nationally important numbers and species, the populations of which exceed 2000 individuals.
As well as feeding and roosting on habitats within the European marine site, SPA species (such as dark-bellied brent goose and wigeon) also use grazing marsh and flooded mineral workings in other parts of the Swale SPA. These habitats are outside the boundary of the European marine site and so they are not addressed within this advice. Nevertheless relevant authorities need to have regard to the SPA interest outside the European marine site, as it might be affected by activities taking place within the European marine site.

3.5.1.1 Key sub-features

Mudflats
Mudflats are a rich source of invertebrates and provide the main feeding ground for wintering species such as grey plover and redshank, which occur in internationally important numbers, and the other nationally important waterfowl species which contribute to the waterfowl assemblage. In the relatively sandy flats of the eastern part of the Swale it is not uncommon to find within one square metre, 30 lugworms, 40 of the similar worm *Scoloplos*, 6 catworms, 6 cockles and 4 of the shell fish, Baltic tellin (Newell, 1954). Within the same square metre there may be literally thousands of the small laver spire shell, a favourite food of pintail. It is said that in energy terms the value of all of these invertebrate prey items together adds up to an amount equivalent to that of that of 16 Mars bars (RSPB, KCC, NRA, undated).

In addition mudflats do support plant life, including eel grass and algae. These are valuable as food for the internationally important populations of dark-bellied brent goose and wigeon, especially when inland feeding sites are frozen.

Saltmarsh
Saltmarsh is the predominantly vegetated part of the intertidal, and is a sub-feature in both of the SPAs. The vegetation varies because the plants at each level within its vertical profile are adapted to their particular degree of tidal exposure. Also in parts the vegetation varies because of grazing by domestic livestock. The importance of the saltmarshes for birds is for high tide roosting and feeding.

Where the vegetation is kept short by grazing livestock, wildfowl which are themselves grazers, including wigeon and dark-bellied brent goose, can feed. Around high tide, the network of creeks within the saltmarsh are the only exposed areas of mud, as mudflats in the lower parts of the estuary are still covered by the tide. Wading birds will feed within these creeks. Where there is shallow water within the saltings it is especially suitable for dabbling duck.

3.6 Marine component of The Medway SPA

3.6.1 Internationally important populations of the regularly occurring Annex 1 species

Species listed on Annex 1 of the Birds Directive are rare, vulnerable or in danger of extinction. In order to ensure their survival and reproduction in their area of distribution, Annex 1 species are the subject of special conservation measures concerning their habitat. Sites which support over 1% of the national population of an Annex 1 species are regarded as internationally important for that species and meet the SPA criteria. The Medway supports such internationally important populations of breeding avocet and little tern, and also wintering avocet. The internationally important wintering population of avocet also contributes to the wintering waterfowl assemblage but to avoid repetition it is listed here in relation to Annex 1 only.

Some of the habitat required for little tern to nest, bare and sparsely vegetated shingle, lies above the Highest Astronomical Tide, outside the upper shore boundary of the European marine site. Avocet breed on areas of grazing marsh. Whilst these habitats are outside the boundary of the European marine site,

relevant authorities need to have regard to these SPA interests as they might be affected by activities taking place within the European marine site.

3.6.1.1 Key sub-features

Mudflats
As described above for the Swale SPA (paragraph 3.5.1.1), mudflats are a rich source of invertebrates. In summer they provide a feeding area for avocet, which are known to move their young into the intertidal area, when feeding grounds on the landward side of the sea wall become unsuitable. In winter large flocks of avocet feed along the water's edge.

Saltmarsh
Saltmarsh is as important as a high tide roost for avocet, as it is for waterfowl in the Swale.

Shallow inshore waters
Little terns feed in the shallow waters of the Medway. Prey include fish, crustaceans and worms.

Shallow inshore waters are listed as a sub-feature for the Medway but not for the Swale because neither little tern nor great crested grebe (which occurs in nationally important numbers in the Medway) reach sufficient numbers to be listed as an interest feature within the Swale SPA, even though they form part of the national interest of the Swale SSSI.

Shingle beaches
Little terns nest on largely unvegetated shingle, such as that on Deadman's Island and Stoke Saltings. They prefer a shallow sloping shoreline that provides protection against flooding. Shingle beaches are not listed as a sub-feature in the Swale because little tern do not reach sufficient numbers to be listed as an interest feature within the Swale SPA, even though they form part of the national interest of the Swale SSSI.

3.6.2 Internationally important assemblage of waterfowl including internationally important populations of regularly occurring migratory bird species

When the Medway Estuary and Marshes SPA was classified, in 1993, data indicated that it held internationally important populations of eight regularly occurring migratory species.

The Medway is one of the most important estuaries in the UK for its total number of wintering waterfowl. In addition to its internationally important populations, the Swale qualified at the time of its extension by holding an average annual peak of 57,600 waterfowl.

As well as feeding and roosting on habitats within the European marine site, SPA species (such as dark-bellied brent goose and wigeon) also use grazing marsh and flooded mineral workings in other parts of the Swale SPA. These habitats are outside the boundary of the European marine site and so they are not addressed within this advice. Nevertheless relevant authorities need to have regard to the SPA interest outside the European marine site, as it might be affected by activities taking place within the European marine site.

3.6.2.1 Key sub-features

Mudflats
As for the Swale SPA (paragraph 3.5.1.1), mudflats in the Medway Estuary and Marshes SPA provide the main feeding grounds for wintering species which occur in internationally important numbers, and the other nationally important waterfowl species which contribute to the waterfowl assemblage.

Saltmarsh
As for the Swale SPA (paragraph 3.5.1.1)**,** saltmarsh in the Medway Estuary and Marshes SPA provides roosting and feeding grounds for wintering species which occur in internationally important numbers, and the other nationally important waterfowl species which contribute to the waterfowl assemblage.

Shallow coastal waters
Great crested grebe feed in the shallow waters of the Medway and, at the time of classification, occurred in nationally important numbers within the Medway Estuary and Marshes SPA.

4. Conservation objectives for SPA interest features

Under Regulation 33(2)(a) of The Conservation (Natural Habitats &c.) Regulations 1994, English Nature has a duty to advise other relevant authorities as to the conservation objectives for the European site. The conservation objectives for the Swale and Medway European marine site interest features are provided below and should be read in the context of other advice given in this package, particularly:

- the attached maps showing the extent of the sub-features;
- summary information on the interest of each of the features; and
- the favourable condition table, providing information on how to recognise favourable condition for the feature and which will act as a basis for the development of a monitoring programme.

4.1 Conservation Objectives for the marine component of The Swale SPA

4.1.1 The conservation objective for the internationally important populations of regularly occurring migratory bird species

Subject to natural change, maintain in favourable condition[5] the habitats for the **internationally important populations of regularly occurring migratory bird species**, under the Birds Directive, in particular:

- **Intertidal Mudflats**
- **Intertidal Saltmarsh**

Numbers of bird species using these habitats are given in Table 1

4.1.2 The conservation objective for the internationally important assemblage of waterfowl.

Subject to natural change, maintain in favourable condition [5] the habitats for the **internationally important assemblage of waterfowl**, under the Birds Directive, in particular:

- **Intertidal Mudflats**
- **Intertidal Saltmarsh**

Numbers of bird species using these habitats are given in Table 1

For a detailed definition of how to recognise favourable condition see attached tables 3 and 4 (Section 5)

Note: These SPA conservation objectives focus on habitat condition in recognition that bird populations may change as a reflection of national or international trends or events. Annual counts for qualifying species will be used by English Nature, in the context of five year peak means, together with available information on UK population and distribution trends, to assess whether these SPAs are continuing to make an appropriate contribution to the Favourable Conservation Status of the species across Europe.

4.2 Conservation Objectives for the marine component of The Medway Estuary and Marshes SPA

4.2.1 The conservation objective for the internationally important populations of the regularly occurring Annex 1 bird species

Subject to natural change, maintain in favourable condition[5] the habitats for the **internationally important populations of the regularly occurring Annex 1 bird species**, under the Birds Directive, in particular:

- **Shingle Beaches**
- **Shallow Coastal Waters**
- **Intertidal Mudflats**
- **Intertidal Saltmarsh**

Numbers of bird species using these habitats are given in Table 2

4.2.2 The conservation objective for the internationally important populations of regularly occurring migratory bird species

Subject to natural change, maintain in favourable condition[5] the habitats for the **internationally important populations of regularly occurring migratory bird species**, under the Birds Directive, in particular:

- **Intertidal Mudflats**
- **Intertidal Saltmarsh**

Numbers of bird species using these habitats are given in Table 2

For a detailed definition of how to recognise favourable condition see attached tables 3 and 4(Section 5)

4.2.3 The conservation objective for the internationally important assemblage of waterfowl.

Subject to natural change, maintain in favourable condition[5] the habitats for the **internationally important assemblage of waterfowl**, under the Birds Directive, in particular:

- **Shallow Coastal Waters**
- **Intertidal Mudflats**
- **Intertidal Saltmarsh**

Numbers of bird species using these habitats are given in Table 2

Note: These SPA conservation objectives focus on habitat condition in recognition that bird populations may change as a reflection of national or international trends or events. Annual counts for qualifying species will be used by English Nature, in the context of five year peak means, together with available information on UK population and distribution trends, to assess whether these SPAs are continuing to make an appropriate contribution to the Favourable Conservation Status of the species across Europe.

[5] For a detailed definition of how to recognise favourable condition see attached tables 3 and 4(Section 5)

5 For a detailed definition of how to recognise favourable condition see attached table (Section 5)

Table 1 Information on populations of bird species qualifying under the Birds Directive using the marine component of The Swale SPA at the time the SPA was classified.

Internationally important populations of regularly occurring migratory bird species[6]

Species	Population (5 year mean 1986/7 to 90/91)*	
Dark-bellied brent geese *Branta bernicla bernicla*	2850 birds	1.6% World*
Wigeon *Anas penelope*	9500 birds	1.2% North West Europe
Grey plover *Pluvialis squatarola*	1550 birds	1% East Atlantic Flyway
Redshank *Tringa totanus*	3100 birds	2% East Atlantic Flyway

Internationally important waterfowl assemblage

Importance	5 year peak mean (1986/7 to 90/91)*
The Swale support large numbers of waterfowl in winter	57,600 birds*

Nationally important bird populations within internationally important assemblages of waterfowl.

Species	Population (5 yr peak mean 1986/7 to 90/91)*
European white-fronted goose *Anser albifrons albifrons*	1875 birds
Shelduck *Tadorna tadorna*	1650 birds
Teal *Anas crecca*	2,100 birds
Pintail *Anas acuta*	435 birds
Shoveler *Anas clypeata*	340 birds
Oystercatcher *Haematopos ostralegus*	3700 birds
Ringed plover *Charadrius hiaticula*	260 birds
Knot *Calidris canutus*	2650 birds
Dunlin *Calidris alpina*	13,000 birds
Black-tailed godwit *Limosa limosa*	220 birds
Curlew *Numenius arquata*	1,847 birds

* SPA citation (March 1993) held on Register of European marine sites for Great Britain, and English Nature 1993.

[6] The Swale SPA is regularly used by 1% or more of the biogeographical population of a regularly occurring species (other than those listed on Annex 1) in any season (Cranswick *et al.* 1995)

Table 2 Information on populations of bird species qualifying under the Birds Directive using the marine component of The Medway Estuary and Marshes SPA at the time the SPA was classified.

Internationally important populations of regularly occurring Annex 1 species

Species	Population (5 year mean)*	
Avocet breeding *Avocetta recurvirostra*	28 pairs (1988-1992)	7% Great Britain
Avocet wintering *Avocetta recurvirostra*	70 birds (1986/7-90/91)	7% Great Britain (5 year peak mean 1986/7 to 90/91)
Little tern *Sterna albifrons*	24 pairs (1988-1992)	1% Great Britain

Internationally important populations of regularly occurring migratory bird species[6]

Species	Population (5 year peak mean 1986/7 to 90/91)*	
Dark-bellied brent geese *Branta bernicla bernicla*	4130 birds	2.4% World
Shelduck *Tadorna tadorna*	5900 birds	2.3% North West Europe
Pintail *Anas acuta*	980 birds	1.4% North West Europe
Grey plover *Pluvialis squatarola*	4810 birds	3.2 % East Atlantic Flyway
Ringed plover *Charadrius hiaticula*	740 birds	1.4% East Atlantic Flyway
Knot *Calidris canutus*	3690 birds	1.0% East Atlantic Flyway
Dunlin *Calidris alpina*	22,900 birds	1.6% East Atlantic Flyway
Redshank *Tringa totanus*	4180 birds	2.7% East Atlantic Flyway

Internationally important waterfowl assemblage

Importance	Population (5 year peak mean 1986/7 to 90/91)*
The Medway estuary and Marshes support large numbers of waterfowl in winter	53,900 birds*

Nationally important populations of regularly occurring migratory bird species[6]

Species	Population (5 year peak mean 1986/7 to 90/91)*	
Great crested grebe *Podiceps cristatus*	250 birds	2.5% Great Britain
Wigeon *Anas penelope*	5200 birds	2.0% Great Britain
Teal *Anas crecca*	2,400 birds	2.4% Great Britain
Shoveler *Anas clypeata*	150 birds	1.7% Great Britain
Oystercatcher *Haematopos ostralegus*	3300 birds	1.1% Great Britain
Black-tailed godwit *Limosa limosa*	390 birds	7.9% Great Britain
Curlew *Numenius arquata*	1,900 birds	2.1% Great Britain
Spotted redshank *Tringa erythropus*	17 birds	8.5% Great Britain
Greenshank *Tringa nebularia*	12 birds	3.0% Great Britain
Turnstone *Arenaria interpres*	630 birds	1.4% Great Britain

* SPA citation (March 1993) held on Register of European marine sites for Great Britain.

6 The Medway Estuary and Marshes SPA is regularly used by 1% or more of the biogeographical population of a regularly occurring species (other than those listed on Annex 1) in any season (Cranswick *et al.* 1995)

5. Favourable condition table

The favourable condition table is supplied as an integral part of English Nature's Regulation 33 advice package. It is intended to supplement the conservation objectives only in relation to management of activities and requirements on monitoring the condition of the site and its features. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under Regulations 20 and 48-50, but it does provide a basis to inform the scope and nature of any 'appropriate assessment' that may be needed. It should be noted that appropriate assessments are, by contrast, a separate activity to condition monitoring requiring consideration of issues specific to individual plans or projects. English Nature will provide more detailed advice to competent and relevant authorities to assess the implications of any given plan or project under the Regulations, where appropriate, at the time a plan or project is being considered.

The favourable condition table is the principle source of information that English Nature will use to assess the condition of an interest feature and as such comprises indicators of condition. On many terrestrial European sites, we know sufficient about the preferred or target condition of qualifying habitats to be able to define measures and associated targets for all attributes to be assessed in condition monitoring. Assessments as to whether individual interest features are in favourable condition will be made against these targets. In European marine sites we know less about habitat condition and find it difficult to specify favourable condition. Individual sites within a single marine habitat category are also all very different, further hampering the identification of generic indicators of condition. Accordingly, in the absence of such information, condition of interest features in European marine sites will be assessed against targets based on the existing conditions, which may need to be established through baseline surveys in many cases.

The assumption that existing interest features on European marine sites are in favourable condition will be tested in the 2000 - 2006 reporting period and the results subsequently fed back into our advice and site management. Where there is more than one year's observations on the condition of marine habitats, all available information will need to be used to set the site within long-term trends in order to form a view on favourable condition. Where it may become clear that certain attributes are a cause for concern, and if detailed studies prove this correct, restorative management actions will need to be taken to return the interest feature from unfavourable to favourable condition. It is the intention of English Nature to provide quantification of targets in the favourable condition table during the 2000 - 2006 reporting period.

This advice also provides the basis for discussions with management and advisory groups, and as such the attributes and associated measures and targets may be modified over time. The aim is to produce a single agreed set of attributes that will then be monitored in order to report on the condition of features. Monitoring of the attributes may be of fairly coarse methodology, underpinned by more rigorous methods on specific areas within the site. To meet UK agreed common standards, English Nature will be committed to reporting on each of the attributes subsequently listed in the final version of the table, although the information to be used may be collected by other organisations through agreements.

The table will be an important, but not the only, driver of the site monitoring programme. Other data, such as results from compliance monitoring and appropriate assessments, will also have an important role in assessing condition. The monitoring programme will be developed through discussion with the relevant authorities and other interested parties. English Nature 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, taking into account all available information and using the favourable condition table as a guide.

Box 1	**Glossary of terms used in the favourable condition table**
Interest feature	The habitat or species for which the site has been selected.
Sub-feature	An ecologically important sub-division of the interest feature.
Attribute	Selected characteristic of an interest feature/sub-feature which provides an indication of the condition of the feature to which it applies.
Measure	What will be measured in terms of the units of measurement, arithmetic nature and frequency at which the measurement is taken. This measure will be attained using a range of methods from broad scale to more specific across the site.
Target	This defines the desired condition of an attribute, taking into account fluctuations due to natural change. Changes that are significantly different from the target will serve as a trigger mechanism through which some further investigation or remedial action is taken.
Comments	The rationale for selection of the attribute.

Table 3 Favourable Condition Table for the marine component of The Swale SPA

Numbers of bird species using these habitats are given in Table 1

NB - Many of the attributes will be able to be monitored at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the first reporting cycle in order to characterise the site and establish the baseline.

INTEREST FEATURE	SUB-FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENT
Internationally important assemblage of waterfowl including internationally and nationally important populations of regularly occurring migratory species	Intertidal mudflats and saltmarsh	Disturbance	Reduction or displacement of birds, measured periodically (frequency to be determined).	No significant reduction in numbers or displacement of wintering birds attributable to disturbance, subject to natural change.	All qualifying species.
		Absence of obstructions to viewlines	Openness of terrain unrestricted by obstructions, measured periodically (frequency to be determined).	No increase in obstructions to existing bird viewlines, subject to natural change.	Some waterfowl require unrestricted views over >200m to allow early detection of predators when feeding and roosting. Dark-bellied brent geese require unrestricted views over >500m.
		Extent and distribution of habitat	Area (ha) measured once during reporting cycle.	No decrease in extent of habitats, from an established baseline, subject to natural change.	For a given tidal frame the shoreline profile determines the extent of intertidal habitat and the time it is available to for use by birds. Any lowering of the profile in relation to sea level will significantly effect the availability of suitable feeding and roosting habitat.
	Intertidal mudflats	Food availability	Presence and abundance of mud-surface plants and green algae, measured periodically (frequency to be	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change.	*Zostera*, *Ulva* and *Enteromorpha* are important for brent goose and wigeon.

			determined).		
Internationally important assemblage of waterfowl including internationally and nationally important populations of regularly occurring migratory species	Intertidal mudflats	Food availability	Presence and abundance of intertidal invertebrate prey species, measured periodically (frequency to be determined).	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change.	Important prey species include: *Macoma, Mytilus/Cerastoderma* spat and *Hydrobia* for knot. *Cardium*, *Mytilus* and *Arenicola* for oystercatcher. *Hydrobia* for Pintail. *Nereis, Hydrobia* and *Corophium* for shelduck. *Macoma, Cardium* and *Nereis* for black-tailed godwit. *Carcinus* and *Nereis* for curlew. *Nereis, Macoma, Hydrobia, Crangon* and *Carcinus* for dunlin. *Nereis, Arenicola* and *Notomastus* for grey plover. *Hydrobia, Macoma, Corophium* amd *Nereis* for redshank. *Gammarus*, tubifex worms and *Pisidium* for ringed plover.
	Saltmarsh	Food availability	Presence and abundance of soft-leaved plants and seed bearing plants measured periodically (frequency to be determined).	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change.	Important food species include: *Spergularia, Puccinellia, Triglochin, Aster trifolium, Plantago* and *Salicornia spp*. for dark-bellied brent geese. *Salicornia* and *Atriplex* for teal. *Agrostis stolonifera, Puccinellia maritime* and *Salicornia spp*. for wigeon. *Puccinellia marima, Hordeum marinum, Lollium perenne, Festuca rubra* and *Alopecurus bulbosus* for white-fronted goose.
		Vegetation characteristics	Open, short vegetation or bare ground predominating in areas used for roosting and short vegetation predominating in areas used for feeding, measured periodically (frequency to be determined).	Vegetation height throughout areas used for roosting and feeding should not deviate significantly from an established baseline, subject to natural change.	Vegetation height of <10cm is required throughout roosting areas for waders. Vegetation height of <10cm is required throughout feeding areas for dark-bellied brent goose. Vegetation height of <5cm is required throughout feeding areas for wigeon.

NB. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Swale estuary and may well be missed by routine monitoring.

Table 4 Favourable Condition Table for the marine component of The Medway SPA

Numbers of bird species using these habitats are given in Table 2

NB - Many of the attributes will be able to be monitored at the same time or during the same survey. The frequency of sampling for many attributes may need to be greater during the first reporting cycle in order to characterise the site and establish the baseline.

FEATURE	SUB - FEATURE	ATTRIBUTE	MEASURE	TARGET	COMMENTS
Internationally important populations of regularly occurring Annex 1 birds (breeding little tern, breeding and wintering avocet)	Shingle, intertidal mudflats, saltmarsh and shallow coastal waters.	Disturbance	Bird numbers, productivity and displacement of birds.	No significant reduction in bird numbers or productivity and no significant displacement of birds attributable to disturbance from an established baseline, subject to natural change.	The breeding success of terns is particularly vulnerable to disturbance and predation. Productivity (number of successfully fledged young) can be used to monitor disturbance.
		Absence of obstruction to viewlines	Openness of terrain unrestricted by obstructions, measured periodically (frequency to be determined).	No increase in obstructions to existing bird viewlines, subject to natural change.	Avocets require unrestricted views to allow early detection of predators when feeding and roosting.
		Extent and distribution of habitat	Area (ha), measured once per reporting cycle.	No decrease in extent from an established baseline[7], subject to natural change.	Sand and shingle is the nesting area. Shallow coastal waters are an important feeding area. If beach profile does not keep pace with sea level rise, nests will suffer greater likelihood of flooding.
	Shingle	Vegetation cover/density	Open, short vegetation or bare ground predominating in areas used by breeding little terns, measured periodically	Vegetation cover <10% and the remainder bare during the breeding season, subject to natural change.	Open areas of largely bare shingle important in areas used by nesting little terns. Open ground with sparse vegetation allows unrestricted views for early detection of predators.

			(frequency to be determined).		
	Intertidal mudflats	Food availability	Presence and abundance of marine insects, crustaceans, molluscs, fish and worms, measured periodically (frequency to be determined).	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change.	*Gammarus, Corophium, Nereis, Hydrobia, Cardium* and *gobies* are important for avocet.
	Saltmarsh	Vegetation characteristics	Open, short vegetation or bare ground predominating in areas used for roosting, measured periodically (frequency to be determined).	Vegetation height throughout areas used for roosting should not deviate significantly from an established baseline, subject to natural change.	Vegetation height of <10cm is required throughout roosting areas.
	Shallow coastal waters	Food availability	Presence and abundance of crustacea, small fish and worms, measured periodically (frequency to be determined).	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change.	For example, crustaceans, annelids, sandeel and sprats are important feeding for little tern
Internationally important assemblage of waterfowl including internationally and nationally important populations of regularly occurring migratory species	Intertidal mudflats, saltmarsh and shallow coastal waters.	Disturbance	Reduction or displacement of birds, measured periodically (frequency to be determined).	No significant reduction in numbers or displacement of wintering birds attributable to disturbance, subject to natural change.	All qualifying species.

		Absence of obstructions to viewlines	Openness of terrain unrestricted by obstructions, measured periodically (frequency to be determined).	No increase in obstructions to existing bird viewlines, subject to natural change.	Some waterfowl require unrestricted views over >200m to allow early detection of predators when feeding and roosting. dark-bellied brent geese require unrestricted views over >500m.
		Extent and distribution of habitat	Area (ha) measured once during reporting cycle.	No decrease in extent of habitats, from an established baseline, subject to natural change.	For a given tidal frame the shoreline profile determines the extent of intertidal habitat and the time it is available to for use by birds. Any lowering of the profile in relation to sea level will significantly effect the availability of suitable feeding and roosting habitat.
	Intertidal mudflats	Food availability	Presence and abundance of mud-surface plants and green algae, measured periodically (frequency to be determined).	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change.	*Zostera*, *Ulva* and *Enteromorpha* are important for brent goose and wigeon.
		Food availability	Presence and abundance of intertidal invertebrate prey species, measured periodically (frequency to be determined).	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change.	Important prey species include: *Macoma, Mytilus/Cerastoderma* spat and *Hydrobia* for knot. *Cardium*, *Mytilus* and *Arenicola* for oystercatcher. *Hydrobia* for pintail. *Nereis*, *Hydrobia* and *Corophium* for shelduck. *Macoma*, *Cardium* and *Nereis* for black-tailed godwit. *Carcinus* and *Nereis* for curlew. *Nereis*, *Macoma, Hydrobia*, *Crangon* and *Carcinus* for dunlin. *Nereis, Arenicola* and *Notomastus* for grey plover. *Hydrobia, Macoma, Corophium* and *Nereis* for redshank. *Gammarus*, tubifex worms and *Pisidium* for ringed plover. *Gammarus, Nereis* and *Macoma* for spotted redshank. *Nereis, Gammarus, Crangon, Hydrobia, Littorina, Mya*, eels and *gobies* for greenshank. *Balanus, Mytilus, Carcinus, Gammarus, Littorina*, dipteran flies and kelp-fly larvae for turnstone.
	Saltmarsh	Food availability	Presence and abundance of soft-leaved plants and seed bearing plants measured	Presence and abundance of food species should not deviate significantly from an established baseline, subject to natural change.	Important food species include: *Spergularia, Puccinellia, Triglochin, Aster trifolium, Plantago* and *Salicornia spp*. for dark-bellied brent geese. *Salicornia* and *Atriplex* for teal. *Agrostis stolonifera, Puccinellia maritime* and *Salicornia spp*. for wigeon.

			periodically (frequency to be determined).		
		Vegetation characteristics	Open, short vegetation or bare ground predominating in areas used for roosting and short vegetation predominating in areas used for feeding, measured periodically (frequency to be determined).	Vegetation height throughout areas used for roosting and feeding should not deviate significantly from an established baseline, subject to natural change.	Vegetation height of <10cm is required throughout roosting areas for waders. Vegetation height of <10cm is required throughout feeding areas for dark-bellied brent goose. Vegetation height of <5cm is required throughout feeding areas for wigeon.
Nationally important populations of regularly occurring migratory species	Shallow coastal waters	Food availability	Presence and abundance of fish, measured periodically (frequency to be determined).	Presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change.	Fish of between 3-21cm are important for great crested grebe.

NB. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Medway estuary and may well be missed by routine monitoring.

6. Advice on operations

English Nature has a duty under Regulation 33(2)(b) of The Conservation (Natural Habitats &c.) Regulations 1994 to advise other relevant authorities as to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated. Information on how English Nature has developed this advice is given in section 6.2, and on how it may be reviewed and updated in the future, in Section 6.4.

The advice is provided in summary form in Table 5 and 6 and Section 6.5 and with more detail in Table 7 and 8 and Section 6.8 and Appendix II including advice in relation to specific interest features and their sub-features.

6.1 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 interest features on the Swale and Medway European marine site. The advice given here will inform on, but is without prejudice to, any advice given under Regulation 48 or Regulation 50 on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

6.2 Methods for assessment

To develop this advice on operations English Nature has used a three step process involving:

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

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

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

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

All the scores of relative sensitivity, exposure and vulnerability are derived using best available scientific information and informed scientific interpretation and judgement. The process uses sufficiently coarse categorisation to minimise uncertainty in information, reflecting the current state of our knowledge and understanding of the marine environment. Information has been gathered from a range of sources including reports such as ABP Research (1999).

6.2.1 Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features or the component sub-features of the Swale and Medway European marine site 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). The sensitivity has been assessed in relation to the use of habitats by birds. As an example, wintering birds are highly sensitive to loss of their roosting or feeding grounds.

The sensitivity assessments of the interest features or their component sub-features of the Swale and Medway European marine site are based upon a series of scientific review documents. These include reports produced for the UK Marine SAC LIFE project (Davison & Hughes 1998; Elliott *et al* 1998), the Countryside Council for Wales Science Report (Holt *et al*, 1995) and the Marine Habitats Reviews (Jones *et al*, 2000.).

The sensitivity assessments are based on current information but may develop with improvements in scientific knowledge and understanding. In particular, English Nature and Scottish Natural Heritage have commissioned the Marine Biological Association of the UK, through its Marine *Life* Information Network (MarLIN) to provide detailed sensitivity information to underpin this advice, over the next three years, and available to all over the World Wide Web (www.marlin.ac.uk).

6.2.2 Exposure assessment

This has been undertaken for the Swale and Medway European marine site by assessing the relative exposure of the interest features or their component sub-features to the effects of broad categories of human activities currently occurring on the site. The exposure has been assessed in relation to the use of habitats by birds. As an example, mudflats, the feeding grounds of wintering waterfowl, are considered highly exposed to changes in the thermal regime because of discharges into the Medway, which raise water temperature by 1 degree Celsius above background levels.

6.2.3 Vulnerability assessment

The third step in the process is to determine the vulnerability of interest features or their component sub-features to operations. This is an integration of sensitivity and exposure. Only if a feature is both sensitive and exposed to a human activity will it be considered vulnerable. In this context therefore, 'vulnerability' has been defined as the exposure of a 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 I.

6.3 Format of advice

The advice is provided within six broad categories of operations which 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;

- provides a consistent framework to enable relevant authorities in England 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 English Nature.

Sensitivity and vulnerability have been assessed in relation to the use of habitats by birds.

These broad categories provide a clear framework against which relevant authorities can assess activities under their responsibility. The more detailed information in Tables 7 and 8 provides relevant authorities with a context against which to consider an assessment of 'significant effect' or any plans or projects which may affect the site and a basis to inform on the scope and nature of appropriate assessments required in relation to plans and projects. It is important to note that this advice is only a starting point for assessing impacts. It does not remove the need for the relevant authorities to consult English Nature formally over individual plans and projects where required to do so under the Regulations.

6.4 Update and review of advice

Information as to the operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated, is provided in light of what English Nature knows about current activities and patterns of usage at the Swale and Medway European marine site. English Nature expects that the information on current activities and patterns of usage (which was used to derive tables 7 and 8) will be supplemented as part of the process of developing management of the site, and through further discussion with the relevant authorities. The option of zoning this information may be appropriate. As such, it is important that future consideration of this advice by relevant authorities and others takes account of changes in the usage patterns that have occurred at the site, over the intervening period, since the advice was issued. In contrast, the information provided in this advice on the sensitivity of interest features or sub-features (Tables 9 and 10) is relatively stable and will only change as a result of an improvement in our scientific knowledge, which will be a relatively long term process. Advice for sites will be kept under review and may be periodically updated through discussion with relevant authorities and others to reflect significant changes in our understanding of sensitivity together with the potential effects of plans and projects on the marine environment.

6.5 Summary of advice on operations for the marine component of The Swale SPA

6.5.1 Internationally important assemblage including nationally and internationally important populations of regularly occurring migratory species

In pursuit of the conservation objective for "habitats supporting the internationally important populations of regularly occurring migratory species and waterfowl assemblage" (Section 4.1), the relevant and competent authorities for Swale and Medway European marine site are advised to manage human activities within their remit such that they do not result in deterioration or disturbance to habitats or species for which the site has been selected, through any of the following:

- Physical loss resulting from removal
- Physical damage by abrasion or selective extraction
- Disturbance from noise or visual presence
- Toxic contamination through increased input of synthetic and/or non-synthetic compounds
- Non-toxic contamination through changes in organic and/or nutrient loading or changes in salinity
- Biological disturbance as result of the introduction of non-native species or selective extraction of species

For feature and sub-feature specific advice on operations refer to Appendix II

6.6 Summary of advice on operations for the marine component of The Medway Estuary and Marshes SPA

6.6.1 Internationally important populations of regularly occurring Annex 1 species

In pursuit of the conservation objective for "habitats supporting internationally important populations of regularly occurring Annex 1 species" (Section 4.2.1), the relevant and competent authorities for the Swale and Medway European marine site are advised to manage human activities within their remit such that they do not result in deterioration or disturbance to habitats or species for which the site has been selected, through any of the following:

- Physical loss by removal
- Physical damage by siltation or abrasion
- Disturbance from noise or visual presence
- Toxic contamination through increased input of synthetic and/or non-synthetic compounds
- Non-toxic contamination through changes in organic and/or nutrient loading, thermal pollution or changes in salinity.
- Biological disturbance as result of the introduction of non-native species or selective extraction of species.

For feature and sub-feature specific advice on operations refer to Appendix II

6.6.2 Internationally important assemblage including nationally and internationally important populations of regularly occurring migratory species

In pursuit of the conservation objective for "habitats supporting the internationally important populations of regularly occurring migratory species and waterfowl assemblage" (Sections 4.2.1 and 4.2.3), the relevant and competent authorities for the Swale and Medway European marine site are advised to manage human activities within their remit such that they do not result in deterioration or disturbance to habitats or species for which the site has been selected, through any of the following:

- Physical loss resulting from removal
- Physical damage by siltation or abrasion
- Disturbance from noise or visual presence
- Toxic contamination through increased input of synthetic and/or non-synthetic compounds
- Non-toxic contamination through changes in organic and/or nutrient loading, thermal pollution or changes in salinity.
- Biological disturbance as result of the introduction of non-native species or selective extraction of species.

For feature and sub-feature specific advice on operations refer to Appendix II

6.7 Plans and Projects

Under Regulation 48(1), 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.

This legal requirement applies to all European sites. Regulation 48 is also applied, as a matter of Government policy, to potential SPAs and listed Ramsar sites.

English Nature's 'Habitats regulations guidance note 1: The Appropriate Assessment (Regulation 48)', is at Appendix IV for further information.

Tables 3 and 4 provide relevant authorities with a guide against which to initiate an assessment of the 'significance' of any plans or projects (and ongoing operations or activities) proposed for the site although this will only be the starting point for assessing impacts and does not remove the need for relevant authorities to formally consult English Nature over individual plans and projects where required under the Regulations.

6.8 Review of consents

Regulation 50 of the Conservation (Natural Habitats, &c.) Regulations 1994 requires a competent authority to undertake a review of any existing consent or permission to which Regulation 48(1) would apply if were being reconsidered as of the date on which the site became a European site. Where a review is required under these provisions it must be carried out as soon as reasonably practicable. This will have implications for discharge and other consents, which will need to be reviewed in light of these objectives and may mean that lower targets for background levels of contaminants etc. will need to be set.

Table 5 Summary of operations which may cause deterioration or disturbance to the interest features of the marine component of The Swale SPA at current levels of use[7]

[7]

The advice below is not a list of prohibitions but rather a checklist for operations for discussion with the management group, which 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 features that are considered to be highly or moderately vulnerable to the effects of the operations.

Standard list of categories of operation which may cause deterioration or disturbance	Internationally important assemblage of waterfowl including Internationally important populations of regularly occurring migratory species
Physical loss	
Removal (e.g. harvesting, coastal development)	_
Smothering (e.g. by artificial structures, disposal of dredge spoil)	
Physical damage	
Siltation (e.g. run-off, channel dredging, outfalls)	
Abrasion (e.g. boating, anchoring, trampling)	_
Selective extraction (e.g. aggregate dredging)	_
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 & translocation	_
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	_

NB. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Swale estuary and may well be missed by routine monitoring.

Table 6 Summary of operations which may cause deterioration or disturbance to the interest features of the marine component of The Medway Estuary and Marshes SPA at current levels of use[7]

The advice below is not a list of prohibitions but rather a checklist for operations for discussion with the management group, which 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 features that are considered to be highly or moderately vulnerable to the effects of the operations.

Standard list of categories of operation which may cause deterioration or disturbance	Internationally important	Internationally important assemblage of waterfowl

	populations of regularly occurring Annex 1 birds	including Internationally important populations of regularly occurring migratory species
Physical loss		
Removal (e.g. harvesting, coastal development)	–	–
Smothering (e.g. by artificial structures, disposal of dredge spoil)		
Physical damage		
Siltation (e.g. run-off, channel dredging, outfalls)	–	–
Abrasion (e.g. boating, anchoring, trampling)	–	–
Selective extraction (e.g. aggregate dredging)		
Non-physical disturbance		
Noise (e.g. boat activity)	–	–
Visual (e.g. recreational activity)	–	–
Toxic contamination		
Introduction of synthetic compounds (e.g. pesticides, antifoulants, 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 & translocation	–	–
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	–	–

NB. Extreme events (such as storms reducing or increasing salinities, exceptionally cold winters or warm summers) also need to be recorded as they may be critical in influencing ecological issues in the Medway estuary and may well be missed by routine monitoring.

[7]This advice has been developed using best available scientific information and informed scientific interpretation and judgement (as at July 2000). This process has used a coarse grading of relative sensitivity, exposure and vulnerability of each interest feature to different categories of operation based on the current state of our knowledge and understanding of the marine environment. This is shown in the sensitivity and vulnerability matrices at Tables 9 and 10. The advice is indicative only, and is given to guide relevant authorities and others on particular operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the site has been designated. The advice, therefore, is not a list of prohibitions but rather a check list for operations which may need to be subject to some form of management measure(s) or further measures where actions are already in force.

The precise impact of any category of operation occurring on the site will be dependant upon the nature, scale, location and timing of events. More detailed advice is available from English Nature to assist relevant authorities in assessing actual impacts and cumulative effects. Assessment of this information should be undertaken in the development of management of the site through wider consultation.

In accordance with Government policy guidance, the advice on operations is feature and site specific, and provided in the light of current activities and patterns of usage at the site as at [July 2000]. As such, it is important that future consideration of this advice by relevant authorities, and others, takes account of changes in usage patterns that have occurred at the site over the intervening period. Advice for sites will be kept under review and may be periodically updated through discussions with relevant authorities, and others, to reflect significant changes in our understanding of sensitivity together with the potential effects of plans or projects on the marine environment. The provision of the statutory advice given here, on operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated, under Regulation 33(2), is provided without prejudice to specific advice given under Regulation 48(3) or Regulation 50 on individual operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

6.9 Interest feature and sub-feature specific advice on operations

This advice relates to the vulnerability of the interest features and sub-features of the Medway and Swale European marine site as summarised in Table 5 and 6 and set out in more detail in Table 9 and 10. An explanation of the sensitivity of the interest features or sub-features follows with an explanation of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of operations. This enables links between the categories of operation and the ecological requirements of the European marine site's interest features, as set out in Section 3, to be made. Feature and sub-feature specific advice on operations is listed in Appendix II.

Table 7. Assessment of the relative exposure of interest features and sub-features of the marine component of The Swale SPA to different categories of operations based on the current level of activities (as of July 2000)

Key: High= High exposure (3) Med =Medium exposure (2) Low= Low exposure (1) None= (0)

Categories of operation which may cause deterioration or disturbance	Internationally important migratory species and waterfowl assemblage	
	Mudflats	*Saltmarsh*
Physical loss		
Removal (e.g. harvesting, land claim)	Medium	Medium
Smothering (e.g. by artificial structures, disposal of dredge spoil)	Low	Low
Physical damage		
Siltation (e.g. run-off, dredging, outfalls)	Medium	Medium
Abrasion (e.g. boating, anchoring, trampling).	High	High
Selective extraction (e.g. aggregate dredging).	Low	Low
Non-physical disturbance		
Noise (e.g. boat activity)	Low	Low
Visual (e.g. recreational activity)	Medium	Medium
Toxic contamination		
Introduction of synthetic compounds (e.g. Pesticides, antifoulants, PCBs)	Medium	Medium
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	Medium	Medium
Introduction of radionuclides	Low	Low
Non-toxic contamination		
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	High	High
Changes in organic loading (e.g. mariculture, outfalls)	High	High
Changes in thermal regime (e.g. outfalls, power stations)	Medium	Low
Changes in turbidity (e.g. run-off, dredging)	Low	Low
Changes in salinity (e.g. water abstraction, outfalls)	Medium	Low
Categories of operation which may cause deterioration or disturbance	Internationally important migratory species and waterfowl assemblage	
	Mudflats	*Saltmarsh*
Biological disturbance		
Introduction of microbial pathogens	Medium	Low
Introduction of non-native species & translocation	Medium	Low
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	High	High

Table 8 Assessment of relative exposure of interest features and sub-features of the marine component of The Medway Estuary and Marshes SPA to different categories of operations based on the current level of activities (as of July 2000)

Key: High= High exposure (3) Med =Medium exposure (2)Low= Low exposure (1)None= (0)

Categories of operation which may cause deterioration or disturbance	**Internationally important populations of regularly occurring Annex 1 species**				**Internationally important migratory species and waterfowl assemblage**		
	Shallow inshore waters	***Mudflats***	***Saltmarsh***	***Shingle Beaches***	***Shallow inshore waters***	***Mudflats***	***Saltmarsh***
Physical loss							
Removal (e.g. harvesting, land claim)	High	High	High	Medium	High	High	High
Smothering (e.g. by artificial structures, disposal of dredge spoil)	Low	Low	Low	Low	Low	Low	Low
Physical damage							
Siltation (e.g. run-off, dredging, outfalls)	High	High	High	Low	High	High	High
Abrasion (e.g. boating, anchoring, trampling).	None	High	High	None	None	High	High
Selective extraction (e.g. aggregate dredging).	Low	Low	Low	None	Low	None	Low
Non-physical disturbance							
Noise (e.g. boat activity)	Low	Low	Low	Low	Low	Low	Low
Visual (e.g. recreational activity)	Medium	Medium	High	Medium	Medium	Medium	High
Toxic contamination							
Introduction of synthetic compounds (e.g. Pesticides, antifoulants, PCBs)	Medium	Medium	Medium	Low	Medium	Medium	Medium
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	Medium	Medium	Medium	Low	Medium	Medium	Medium
Introduction of radionuclides	Low	Low	Low	Low	Low	Low	Low
Non-toxic contamination							
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	Medium	High	High	Low	Medium	High	High
Changes in organic loading (e.g. mariculture, outfalls)	High	High	High	Low	High	High	High

Changes in thermal regime (e.g. outfalls, power stations) Changes in turbidity (e.g. run-off, dredging)	High Low	High Low	Low Low	Low Low	High Low	High Low	Low Low
Changes in salinity (e.g. water abstraction, outfalls)	Low	Medium	Low	Low	Low	Medium	Low
Biological disturbance							
Introduction of microbial pathogens	Low	Medium	Low	None	Low	Medium	Low
Introduction of non-native species & translocation	None	Medium	Low	None	None	Medium	Low
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	Medium	High	High	None	Medium	High	High

Table 9 Assessment of the relative vulnerability of interest features and sub-features of the marine component of The Swale SPA to different categories of operations.

Categories of operations to which the features or sub-features of the site are highly or moderately vulnerable are indicated by shading. Table also incorporates relative sensitivity scores used in part to derive vulnerability.[8]

Key

	High vulnerability	••••	High sensitivity
	Moderate vulnerability	•••	Moderate sensitivity
		••	Low sensitivity
		•	No detectable sensitivity

Categories of operations which may cause deterioration or disturbance	**Internationally important migratory species and waterfowl assemblage**	
	Mudflats	**Saltmarsh**
Physical Loss		
Removal (e.g. harvesting, land claim, coastal defence)	••••	••••
Smothering (e.g. artificial structures, disposal of dredge spoil)	•••	•••
Physical Damage		
Siltation (e.g. run-off, channel dredging, outfalls)	••	••
Abrasion (e.g. boating, anchoring, trampling)	••••	•••
Selective extraction (e.g. aggregate dredging)	••••	••
Non-physical disturbance		
Noise (e.g. boat activity)	••••	••••
Visual presence (e.g. recreational activity)	••••	••••
Toxic contamination		
Introduction of synthetic compounds (e.g. pesticides, antifoulants, 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. outfalls, 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 & translocation	•••	•••
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	•••	•••

[8] English Nature's advice on operations is derived from an assessment combining relative sensitivity of the features or sub-features with information on human usage of the site (as at July 2000), to identify relative vulnerability to categories of operations. In accordance with Government policy guidance this advice is provided in the light of current activities and patterns of usage at the site. It is important therefore that future consideration of this advice by relevant authorities, and others, takes account of changes in the usage patterns at the site. In contract the sensitivity of interest features, or sub-features, is relatively stable with alterations reflecting improvement in our scientific knowledge and understanding. To this end, information on sensitivity has been included in this table to assist the management and advisory groups with the future management of the site.

Table 10 Assessment of the relative vulnerability of interest features and sub-features of the marine component of The Medway Estuary and Marshes SPA to different categories of operations.

Assessment of the relative vulnerability of interest features and sub-features of the marine component of The Medway Estuary and Marshes SPA to different categories of operations.

Categories of operations to which the features or sub-features of the site are highly or moderately vulnerable are indicated by shading. Table also incorporates relative sensitivity scores used in part to derive vulnerability.[8]

Key

	High vulnerability	••••	High sensitivity
	Moderate vulnerability	•••	Moderate sensitivity
		••	Low sensitivity
		•	No detectable sensitivity

Categories of operations which may cause deterioration or disturbance	**Internationally important populations of regularly occurring Annex 1 species**				**Internationally important migratory species and waterfowl assemblage**		
	Shallow inshore waters	**Mudflats**	**Saltmarsh**	**Shingle**	**Shallow inshore waters**	**Mudflats**	**Saltmarsh**
Physical Loss							
Removal (e.g. harvesting, land claim, coastal defence)	••••	••••	••••	••••	••••	••••	••••
Smothering (e.g. artificial structures, disposal of dredge spoil)	•••	•••	•••	•••	••	•••	•••
Physical Damage							
Siltation (e.g. run-off, channel dredging, outfalls)	••	••	••	•	••	••	••
Abrasion (e.g. boating, anchoring, trampling)	••	••	•••	••••	••	••••	•••
Selective extraction (e.g. aggregate dredging)	••	•••	••	••••	••	••••	••
Non-physical disturbance							
Noise (e.g. boat activity)	•••	••••	••••	••••	•••	••••	••••
Visual presence (e.g. recreational activity)	••	••••	••••	••••	••	••••	••••
Toxic contamination							
Introduction of synthetic compounds (e.g. pesticides, antifoulants, 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. outfalls, 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 & translocation	••	•••	•••	•	••	•••	•••
Selective extraction of species (e.g. bait digging, wildfowling, commercial & recreational fishing)	•••	•••	•••	•	•••	•••	•••

[8] English Nature's advice on operations is derived from an assessment combining relative sensitivity of the features or sub-features with information on human usage of the site (as at July 2000), to identify relative vulnerability to categories of operations. In accordance with Government policy guidance this advice is provided in the light of current activities and patterns of usage at the site. It is important therefore that future consideration of this advice by relevant authorities, and others, takes account of changes in the usage patterns at the site. In contract the sensitivity of interest features, or sub-features, is relatively stable with alterations reflecting improvement in our scientific knowledge and understanding. To this end, information on sensitivity has been included in this table to assist the management and advisory groups with the future management of the site.

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8. Glossary

Advisory Group	The body of the representatives from local interests, user groups and conservation groups, formed to advise the management group
Annex 1 Bird species	The species listed in Annex 1 of the Birds Directive are the subject of special conservation measures concerning their habitat. These measures ensure the survival and reproduction of the birds in their area of distribution. Species listed on Annex 1 are in danger of extinction, rare or vulnerable
Annex I habitat type(s)	A natural habitat(s) listed in Annex I of the Habitats Directive for which Special Areas of Conservation can be selected.
Annex II species	A species listed in Annex II of the Habitats Directive for which Special Areas of Conservation can be selected.
Annex V	The listing, in the Habitats Directive, of the animal and plant species whose taking in the wild and exploitation may be subject to management measures.
Assemblage	A collection of plants and/or animals characteristically associated with a particular environment.
Attribute	Characteristic of an interest feature/sub-feature which provides an indication of the condition of the feature or sub-feature to which it applies.
BAP	Biodiversity Action Plan.
Benthos	Those organisms attached to, or living on, in or near, the seabed, including that part which is exposed by tides.
Biotope	The physical habitat with its biological community; a term which refers to the combination of physical environment and its distinctive assemblage of conspicuous species.
Biodiversity	The total variety of life on earth. This includes diversity within species, between species and ecosystems.
Characteristic	Special to, or especially abundant in, a particular situation or biotope. Characteristic species should be immediately conspicuous and easily identified.
Circalittoral	The rocky subtidal zone below that which is dominated by algae (Animal dominated subtidal zone).
Community	A group or organisms occurring in a particular environment, presumably interacting with each other and with the environment, and identifiable by means of ecological survey from other groups.
Competent authority	Any Minister, government department, public or statutory undertaker, public body or person holding a public office that exercises legislative powers.
Conservation objective	A statement of the nature conservation aspirations for a site, expressed in terms of the favourable condition that we wish to see the species and/or habitats for which the site has been selected to attain. Conservation objectives for European marine sites relate to the aims of the Habitats Directive.
Eulittoral	The main part of the intertidal zone characterised by limpets, barnacles, mussels, fucoid algae and with red algae often abundant on the lower part.
Epifauna	Benthic animals living on the seabed.
European Marine Site	A European site which consists of, or in so far as it consists of, areas covered intermittently or continuously by seawater.
European Site	A classified SPA, designated SAC, site of Community importance (a site selected as a candidate SAC, adopted by the European Commission but not yet designated), a candidate SAC (in England only) or a site hosting a priority species in respect of which Article 5 of the Habitats directive applies.
Favourable conservation status	A range of conditions for a natural habitat or species at which the sum of the influences acting upon that habitat or species are not adversely affecting its distribution, abundance, structure or function throughout the EC in the long term. The condition in which the habitat or species is capable of sustaining itself on a long-term basis.
Favourable condition	A range of conditions for a natural habitat or species at which the sum of the influences acting upon that habitat or species are not adversely affecting its distribution, abundance, structure or function within an individual Natura 2000 site in the long term. The condition in which the habitat or species is capable of sustaining itself on a long-term basis.
Habitat	The place in which a plant or animal lives.
Habitats Directive	The abbreviated term of *Council Directive 92/43/EEC of 21 May 1992 on the*

	Conservation of Natural Habitats and of Wild Fauna and Flora. It is the aim of this Directive to promote the conservation of certain habitats and species within the European Union.
Infauna	Benthic animals which live within the sediment.
Infralittoral	The subtidal zone in which upward facing rocks are dominated by erect algae, typically kelps.
Interest feature	A natural or semi-natural feature for which a European site has been selected. This includes any Habitats Directive Annex I habitat, or specific component of their fauna and flora, or any Annex II species and any population of a bird species for which and SPA has been designated under the Birds Directive. Any habitat of a species for which a site has been selected, or typical species of an Annex I habitat are also considered to be interest features.
Maintain	The action required for an interest feature when it is considered to be in favourable condition.
Management group	The body of relevant authorities formed to manage the European marine site.
Management scheme	The framework established by the relevant authorities at a European marine site under which their functions are exercised to secure, in relation to that site, compliance with the requirements of the Habitats Directive.
Nationally scarce/rare	For marine purposes, these are regarded as species of limited national occurrence.
Natura 2000	The European network of protected sites established under the Birds Directive and the Habitats Directive.
Notable species	A species that is considered to be notable due to its importance as an indicator, and may also be of nature conservation importance, and which is unlikely to be a 'characteristic species' .
Operations which may cause deterioration or disturbance	Any activity or operation taking place within, adjacent to, or remote from a European marine site that has the potential to cause deterioration to the natural habitats for which the site was designated, or disturbance to the species and its habitats for which the site was designated.
Plan or project	Any proposed development that is within a relevant authority's function to control, or over which a competent authority has a statutory function to decide on applications for consents, authorisations, licences or permissions.
Peak mean counts (5 yr)	Swale and Medway is broken down into count sectors. Over the winter months WeBs volunteers count all the birds which are visible within each sector. The yearly figures for each species in Swale and Medway are then averaged over a five year period to give the 5 yr peak mean count.
Relevant authority	The specific competent authority which has powers or functions which have, or could have, an impact on the marine environment, or adjacent to, a European marine site.
Restore	The action required for an interest feature when it is not considered to be in a favourable condition.
Sensitivity	The intolerance of a habitat, community or individual species to damage from an external force.
Sub-feature	An ecologically important sub-division of an interest feature.
Vulnerability	The exposure of a habitat, community or individual of a species to an external factor to which it is sensitive.
WEBs	Wetland Bird Survey: a collaborative national surveillance scheme of the UK's waterfowl based on counts undertaken once per month outside of the breeding season.

Appendix I Matrix of relative vulnerability

The relative vulnerability of an interest feature or sub-feature is determined by combining the relative sensitivity and exposure assessments according to the table below.

		Relative sensitivity of the interest feature		
		High	**Moderate**	**Low**	**None detectable**
Relative exposure of the interest feature	**High**				
	Medium				
	Low				
	None				

	Categories of relative vulnerability	
	High	
	Moderate	
	Low	
	None detectable	

Appendix II Feature and sub-feature specific advice on operations

Categories of operations Categories of operations	Exposure	Sensitivity
Physical loss	The degree of exposure to removal is categorised as high for the three widespread sub-features (shallow coastal water, mudflats and saltmarsh) because of the recent history of land claim and development. Most of this land claim has been in the Medway, though in recent years there have been a number proposals which would involve habitat loss in the Swale. Exposure to removal is categorised as low for shingle because its distribution is restricted and is largely away from centres of development. Smothering is an effect of boat mooring. Also disposal of dredging spoil may in certain circumstances smother areas. Neither at present appear to affect large areas. Exposure to smothering is therefore categorised as low.	Sea level rise, exacerbated by coastal squeeze, is the main threat of loss of intertidal habitats. If current rates of saltmarsh loss continue in the Medway and the Swale, the majority of the saltmarsh resource will be lost by the middle of this century. Drift line shingle habitat is nesting habitat for little tern. This habitat is also impacted upon by coastal squeeze. Higher spring tides, due to sea level rise, increase the risk of flooding at nesting sites
Physical damage	Siltation occurs as a result of dredging operations, the plume from which may cover a large proportion of the estuary. The exposure of saltmarsh and mudflat to siltation is therefore categorised as high. The exposure of shingle beaches to siltation is seen as low because these beaches are only covered by the highest tides of the year. Abrasion occurs as erosion caused by tidal movement. Burd 1992 shows high rates of erosion. The exposure of mudflat and saltmarsh to abrasion is therefore categorised as high. Also abrasion occurs on the site as a result of boatwash, mooring of boats and extraction of shellfish. These are expected to have a less widespread effect than tidal erosion and would not in themselves lead to a categorisation of exposure to abrasion as high. Selective extraction may occur in the form of aggregate or clay removal during dredging operations in the navigation channels of the Medway. The subtidal channels are outside the SPA in the Medway (though they are included in the Swale SPA) and so most selective extraction in the estuary would be outside the European marine site. Exposure for the site to selective	Prey items of birds feeding on intertidal mudflats live on the surface of the mud or within the sediment. Siltation is unlikely to affect availability of prey species as burrowing worms and shellfish would tend migrate upwards through deposited silts. A change in , however, particle size could lead to a change in the abundance of prey species. Filter-feeding shellfish may be stressed by increased siltation and this may affect prey availability to waterfowl. Similarly, eelgrass (*Zostera* spp.), which occurs on muddy sands, is a food source for internationally important numbers of Brent geese. This is also sensitive to siltation, requiring an equilibrium between sediment deposition and erosion. Any disruption to this process, such as coastal defence structures (sea walls or groynes) and channel dredging, may alter the sediment flow and destabilise the eelgrass beds. The turbidity caused by silt plumes from dredging or alteration of current flow may also reduce light availability which is essential for photosynthesis, though intertidal eelgrass may not be as susceptible

	extraction is categorised as low.	as its subtidal counterpart. Eelgrass beds (*Zostera* spp.) are also highly sensitive to damage by abrasion. Shellfish can be damaged by benthic trawls. Trawling has the potential of impacting on prey populations. A combination of human influences can cause abrasion of saltmarshes: use of personal water craft, boat wash, groynes, scour due to land drainage outfalls. Selective removal of any of the estuary sub-features will impact on the dynamics of the system and could lead to impacts on bird roosting, feeding or breeding.

Non-physical disturbance	Much of the site is accessible to the public, especially its perimeter. In many areas the sea wall is a public right of way and there are zones of high public activity particularly during the spring and summer. The site is also easily accessible from the water and is much used by yachts and other watercraft. Noise is greatest around the edge of the estuary where there are urban areas and development, and where there are most powered craft, particularly in the main navigation channel. Noise arises from recreational activity, particularly where there are powered craft or guns. Exposure to noise is generally low, especially for shingle beaches and saltmarsh because of their location mostly in the least accessible parts of the estuary. All of the sub-features are exposed to potential disturbance from the visible presence of people. Exposure is high for saltmarsh because it is exposed throughout most states of the tide and it is the focus of wildfowling activity.	All bird species using the site are highly sensitive to disturbance, particularly during severe weather, when energy reserves are at a premium. Disturbance causes birds to expend energy at a time when feeding rates are likely to be reduced by lack of food availability. In near freezing conditions, burrowing animals are more deeply embedded in the intertidal sediment, requiring birds to use more energy to obtain food, reducing the frequency of feeding in the process. Evidence suggests that little terns nesting in the Medway and the Swale have been forced to abandon nests due to non-physical disturbance. There are reports of birds being disturbed by low-flying aircraft. Noise from boat engines appears to disturb feeding birds, depending on distance from the mudflat margins.
Toxic contamination	Sewage discharge points are a potential source of toxic contaminants which may affect limited areas. Toxic contaminants in the marine environment are, however, often the result of diffuse sources and so the precise source can be difficult to identify. All of the sub-features are considered to have a medium exposure to toxic contamination from synthetic compounds, except for shingle beaches which are least often covered by the tide. The exposure ratings are justified by the level of use of the estuary, its industrial past and juxtaposition with large urban areas.	Industrial and domestic effluent discharges contain contaminants which build up in the food chain and may have toxic effects on birds and their prey. These contaminants include heavy metals such as copper, zinc, mercury, cadmium, radionuclides, and synthetic organic compounds (e.g. dieldrin, TBT, PCBs - polychlorinated biphenyls). These may have lethal and sub-lethal effects on marine invertebrates predated by birds. Specialist feeders could be affected by the loss of a prey species, while generalist feeders could benefit from an abundance of opportunistic prey species. This may however, result in a reduced diversity of species in the bird assemblage and may affect internationally important

		populations. Sub-lethal effects on food sources reduce the fitness of individual prey species by affecting reproduction, genetics, physiology and general health. Birds feeding on contaminated food sources are directly at risk from those containing substances with the potential to accumulate in the food chain. All sub-features have moderate to high vulnerability ratings for toxic contamination by synthetic and non-synthetic compounds. feeding or respiratory structures and; eelgrass (*Zostera* spp.) may be affected by increased turbidity of water, reducing light penetration and consequently photosynthesis. Increased turbidity levels in the shallow coastal waters also reduce the visibility of prey items for feeding little terns.

Non-toxic contamination	The Medway and Swale are exposed to nutrient enrichment from sewage outfalls and agricultural run off. The extent of urban development and arable land around these estuaries, in relation to their size and enclosed shape makes the likely exposure to organic and other nutrient enrichment high. Exposure to changes in the thermal regime are high in the Medway because of the discharges of cooling water from power stations, which raises the temperature of the order of 1 degree Celcius above background levels. Exposure to changes in the thermal regimes rated as medium in the Swale because modelling for a new power station on the Isle of Grain shows thermal effects extending into the Swale (Enron, 1998), though with less impact than in the Medway. Exposure to changes in turbidity is thought low because the estuary is constantly turbid. Exposure to changes in salinity are categorised as medium because of known declines in the freshwater discharge from the Medway and the North Kent Springs. The quantity of waste washed down the River Medway into the estuary is reported as high by the Port Authority. Exposure to radionuclides is categorised as low, given the general burden of these in the English Channel and North Sea (Meekums, 2000, pers comm.)	Blanketing algae encouraged by nutrient enrichment may: exclude eel grass by shading; reduce exchange between the water column and substrate, making the sediment anoxic; create a barrier between feeding waders and prey in the mud, thereby preventing feeding. On the other hand, the algae *Enteromorpha* and *Ulva* are themselves food for wigeon and dark-bellied brent geese. Organically enriched sediments benefit invertebrate prey species that can tolerate low oxygen levels. Though there may be an abundance of marine worms (oligochaetes), which thrive in these conditions, there are usually few other species present. While it may appear that birds benefit under these circumstances because large numbers visit such areas to feed, it is likely to indicate opportunism by a limited number of bird species, and is unlikely to benefit the estuary bird populations as a whole. In the absence of such organically enriched areas, birds are likely to be more widespread on the intertidal flats. Feeding around thermal discharges could increase if some prey populations have increased in response to the heated water or are more available due to changes in behaviour triggered by the increase in temperature. For example, some burrowing marine animals have been reported to leave their burrows and lie on the surface of the sediment in response to higher temperatures (Cole *et al*., 1999). Most prey communities are adapted to turbid conditions and increases from man-induced sources are likely to be tolerated. The exceptions include: filter-feeding shellfish inhabiting the foreshore and shallow waters may lose condition if turbidity levels increase above background levels clogging feeding or respiratory structures and; eelgrass (*Zostera* spp.) may be affected by increased turbidity of water, reducing light penetration and consequently photosynthesis. Increased turbidity levels in the shallow coastal waters also reduce the visibility of prey items for feeding little terns.
Biological disturbance	Microbial pathogens may enter the estuaries through sewage discharges or by the introduction of shellfish. Exposure to	As pathogens are often species specific, specialist feeders, such as brent geese on eelgrass or knot on shellfish, could be

	microbial pathogens is categorised as medium for intertidal mudflats because this is the sub-feature in which shellfish are cultivated. Currently cultivation and harvesting of shellfish occurs in the Swale only, though rights exist for the same in the Medway. Exposure of shallow waters to selective extraction of species is classed as medium because fishing does occur but there is not a large commercial fleet operating in the Medway and Swale. There are eight registered and licens ed fishing vessels which regularly fish in the River Medway (Meekums, 2000, pers. Comm). Exposure of intertidal mudflats is classed as high because there is bait digging and wildfowling over much of the Medway and Swale and shellfish harvesting in the Swale. Wildfowling occurs on and around the edge of the saltmarsh. Wildfowling rights are exercised over the majority of the saltmarsh and so the exposure of this sub-feature to selective extraction is classed as high.	affected if an epidemic disease severely depleted these important food sources. Brent geese populations did recover, largely by switching to alternative food sources when eelgrass was depleted by a wasting disease in the 1930s, but this took several decades. There is the potential for microbial pathogens to infect Annex 1 species and internationally important assemblages of feeding birds via food sources. An introduced species may affect the availability of prey items to birds either through predation of favoured prey or by out-competing them for food, leading to losses of the prey population. Bird populations may be affected if they are in competition with humans in exploiting a food species. Over exploitation of shellfish stocks could have a serious impact on birds such as knot and oystercatcher.

Appendix III List of Relevant Authorities

Relevant Authority	Contact	Address
English Nature	Mr R Cameron	
Kent County Council	Mr N Hilkene Mr G Kennison	Strategic Planning Directorate, Invicta House, County Hall, Maidstone, Kent ME14 1XX
Medway Council	Dr R Simmonds	Compass Centre, Chatham Maritime, Chatham, Kent ME4 4YH
Swale Borough Council	Mr I Russell Director of Development Services	Swale House, East Street, Sittingbourne, Kent ME10 3HT
Canterbury City Council	Mr E Edwards, Engineering Sarah Parker, Local Plans	Planning Department, Military Road, Canterbury, Kent CT1 1YW
Environment Agency	Dr B Buckley, Kent Area Manager	Orchard House, Endeavour Park, London Road, Addington, West Malling, Kent ME19 5SH
Mid Kent Water plc	Ms K Irving	Rocfort Road, Snodland, Kent ME6 5AH
Southern Water plc	Mr G Lewis	Victory House, Churchill Court, Manor Royal, Crawley, Sussex RH10 2PN
Southern Water plc	Mr R Tambling, Area Coordinator (Kent), Paul M Atkinson, Environmental Strategy Manager	Southern House, Lewes Road, Falmer, Brighton, W Sussex BN1 9PY
Lower Medway Internal Drainage Board	Mr I Palmer	17 Albion Place, Maidstone Kent, ME14 5EQ
Medway Ports	Capt P White, Harbour Master	Sheerness Docks Sheerness, Kent ME12 1RX
Kent and Essex Sea Fisheries Committee	Mr J Stroud	The Ice House, Military Road, Ramsgate, Kent CT11 9LG
Faversham Oyster Fishery Company	Mr A Jarrett, Chairman	c/o Dudley Cramp & Co, 42 High Street Sittingbourne, Kent ME10 4PB
Rochester Floating Fishery	Mr S Hales	c/o The Chamberlain, 12 Cross Street Rochester, Kent
Seasalter Shellfish	Mr J Bayes	East Quay, The Harbour, Whitstable, Kent CT5 1AB
Whitstable Oyster Company	Mr B Green	Sea Street, Whitstable, Kent

Appendix IV Habitats Regulations Guidance Note 1