The Severn Estuary
Special Protection Area

European Marine Site

English Nature & the Countryside Council for Wales' advice for the Severn Estuary Special Protection Area given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

February 2005

The Severn Estuary

The Severn Estuary is the largest coastal plain estuary in the UK with extensive mudflats and sandflats, rocky shore platforms, shingle and islands. Saltmarsh fringes the coast, backed by grazing marsh with freshwater and occasional brackish ditches. The estuary's classic funnel shape, unique in the UK, is a factor causing the Severn to have the second highest tidal range in the world (after the Bay of Fundy in Canada) at more than 12 meters. This tidal regime results in plant and animal communities typical of the extreme physical conditions of strong flows, mobile sediments, changing salinity, high turbidity and heavy scouring. The resultant low diversity invertebrate communities, that frequently include populations of ragworms, lugworms and other invertebrates in high densities, form an important food source for passage and wintering birds. The site is important in the spring and autumn migration periods for waders moving along the west coast of Europe, as well as in winter for large numbers of waterbirds including swans, geese, ducks and waders. These bird populations are regarded as internationally important.

As with many other estuaries in England and Wales, the Severn Estuary has long provided a focus for human activity, a location for settlement, a source of food, water and raw materials and a focus for trade and exploration. The Estuary and its coastal hinterland support major cities including Cardiff, Bristol, Newport and Gloucester. The Severn Estuary ports are very important to the regional and, in some cases, national economy. The Estuary's beaches and undeveloped coastline, with low-lying levels, freshwater wetlands, and cliff scenery, provide an important focus for recreation and appreciation of the Estuary's wildlife.

English Nature and the Countryside Council for Wales' advice for the Severn Estuary Special Protection Area European marine site given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

Preface

This document contains the joint advice of English Nature and the Countryside Council for Wales to other competent and 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 which the Severn Estuary Special Protection Area (SPA) European marine site is designated. This advice is provided in fulfilment of our obligations under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994.

The extent of the Severn Estuary European marine site is defined in Section 1. This advice does not cover the terrestrial areas of the Severn Estuary SPA.

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 1992 Habitats Directive[1], which support certain natural habitats and species of European importance, and SPAs classified under the 1979 Birds Directive[2] which support significant numbers of internationally important wild birds

This 'Regulation 33 package' is designed to help relevant and competent authorities responsible for complying with the requirements of the Birds and Habitats Directives to:

- understand the international importance of the site;
- understand the underlying physical and ecological processes supporting the species for which the site is designated;
- if appropriate, develop a management scheme under which they shall exercise their functions in accordance with the requirements of the Directives;
- determine the scope and nature of 'appropriate assessment' required in relation to plans and projects (Regulations 48 & 50).

The conservation objectives contained in this Regulation 33 package provide the standards against which the condition of the features of the site can be monitored, enabling judgements to be made about whether that condition is favourable. 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.

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

English Nature and the Countryside Council for Wales 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. If as a result of the ongoing SPA Network Review[3] interest features are added to the site or the boundaries are changed, English Nature and the Countryside Council for Wales will revise this advice accordingly.

Acknowledgements

English Nature and the Countryside Council for Wales would like to thank all those organisations and individuals who assisted in the development of this advice.

[3] See Section 2.1

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English Nature and the Countryside Council for Wales' advice for the Severn Estuary Special Protection Area European marine site given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994

1. Introduction

This document contains advice for the Severn Estuary Special Protection Area European Marine Site i.e. that area of the site below the highest astronomical tide line, given under Regulation 33(2) of the Conservation (Natural Habitats &c.) Regulations 1994.

1.1 Natura 2000

The European Union Habitats[4] and Birds[5] 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[6]. The Birds Directive protects all wild birds and their habitats within the European Union, especially 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 SACs and SPAs are known as European Sites and will form a network of conservation areas 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 can be found within the documents: *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* (DETR & The Welsh Office, 1998), *Planning Policy Guidance No. 9: Nature Conservation* (Department of the Environment, 1994), Planning Policy Wales March 2002 (Welsh Assembly Government), Planning Guidance (Wales) Technical Advice Note (TAN)5: Nature Conservation and Planning (Welsh Assembly Government).

1.2 The role of English Nature and the Countryside Council for Wales

The Conservation (Natural Habitats &c.) Regulations 1994 translate the Habitats Directive into law in Great Britain. It gives English Nature and the Countryside Council for Wales a statutory responsibility to advise relevant authorities as to the conservation objectives for

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

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

6 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.

European marine sites in England and Wales 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 management scheme which may be developed for this site. It will also aid competent authorities in defining the scope and nature of 'appropriate assessment' which the Habitats Directive requires to be undertaken for plans and projects having a significant effect on the European site (Regulations 20, 48 & 50). Note that English Nature and the Countryside Council for Wales will also advise competent authorities on individual plans and projects as they arise. English Nature and the Countryside Council for Wales are also competent and relevant authorities.

1.3 Precautionary principle

The advice on operations contained within this package has been made based on the precautionary principle and the interpretation of any monitoring programmes undertaken by the Countryside Agencies will also be made based on the precautionary principle. All forms of environmental risk should be tested against the precautionary principle which means that where there are real risks to the site, lack of full scientific certainty should not be used as a reason for postponing measures that are likely to be cost effective in preventing such damage. It does not however imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998).

1.4 The role of competent and relevant authorities

The Conservation (Natural Habitats &c.) Regulations 1994 require competent authorities to exercise their functions so as to secure compliance with the requirements of the Habitats Directive. The term "competent authority" includes all public bodies and statutory undertakers. The Regulations identify a number of competent authorities as "relevant authorities", with particular functions in relation to European marine sites. In addition to their duties as competent authorities, under Regulation 34, the relevant authorities may establish a management scheme for a European marine site under which they shall exercise their relevant functions. Such a management scheme should be guided by the information contained in this document. Relevant authorities must, within their areas of jurisdiction, have regard to both direct and indirect effects on an interest feature of the site. This may include consideration of issues outside the boundary of the European marine site.

Relevant authorities should ensure that all plans for the area integrate with the management scheme for the European marine site. Such plans may include shoreline management plans, local Environment Agency plans, Sites of Special Scientific Interest management plans, local Biodiversity Action 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 European marine site, and may therefore need to modify the management scheme and/or 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. For the purposes of this advice package, the term 'interest feature' refers to any birds qualifying as features under the SPA qualifying criteria that are found within the European marine site or the wider SPA boundary.

Under certain circumstances, where another relevant authority is unable to act for legal reasons, or where there is no other relevant authority, English Nature and the Countryside Council for Wales are empowered to use their bylaw-making powers for Marine Nature Reserves (MNR) and National Nature Reserves (NNR) for use in European marine sites.

1.5 Factors outside the control of relevant authorities

Nothing within this Regulation 33 package will require relevant and competent authorities to undertake any actions or ameliorate changes in the condition of interest features if it is shown that the changes result wholly from natural causes[7] or human events outside their statutory functions. English Nature and the Countryside Council for Wales will work with relevant authorities and others to develop a protocol for evaluating all observed changes and to develop our understanding of natural change.

1.6 Responsibilities under other conservation designations

In addition to its SPA status, the Severn Estuary is also a possible SAC and designated and subject to agreements under other conservation legislation. Parts of it are notified as Sites of Special Scientific Interest (SSSIs) under the 1981 Wildlife and Countryside Act. The Estuary is also a Wetland of International Importance ("Ramsar site") under the 1971 Ramsar Convention and Bridgwater Bay is also a National Nature Reserve. The obligations of relevant authorities and other organisations under such designations are not affected by the advice contained in this document.

1.7 Role of conservation objectives

The role of the conservation objectives for a European marine site is to define the nature conservation aspirations for the features of interest, thus representing the aims and requirements of the Habitats and Birds Directives in relation to that site.

The Habitats Directive requires that:

- measures taken under it are designed to maintain or restore habitats and species of European importance at "favourable conservation status" (FCS). According to the Directive, a habitat will be at FCS when its range and area in Europe are stable or increasing, the specific structure and functions necessary for its long term maintenance exist and are likely to continue to exist, and the conservation status of its typical species is favourable;
- appropriate steps are taken in SPAs and SACs to avoid the deterioration of habitats and significant disturbance of species;

[7] Determination of what constitutes natural change will be based on the best available information and scientific opinion at the time

- any plan or project not directly connected with or necessary to the management of the site (for nature conservation) but likely to have a significant effect on it, is subject to appropriate assessment in view of the site's conservation objectives.

In addition, the Birds Directive requires that, in relation to certain species of birds listed in Annex 1 of the Directive and regularly occurring migratory species, special measures are taken in order to ensure their survival and reproduction in their area of distribution.

Therefore, the conservation objectives for the Severn Estuary SPA European marine site represent English Nature and the Countryside Council for Wales' judgement of the appropriate contribution of the site to ensuring the survival and reproduction of the species concerned in their area of distribution. They are intended to guide relevant and other competent authorities in the exercise of their functions to comply with the requirements of the Directives outlined above.

In relation to the Severn Estuary SPA, English Nature and the Countryside Council for Wales use the term "favourable condition" for the condition represented by the achievement of the conservation objectives, in other words the desired condition for a habitat or a species on an individual site.

1.8 Role of advice as to operations

The advice on operations set out in Section 5 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 a site's features have been generally presumed to be in favourable condition at the time they were identified. This assumption will be tested during the 2000 - 2006 reporting period.

The advice should also be used to help identify the extent to which existing use and management of the site are, or can be made, consistent with the achievement of the conservation objectives and thereby focus the attention of relevant authorities on factors affecting or likely to affect the interest features of the site.

This operations advice formed the basis for initial discussions and has been greatly refined with respect to activities through detailed discussions with the management and advisory groups in formulating and agreeing the Severn Estuary Management Scheme. The Severn Estuary Management Scheme has now been issued and should be referred to for the most up to date advice on activities at the local level. It is available on the Association of Severn Estuary Relevant Authorities (Asera) website (http://www.severnestuary.net/asera/)

1.9 European site definition

A European site is any one of the following, as defined in the Conservation (Natural Habitats, &c.) Regulations 1994, as amended.

- A special area of conservation (SAC) (designated under the Habitats Directive, which supports certain natural habitats and species of European importance);
- a site of Community importance (SCI) (after a cSAC has been accepted by the government and European Commission it becomes an SCI);

- a site hosting a priority natural habitat type or priority species which the European Commission thinks should be on the list submitted by the UK government;
- a classified Special Protection Area (SPA) (classified under the Birds Directive which supports significant numbers of internationally important wild birds);
- in England a candidate Special Area of Conservation (after submission to the European Commission (but before designation by government) a site becomes a candidate SAC).

Also, in accordance with DETR's Planning Policy Guidance (PPG9), Welsh Assembly Government's Planning Guidance (Wales) Technical Advice Note (TAN) 5: Nature Conservation and Planning.
, the DETR statement *Ramsar Sites in England* (November, 2000) and National Assembly for Wales policy statement *Ramsar Sites in Wales* (February 2001)*;* Ramsar sites must be given the same consideration as European sites when considering plans and projects that may affect them.

Where the European site lies below highest astronomical tide, ie land 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, it is described as a European marine site.

The marine areas of the Severn Estuary Special Protection Area form the Severn Estuary European marine site. Advice to competent and relevant authorities as to the conservation objectives and advice on operations will be developed for the possible Special Area of Conservation and Ramsar Site in due course.

1.10 Description of the site

The Severn Estuary is the largest example of a coastal plain estuary in the United Kingdom and one of the largest estuaries in Europe with an area of 24,700 ha. It lies in the broad Severn Vale, and the sediments that have accumulated since the last ice age on its margins bury a valley within a valley. As with many other estuaries in England and Wales, it has been a focus for human activity, a location for settlement, a source of food, water and raw materials and a gateway for trading and exploration. The Estuary and its coastal hinterland support the cities of Cardiff, Bristol, Newport and Gloucester. Today, major industries are sited around the Estuary's shores. There are modern port installations, chemical processing companies and nuclear power stations among others.

Exploitation of the natural resources includes commercial shrimp fishing and fishing for salmon using putchers, lave nets, draught nets and bag nets. The Severn supports an important eel fishery. Aggregate extraction also occurs within the estuary.

Human activity has increasingly influenced the character of the marginal wetland mudflats and marshes, with extensive land claim occurring during and since the Roman period. Sediment flows and fluxes affecting the estuary are of particular importance for estuarine processes and ecology and the morphology of the estuary is constantly changing due to the complex hydrodynamics. Sediment deposits provide essential material to maintain the mudflats, sandflats and saltmarsh. Estuary-wide fluctuations in the wind-wave climate over recent centuries have led to major movements of the high-tide shoreline, and some reclaimed lands have been lost (Allen, 1990).

Alongside all these competing activities, the Estuary also supports a wide array of habitats and species of international importance for nature conservation.

The Severn Estuary is important for its immense tidal range, which affects both the physical environment and the diversity and productivity of the biological communities. The tidal range is the second largest in the world, reaching 12.3 m at Avonmouth. This macrotidal environment is partly due to a funnel shape which concentrates the tidal wave as it moves up the Bristol Channel. Tidal currents are also amplified and exceed 7 m/s close to Avonmouth (British Geological Survey, 1996). There are five major rivers which feed into the estuary causing changes in salinity which may be from brackish to fully saline, depending on the season and rainfall. Together these rivers tend to produce a marked east-west salinity gradient. Fine sediments from erosion of the intertidal zone and suspended sediments in river water entering the estuary create high turbidity, which has its highest average level between Avonmouth and the outer part of Bridgwater Bay (British Geological Survey, 1996). The strong tidal currents create a highly dynamic environment and the resultant scouring of the seabed and high turbidity give rise to low diversity communities.. The Severn has an extreme type of hydrodynamic and sedimentary regime which distinguishes it from other estuaries and which puts its fingerprint on the whole system. It is estimated that the estuary carries 10 million tons of suspended sediments on spring tides. Such conditions were initiated by the start of sea-level rise in late glacial times, with some evidence for steady sedimentation persisting for at least 5000 years, during which there has been a steady rise in sea level of 5 m, a trend continuing at present at a rate of 0.3 mm per year (British Geological Survey, 1996).

The extreme hydrodynamic and sedimentary conditions determine the type of habitats and species present and result in characteristic animal and plant communities. The Severn Estuary comprises many different habitats including saltmarsh, intertidal and subtidal mud and sand, mixed mud and sand, rock outcrops, boulder and shingle shores as well as *Sabellaria* biogenic reefs. There are sandy beaches on the southern shores, backed by sand dunes. The predominant unconsolidated sediments are muds and sands. The intertidal habitats include saltmarsh, mud and sandflats, mixed mud and sand, rock outcrops, boulder and shingle shores. Subtidally, the predominant unconsolidated sediments are muds and sands but a substantial area is rock. The presence of extensive areas of sand in low salinity conditions, distinguishes the Severn Estuary from other estuaries in the same biogeographic zone. Beds of eelgrass occur on some of the more sheltered mud and sand banks around the Welsh side of the Severn Crossing. All three species of eelgrass, *Zostera marina*, *Z. anguistifola* and *Z. noltii* have been recorded in the estuary. These, particularly the last two species, are of restricted distribution in British estuaries. It is unusual to have all three species in one location. The estuarine fauna includes internationally important populations of waterfowl, important invertebrate populations and large populations of fish.

The intertidal zone of mudflats, sandbanks, rocky platforms and saltmarsh is one of the largest and most important in Britain.

The extensive mudflats and sandflats cover an area of 20,958 ha, the fourth largest area in the UK. Whilst the diversity of species is often low, in places the mudflats and sandflats support dense populations of marine invertebrate species, which provide a food source for the large populations of waterfowl and the many species of fish.

The Severn Estuary is fringed by saltmarsh and holds the largest aggregation of saltmarsh in the south and south-west of the UK. It covers approximately 1,400 ha representing about 4% of the total area of saltmarsh in the UK (Dargie, 2000). The Severn Estuary saltmarshes are generally grazed by sheep and/or cattle, a significant factor in determining the plant communities found within them. Recent surveys have shown that the total extent of saltmarsh in the estuary has remained fairly constant since the 1970s, with the marshes of the outer estuary showing most signs of erosion. Some of the saltmarshes show a sequence of saltmarsh cliffs related to past cycles of accretion and erosion.

There is a wide salinity gradient, which has led to a range of both gradual and stepped transitional habitats including transitions between bare mudflat and upper marsh, supporting communities that include nationally rare plant species, freshwater inundated grasslands and freshwater marshes, with communities varying according to the frequency of tidal inundation. Steep banked creeks cross the saltmarsh, which provide shelter from the prevailing south westerly winds. The grazed saltmarsh is dominated by common saltmarsh-grass *Puccinellia maritima* and red fescue *Festuca rubra*.

Saltmarshes have an important role to play in estuarine processes, both through the recycling of nutrients within the estuary and through their role as soft sea defences, dissipating wave energy. They are highly productive biologically, providing nutrients that support other features within the marine ecosystem. They also have an important physical role, acting as a sediment store to the estuary as a whole and in providing feeding and roosting sites for waders and wildfowl particularly at high tide.

There are areas of rocky shore consisting of boulders, rock, mussel/cobble scars, rocky pools and shingle covering 1,500 ha in total which are also highly productive and diverse areas biologically and provide valuable feeding and roosting sites for birds.

The fish fauna of the Severn Estuary is very diverse (Potts & Swaby, 1994). More than 110 species of fish have been identified, which include seven different species of migratory fish, more than any other British estuary. The estuary is one of the most important British estuaries for several rare species, including river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus and* twaite shad *Alosa fallax*. The river and sea lamprey are a primitive type of fish having a distinctive suckered mouth but no jaws. Although numbers of lamprey have declined over the last 100 years, the UK is still one of their strongholds. Sea and river lampreys spend their adult life in the sea or estuaries but spawn and spend the juvenile phase in rivers. They use the Severn Estuary as a migratory passage to and from their spawning and nursery grounds in the rivers. Allis and twaite shad are the only two members of the herring family found in fresh water in the UK. Both look like large herring and were formerly eaten in this country before numbers declined and the fisheries collapsed. In the middle of the 19th Century, the value of shad rivalled that of salmon, and in the River Severn, shad made up about one-third of all catches. The fish enter estuaries in early spring and move up into the rivers to spawn. The estuary serves as a nursery area for juvenile fish where they feed heavily on small items of plankton. The Severn Estuary supports a run of migratory salmon. These fish pass through the estuary on their way to and from their spawning grounds in the upper reaches of the rivers and the open sea. The Estuary also has the largest eel run in the country.

Many estuaries in the UK are of great importance to migratory and wintering wildfowl and waders. The Severn Estuary forms part of the complex chain of estuary sites along the western coast of the UK that provide habitats for migratory waterfowl. The relatively mild winter weather conditions found here compared to continental Europe at similar latitudes can be of additional importance to the survival of wintering waterfowl during periods of severe weather. It is especially important when there is severe weather affecting other sites further north and on the east coast of Britain. The Severn Estuary ranks amongst the top ten British estuaries for the size of visiting waterfowl populations that it supports over winter (Musgrove *et. al*., 2001). Outside of this period, it is of particular importance as a staging area in autumn and spring for migratory waterfowl species as it lies on the East Atlantic Flyway route.

2. Qualifying interest features within the SPA under the EU Birds Directive

The Severn Estuary is a Special Protection Area (SPA), the boundary of which is illustrated in Appendix II.

2.1 Interest features under the EU Birds Directive

The Severn Estuary 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.

Qualifying species which use the European marine site also utilise the 'terrestrial' areas of the SPA outside the European marine site for breeding, feeding and roosting purposes.

The Severn Estuary was classified as an SPA on 13 July 1995 and it is that citation on which this advice is based. Information on populations of bird species using the Severn Estuary European marine site at the time the SPA was classified is contained in Table 1. The Severn Estuary was also listed on 13 July 1995 as a Ramsar site under the Ramsar convention for its internationally important wetland status.

The Upper Severn Estuary was classified as an SPA on 5 February 1988 and has now been subsumed within the Severn Estuary SPA.

This English Nature and the Countryside Council for Wales 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 the Joint Nature Conservation Committee (JNCC), which will provide advice to Ministers on any changes in SPA citations required. Depending on the outcome of this review and decisions from the Department for Environment, Food and Rural Affairs (DEFRA) and the National

Assembly for Wales, English Nature and the Countryside Council for Wales may need to reissue this advice with updated bird information.

Table 1 Information on populations of bird species using the Severn Estuary European marine site at the time the Severn Estuary SPA was classified.

Internationally important populations of regularly occurring Annex 1 species

Species	**Population (5 yr peak mean :1988/9 to 1992/3)**[8]	
Bewick's swan *Cygnus columbianus bewickii*	289 birds	4.1% Great Britain 1.7% North West Europe

Internationally important populations of regularly occurring migratory bird species[9]

Species	**Population (5 yr peak mean: 1988/9 to 1992/3)**	
Shelduck *Tadorna tadorna*	2,892 birds	1.2% North West Europe
Dunlin *Calidris alpina alpina*	41,683	2.9% East Atlantic flyway
Redshank *Tringa totanus*	2,013	1.3% East Atlantic flyway
European white-fronted goose *Anser albifrons albifrons*	3,002	1.0% North West Europe

An internationally important assemblage of waterfowl

Importance	**Population (5 yr peak mean: 1988/9 to 1992/3)**
The Severn Estuary supports over 20,000 wintering waterfowl.	68,026 individual birds comprising 17,502 wildfowl and 50,524 waders

Nationally important bird populations within internationally important assemblage of waterfowl

Species	**Population (5 yr peak mean: 1988/9 to 1992/3)**	
Wigeon *Anas penelope*	3,977 birds	1.6% Great Britain
Teal *Anas crecca*	1,998	2.0% Great Britain
Pintail *Anas acuta*	523	2.1% Great Britain
Pochard *Aythya ferina*	1,686	3.8% Great Britain
Tufted duck *Aythya fuligula*	913	1.5% Great Britain
Ringed plover *Charadrius hiaticula*	227	1.0% Great Britain
Grey plover *Pluvialis squatarola*	781	3.7% Great Britain
Curlew *Numenius arquata*	3,096	3.4% Great Britain
Whimbrel *Numenius phaeopus*	246	4.9% Great Britain
Spotted redshank *Tringa erythropus*	3	1.5% Great Britain

[8] SPA citation Severn Estuary (1993) held on Register of European marine sites for Great Britain

[9] The Severn Estuary is regularly used by 1% or more of the biogeographical population of these regularly occurring species (other than those listed on annex 1) in any season (Cranswick *et al.*, 1995)

3. The importance of the Severn Estuary SPA European marine site interest features and supporting habitats

This section describes and explains the importance of the SPA interest features within the Severn Estuary European marine site context. Supporting habitats have also been identified to highlight the ecologically important components of the European marine site for each interest feature and are mapped at Figures 2 and 3 to show their distribution and extent.

The Severn Estuary SPA includes both marine areas (i.e. land covered continuously or intermittently by tidal waters) and land that is not subject to tidal influence. The marine part of the SPA is termed a European marine site. The seaward boundary of the European marine site is concurrent with that of the SPA. The landward boundary of the European marine site 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.

3.1 Legislative 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 and the Countryside Council for Wales' conservation objectives at the site level focus on maintaining both the populations of the qualifying species and the habitats used by them. Site management should therefore aim to avoid both damage to the supporting habitats and disturbance to the birds. In reporting on the conservation status, account will need to be taken of both habitat conditions and the status of the bird populations.

Accordingly, English Nature and the Countryside Council for Wales will use annual counts, in the context of five year peak 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 Union.

In addition to focusing on avoiding deterioration to the habitats of the qualifying species, the Habitats Directive also requires that actions be taken to avoid significant disturbance to the species for which the site was designated. Such disturbance may result in alterations in population trends and/or distribution patterns. Avoiding disturbance to species requirements is mentioned in the favourable condition table accompanying 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 also directed to the inclusion of disturbance in the advice on operations provided in Section 5. 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 Reduction in organic inputs

Under the Urban Waste Water Treatment (UWWT) Directive all coastal discharges above a certain volume must have had 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. Wildfowl and waders prey upon the invertebrates found in the sediments close to wastewater outfalls and other species on the fish that exploit these resources (Burton *et al*., 2002). Improvements to discharges have been shown to lead to reductions in these resources. Recent research has also provided evidence that numbers of waterbirds have declined on two estuaries, the Orwell and the Mersey, following changes to waste water treatment (Burton *et al*., 2002). On the other hand, where bird populations are currently adversely affected by eutrophication, or on the most grossly polluted sites, cleaner discharges may contribute to improving site condition.

English Nature and the Countryside Council for Wales generally support the cleaning up of coastal discharges. On balance, the overall ecological benefits of cleaner discharges tend to outweigh any subsequent local decline in bird numbers, although there is presently insufficient knowledge to accurately predict the effects for individual SPA sites.

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 Relationship between bird populations and supporting habitats

In recognition of the fact that bird populations on a site may change in response to wider national or international trends or events, this Regulation 33 advice addresses the habitat conditions on the site necessary to support the bird populations, as well as the bird populations themselves. “Supporting habitats” are identified which describe the key habitats within the European marine site necessary to support the interest features i.e. the qualifying bird species (see Table 2). The “favourable condition table” (see section 4.7) contains further detail on habitat conditions.

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 and the Countryside Council for Wales, in the context of five year peak mean counts, together with available information on UK population and distribution trends, to assess whether this SPA is continuing to make an appropriate contribution to the Favourable Conservation Status of the species.

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 most important factors related to this are:

- current extent and distribution of suitable feeding and roosting habitat (eg saltmarsh, mudflats, shingle and rocky shores);

- sufficient prey availability (eg crustaceans, small fish, molluscs, worms and seeds);
- levels of disturbance maintained at or below levels necessary to provide favourable conditions for birds' feeding and roosting areas;
- water quality necessary to maintain intertidal plant and animal communities; and
- fresh water quantity, tidal flows, salinity gradients and grazing necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.

There are also a number of habitats, such as the wet coastal grazing marsh, improved grassland and open standing waters that support the qualifying bird species and occur within the SPA boundary. However, these habitats lie above highest astronomical tide and therefore are not within the European marine site. Objectives to maintain these aspects of bird interest in favourable condition are found within English Nature and the Countryside Council for Wales' conservation objectives for the relevant SSSI within the SPA boundary and will be dealt with through relevant procedures outlined in the Conservation (Natural Habitats &c.) Regulations 1994.

Some species will also use areas of land and coastal waters outside the boundaries of both the European marine site and the SPA. Relevant authorities need to have regard to such adjacent interests, as they might be affected by activities taking place within, or adjacent to the European marine site.

Table 2: A summary of the qualifying features and associated supporting habitats within the Severn Estuary SPA European marine site

Designation	Qualifying feature	Protected Supporting habitats		
		Estuary		
		Intertidal mudflats and sandflats	Shingle & Rocky Shore	Saltmarsh
SPA (classified ***13/7/95***)	Annex I species[10]	✓		✓
	Migratory species[11]	✓	✓	✓
	Waterfowl assemblage[12]	✓	✓	✓

[10] Qualifies under article 4.1 of the EC Birds Directive by supporting regularly occurring Annex 1 bird species in numbers of European importance

[11] Qualifies under article 4.2 of the EC Birds Directive by supporting regularly occurring migratory species in numbers of European importance

[12] Qualifies under article 4.2 of the EC Birds Directive by supporting an internationally important assemblage of waterfowl

3.4 Internationally important populations of regularly occurring Annex 1 species

The species listed in Annex 1 of the Birds Directive are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. Species listed on Annex 1 are in danger of extinction, rare or vulnerable. Annex 1 species that regularly occur at levels over 1% of the national population meet the SPA qualifying criteria. The Severn Estuary SPA supports internationally important populations of one Annex I species (see Table 1).

The qualifying wintering species that occurs within the European marine site is:

- Bewick's swan Cygnus *columbianus bewickii*

3.4.1 Key supporting habitats for the Annex I species

Intertidal mudflats and sandflats - The focal area for the Bewick's swans is the upper Severn Estuary in the vicinity of the New Grounds, Slimbridge area. The mudflats and sandflats exposed as the tide falls where the estuary widens in the upper reaches of the site at Waveridge Sands, Frampton Sands and The Noose are used as a safe refuge areas when the birds are disturbed.

Saltmarsh communities - The birds feed on the saltmarsh and the transition from saltmarsh to coastal grazing marsh in front of the sea defences in the upper estuary at The Dumbles, where areas of the high marsh are mainly affected only by brackish water during tidal inundation. They favour areas that have unrestricted views for the early detection of predators.

Bewick's swan graze on a range of 'soft' meadow grasses such as *Agrostis stolonifera* and *Alopecurus geniculatus* found in wet meadows which are outwith the European marine site boundary.

3.5 Internationally important populations of regularly occurring migratory species

Migratory species that regularly occur at levels of 1% or more of the total biogeographic population meet the SPA criteria and qualify in their own right.

The Severn Estuary SPA supports internationally important numbers of regularly occurring migratory species over winter:

The qualifying migratory species that occurs within the European marine site are:

- European white-fronted goose *Anser albifrons*
- shelduck *Tadorna tadorna*
- dunlin *Calidris alpina alpina*
- redshank *Tringa totanus totanus*

The qualifying migratory species that occurs within the SPA but outside the European marine site boundary is:

- gadwall *Anas strepera*

3.5.1 Key supporting habitats for the migratory bird species

Intertidal mudflats and sandflats - The extensive mudflats and sandflats of the Severn Estuary provide undisturbed refuge and a rich resource of intertidal invertebrates as food for many species of migratory birds. The Severn supports massive populations of birds, many of which are highly mobile, feeding and roosting in different areas, depending on food availability and the state of the tide.

The European white-fronted geese roost at night on estuarine sandbanks and usually fly less than 10km to the daytime feeding grounds. Therefore conservation of traditional roosting sites is necessary to enable the population to exploit potential feeding habitats. The sandbanks adjacent to the New Grounds at Slimbridge are a long established, traditional wintering area for the European white-fronted geese (Owen *et al.,* 1986) where they use Waveridge Sand, Frampton Sand and the Noose. Only occasionally will small numbers occur at other localities within the Severn Estuary. Shelduck exploit the rich resources of invertebrates found in the intertidal mudflats where they forage for molluscs and other invertebrates such as the mudsnail *Hydrobia* spp, mussels *Mytilus edulis* and small crustaceans such as the common shore crab *Carcinus maenas.* They feed in groups, and are distributed widely throughout the estuary where there are extensive areas of intertidal flats, but there are major concentrations on Bridgwater Bay, around the mouth of the Rhymney river and, prior to construction of the Cardiff Barrage, in Cardiff Bay (Ferns, 1980a; Fox & Salmon, 1988a; Clarke, 1989; WWT Wetlands Advisory Service, April 2003). Bridgwater Bay is a long established traditional moulting area for shelduck during late summer and autumn (Eltringham & Boyd, 1960, 1963; Morley, 1966; Fox & Salmon, 1988a). It is the largest single moulting area in Europe away from Waddensea.

Redshank and dunlin are distributed widely and feed throughout the estuary on marine polychaete worms, crustaceans and molluscs such as the Baltic tellin *Macoma balthica*. They frequently feed along undisturbed strandlines throughout the estuary. They favour areas that have abundant invertebrate prey species and unrestricted views for the early detection of predators. The location of feeding birds on the intertidal flats is a reflection of the invertebrate species found there which, in turn, are dependent on the sediment type. Dunlin and redshank mainly feed on invertebrates in the muddier finer sediments. Dunlin are found mostly on the mid shore whereas redshank are more thinly distributed and are often found in smaller groups in the creeks and sub-estuaries. The Severn has the third largest wintering population of Dunlin in Britain. Feeding flocks are widely distributed around the estuary particularly downstream of the first Severn Bridge, with particular concentrations at Rhymney/Peterstone, Uskmouth, Welsh Grounds, Undy, Clevedon and Bridgwater Bay (Ferns, 1977; Mudge, 1979; Ferns, 1980a; Clark, 1989). There are notable concentrations of redshank at the mouths of the Rhymney, Wye, Avon and Parrett rivers (Ferns, 1977, 1980a; Clark, 1989; WWT Wetlands Advisory Service, April 2003).

Saltmarsh - Upper and lower saltmarsh provide important feeding and roosting areas for the internationally important migratory birds throughout the estuary. The saltmarshes provide a rich feeding habitat for redshank and shelduck, which feed on invertebrate species in the sediments, such as the mudsnail *Hydrobia.* The European white-fronted geese graze on a range of saltmarsh grasses and herbs such as common saltmarsh grass *Puccinellia maritima* and sea barley *Hordeum marinum*. The birds feed on the saltmarsh and the transition to coastal grazing marsh in front of the sea defences in the upper estuary and particularly at the The Dumbles.

The saltmarshes also have an important function providing a safe haven from the tides that flood the mudflats twice a day. The low-growing dense vegetation provides a suitable roosting habitat for redshank and dunlin, which prefer to roost on areas of short vegetation ensuring good visibility. The saltmarshes throughout the estuary provide an important communal roosting site for redshank, dunlin and shelduck. Upper saltmarsh in particular makes ideal highwater roost sites and there are main high tide roosts in some areas with little human disturbance where waders congregate from their feeding areas.

Shingle and rocky shore - the shingle and rocks in the estuary provide feeding areas for dunlin and redshank and some limited foraging at high tide. It is also provides important roost sites at high tide particularly for the dunlin and redshank. Many of the rocks are off shore and are therefore generally free from human disturbance. These include Guscar Rocks in the upper reaches, Blackstone Rocks at Clevedon and Stert Island in Bridgwater Bay.

Wet coastal grazing marsh, improved grassland and open standing waters – these supporting habitats lie outside the European marine site boundary but within the SPA. They provide key areas for feeding and roosting for all the migratory species particularly at high tide.

3.6 Internationally important assemblage of waterfowl

The Severn Estuary is one of the key estuaries in the UK for wintering waterfowl (wildfowl and waders). In addition to supporting internationally important populations of birds, it also qualifies for its wintering waterfowl assemblage, regularly supporting over 20,000 birds (Cranswick *et al.,* 1999). A peak count of over 100,000 waterfowl was recorded in the winter season of 1992-93 (Waters *et al*., 1993). The wintering waterfowl assemblage (consisting of over 68,000 birds) includes all regularly occurring waterfowl. Species that qualify as a listed component of the assemblage include all the internationally important regularly occurring migratory species as well as the Annex 1 wintering species. The list also includes species present in nationally important numbers or species whose populations exceed 2,000 individuals. These species are **wigeon** *Anas penelope*, **teal** *Anas crecca*, **pintail** *Anas acuta*, **pochard** *Aythya feri*na, **tufted duck** *Aythya fuligula*, **ringed plover** *Charadrius hiaticula*, **grey plover** *Pluvialis squatarola*, **curlew** *Numenius arquata*, **whimbrel** *Numenius phaeopus* and **spotted redshank** *Tringa erythropus*.

3.6.1 Key supporting habitats for the waterfowl assemblage

Since a number of species comprising the waterfowl assemblage are qualifying species in their own right, their habitat requirements are described in sections 3.4 and 3.5 above. This

section therefore mainly deals with the habitat requirements of the non-qualifying species which form part of the waterfowl assemblage.

Intertidal mudflats and sandflats - Many of the bird species found within the Severn Estuary are highly mobile, feeding and roosting in different areas, depending on food availability, weather and tides. They favour areas that have abundant prey species and unrestricted views for the early detection of predators. Some species of wader such as ringed plover and turnstone will feed on the rich invertebrate fauna associated with rotting seaweed occurring along undisturbed strandlines.

Pintail and Teal are widely distributed around the estuary with a notable concentration at the New Grounds. Pintail are also found at Peterstone/Rhymney. Pochard and tufted duck have a highly clumped daytime distribution mainly at New Grounds with most others at Peterstone and the mouth of the Rhymney. Large numbers of pochard move onto the estuary in periods of sustained cold weather. There is a large number of wintering ringed plover on the estuary and these numbers swell during the spring and autumn when there is a considerable passage of migrants through the Severn Estuary. There are major concentrations of curlew on the flats above the first Severn Bridge as well as Bridgwater Bay and the Welsh Grounds. The Severn Estuary is a particularly important staging post for whimbrel during autumn and spring passage periods where some birds feed on the mudflats. Spotted redshank are occasionally found on the Axe and Yeo estuaries.

Saltmarsh - Upper and lower saltmarsh provide important feeding and roosting areas for the internationally important assemblage of waterfowl throughout the estuary. The European white-fronted geese graze on a range of saltmarsh grasses and herbs. The birds feed on the saltmarsh and the transition to coastal grazing marsh in front of the sea defences in the upper estuary.

There are areas of well grazed saltmarsh with saltpans at the River Axe and in the upper reaches of the estuary, which are used by wigeon and other wildfowl. Pools in the higher marsh at Bridgwater Bay and in the saltmarsh above the Severn bridges are also attractive to waders and wildfowl, providing invertebrates and shelter. In the winter, ducks such as teal and pintail feed on seeds of saltmarsh plants such as *Salicornia* sp. and *Atriplex* sp. Probing waders such as curlew also feed on the saltmarsh.

The saltmarsh provides a safe haven for the feeding waders and wildfowl from the tides that flood the mudflats twice a day. Upper saltmarsh in particular makes ideal high water roost sites and there are main high tide roosts in some areas with little human disturbance where waders congregate from their feeding areas. Waders in particular, require very short vegetation to afford unrestricted views for the early detection of predators.

Shingle and rocky shore - The shingle and rocks in the estuary provide feeding areas for many wildfowl and waders and important roost sites at high tide. Many of the rocks are off shore and are therefore generally free from human disturbance. These include Guscar Rocks in the upper reaches, Blackstone Rocks at Clevedon and Stert Island in Bridgwater Bay. Whimbrel have major night roosts at Collister Pill and Stert Island and the Stert Island roost is the largest of its kind in Britain. Spotted redshank are also found around Stert Island.

Wet coastal grazing marsh, improved grassland and open standing waters – these supporting habitats lie outside the European marine site boundary but within the SPA. They

provide key areas for breeding, feeding and roosting for all the assemblage species particularly at high tide.

3.7 Low-tide distribution of waterbirds on the Severn Estuary SPA

English Nature and the Countryside Council for Wales commissioned the British Trust for Ornithology (BTO) to organise , as part of the series of WeBS Low Tide Counts, a complete low tide survey of the Severn Estuary during the winter of 2002/03 (Burton et al., 2003) The mean numbers and distribution of total waterbird species recorded on each count section on the Severn Estuary in the winters 1987/88 to 1991/92 and in 2002/03 from this BTO low-tide count data for various individual species and the bird assemblage are illustrated in Appendix V and VI respectively. The Figures generally indicate that the waterfowl are distributed extensively across virtually the entire intertidal area with some obviously high concentrations in specific areas.

These maps are indicative only and several constraints on their use should be noted when attempting to interpret them. Firstly, it should be noted that in each winter only a maximum of four counts were made of each count section, one a month from November to February. Observation of the central areas of the estuary is also very difficult with all observations being made from land and it is possible that the numbers of birds using these areas were underestimated. Gulls were only recorded in the 2002/03 survey. However, even in that survey, coverage of these species was patchy. The Severn is a highly dynamic estuary and thus the location and extent of many of the intertidal areas may have changed since the Ordnance Survey maps used for this project were created. The movements of sediments may potentially also cause marked differences in the distributions of invertebrates and thus waterbirds between years. It should also be noted that the numbers of birds recorded on the Severn Estuary may vary annually due to weather conditions. In cold winters, the west coast of Britain may act as a refuge for many waterbirds that in milder winters would occur on the east coast or on the Continent. In cold winters, therefore, waterbirds may be more widely distributed across the estuary than they would in milder winters. Lastly, in assessing the importance of different intertidal mudflats, it is also essential to note that some species may use different areas during the night to those where they are recorded in the day.

4. Conservation objectives for SPA European marine site interest features

Under Regulation 33(2)(a) of the Conservation (Natural Habitats &c.) Regulations 1994, English Nature and the Countryside Council for Wales have a duty to advise other relevant authorities as to the conservation objectives for the European marine site. The conservation objectives for the Severn Estuary SPA 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 supporting habitats;
- 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 interest feature and which will act as a basis for the development of a monitoring programme.

All the conservation objectives provided below are subject to review by English Nature and the Countryside Council for Wales.

4.1 Interest feature 1: Internationally important population of regularly occurring Annex 1 species: Bewick's swan

The conservation objective is to maintain the Bewick's swan population and its supporting habitats in **favourable condition**, as defined below[13].

This conservation objective is subject to review.

The interest feature Bewick's swan will be considered to be in favourable condition when, subject to natural processes (Box 1), each of the following conditions are met:

(i) the 5 year peak mean population size for the Bewick's swan population is no less than 289 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh at the Dumbles (Appendix III) is maintained;

(iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose (Appendix III) is maintained;

(iv) the extent of vegetation with an effective field size of >6 ha and with unrestricted bird sightlines > 500m at feeding, roosting and refuge sites (Appendix III) are maintained;

(v) greater than 25% cover of suitable soft leaved herbs and grasses (Box 2) in winter season throughout the transitional saltmarsh at the Dumbles (Appendix III) is maintained;

(vi) aggregations of Bewick's swan at feeding, roosting and refuge sites (Appendix III) are not subject to significant disturbance.

[13] Tables 3a (pg. 36) and 3b (pg. 39) set out the type of information that will be used to support judgements on whether or not this conservation objective is being met.

4.2 Interest feature 2: Internationally important population of regularly occurring migratory species: wintering dunlin

The conservation objective is to maintain the dunlin population and its supporting habitats in **favourable condition**, as defined below[14].

This conservation objective is subject to review.

The interest feature dunlin will be considered to be in favourable condition when, subject to natural processes (Box 1), each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering dunlin population is no less than 41,683 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix IV) is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix IV) is maintained;

(iv) the extent of shingle and rocky shore (Appendix IV) is maintained;

(v) the extent of vegetation with a sward height of <10cm is maintained throughout the saltmarsh (Appendix IV);

(vi) the distribution and abundance of suitable invertebrates (Box 3) in intertidal mudflats and sandflats (Appendix IV) is maintained;

(vii) the distribution and abundance of suitable invertebrates (Box 3) in shingle and rocky shore (Appendix IV) is maintained;

(viii) the extent of strandlines is maintained;

(ix) unrestricted bird sightlines of >200m at feeding and roosting sites (Appendix IV) are maintained;

(x) aggregations of dunlin at feeding or roosting sites (Appendix IV) are not subject to significant disturbance.

[14] Tables 3a and 3b set out the type of information that will be used to support judgements on whether or not this conservation objective is being met.

4.3 Interest feature 3: Internationally important population of regularly occurring migratory species: wintering European white-fronted goose

The conservation objective is to maintain the European white-fronted goose population and its supporting habitats in **favourable condition**, as defined below[15].

This conservation objective is subject to review.

The interest feature European white-fronted goose will be considered to be in favourable condition when, subject to natural processes (Box 1), each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering European white fronted goose population is no less than 3,002 individuals (ie the 5 year peak mean between 1988/9-1992/3);

(ii) the extent of saltmarsh at the Dumbles (Appendix III) is maintained;

(iii) the extent of intertidal mudflats and sandflats at Frampton Sands, Waveridge Sands and the Noose (Appendix III) is maintained;

(iv) greater than 25% cover of suitable soft-leaved herbs and grasses (Box 4) is maintained during the winter on saltmarsh areas (Appendix III);

(v) unrestricted bird sightlines of >200m at feeding and roosting sites (Appendix III) are maintained;

(vi) aggregations of European white-fronted goose at feeding or roosting sites (Appendix III) are not subject to significant disturbance.

4.4 Interest feature 4: Internationally important population of regularly occurring migratory species: wintering redshank

The conservation objective is to maintain the redshank population and its supporting habitats in **favourable condition**, as defined below[16].

This conservation objective is subject to review.

The interest feature redshank will be considered to be in favourable condition when, subject to natural processes (Box 1), each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering redshank population is no less than 2,013 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix IV) is maintained;

[15] Tables 3a and 3b set out the type of information that will be used to support judgements on whether or not this conservation objective is being met.
[16] Tables 3a and 3b set out the type of information that will be used to support judgements on whether or not this conservation objective is being met.

(iii) the extent of intertidal mudflats and sandflats (Appendix IV) is maintained;

(iv) the extent of shingle and rocky shore (Appendix IV) is maintained;

(v) the extent of vegetation with a sward height of <10cm throughout the saltmarsh (Appendix IV) is maintained;

(vi) the distribution and abundance of suitable invertebrates (Box 3) in intertidal mudflats and sandflats (Appendix IV) is maintained;

(vii) the distribution and abundance of suitable invertebrates (Box 3) in shingle and rocky shore (Appendix IV) is maintained;

(viii) strandlines are not subject to significant disturbance;

(ix) unrestricted bird sightlines of >200m at feeding and roosting sites (Appendix IV) are maintained;

(x) aggregations of redshank at feeding or roosting sites (Appendix IV) are not subject to significant disturbance.

4.5 Interest feature 5: Internationally important population of regularly occurring migratory species: wintering shelduck

The conservation objective is to maintain the shelduck population and its supporting habitats in **favourable condition**, as defined below:[17]

This conservation objective is subject to review.

The interest feature shelduck will be considered to be in favourable condition when, subject to natural processes (Box 1), each of the following conditions are met:

(i) the 5 year peak mean population size for the wintering shelduck population is no less than 2,892 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix IV) is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix IV) is maintained;

(iv) the extent of shingle and rocky shore (Appendix IV) is maintained;

(v) the distribution and abundance of suitable invertebrates (Box 5) in intertidal mudflats and sandflats (Appendix IV) is maintained;

[17] Tables 3a and 3b set out the type of information that will be used to support judgements on whether or not this conservation objective is being met.

(vi) unrestricted bird sightlines of >200m at feeding and roosting sites (Appendix IV) are maintained;

(vii) aggregations of shelduck at feeding or roosting sites (Appendix IV) are not subject to significant disturbance.

4.6 Interest feature 6: Internationally important assemblage of waterfowl

The conservation objective is to maintain the waterfowl assemblage and its supporting habitats in **favourable condition**, as defined below:[18]

This conservation objective is subject to review.

The interest feature waterfowl assemblage will be considered to be in favourable condition when, subject to natural processes (Box1), each of the following conditions are met:

(i) the 5 year peak mean population size for the waterfowl assemblage is no less than 68,026 individuals (ie the 5 year peak mean between 1988/9 - 1992/3);

(ii) the extent of saltmarsh (Appendix IV) is maintained;

(iii) the extent of intertidal mudflats and sandflats (Appendix IV) is maintained;

(iv) the extent of shingle and rocky shore (Appendix IV) is maintained;

(v) extent of vegetation of <10cm throughout the saltmarsh (Appendix IV) is maintained;

(vi) the distribution and abundance of suitable invertebrates (Box 6) in intertidal mudflats and sandflats (Appendix IV) is maintained;

(vii) the distribution and abundance of suitable invertebrates (Box 6) in shingle and rocky shore (Appendix IV) is maintained;

(viii) greater than 25% cover of suitable soft leaved herbs and grasses (Box 7) during the winter on saltmarsh areas (Appendix IV) is maintained;

(ix) strandlines are not subject to significant disturbance;

(x) unrestricted bird sightlines of >500m at feeding and roosting sites (Appendix IV) are maintained;

(xi) waterfowl aggregations at feeding or roosting sites (Appendix IV) are not subject to significant disturbance.

[18] Tables 3a and 3b set out the type of information that will be used to support judgements on whether or not this conservation objective is being met.

4.7 Internationally important population of regularly occurring migratory species: gadwall

Gadwall is also a qualifying interest feature of the Severn Estuary SPA but does not occur within the European marine site. It is found within the SPA, but only above the highest astronomical tide (HAT) and the European marine site for which this Reg 33 advice is written, only extends up to HAT. Consequently, there are no specific conservation objectives within this document for this species. Objectives to maintain this features in favourable condition are identified within English Nature and the Countryside Council for Wales' conservation objectives for the relevant SSSIs within each European site boundary, and will be dealt with through procedures outlined in the Conservation (Natural Habitat &c.) Regulations 1994. However, relevant authorities need to have regard to such adjacent interests as they may be affected by activities taking place within, or adjacent to the European marine site.

Box 1: Natural processes

Each interest feature is subject to both natural processes and human influences. Human influence on the interest features is acceptable provided that it is compatible with the achievement of the conditions set out under the definition of favourable condition for each interest feature. A failure to meet these conditions which is entirely a result of natural processes will not constitute unfavourable condition, but will trigger a review of the definition of favourable condition. This qualification is necessary because:

(a) the bird populations themselves are subject to natural factors, many of which arise outside the SPA, such as breeding success and winter temperatures;

(b) the supporting habitats of the birds are influenced by the evolution of the estuary. Natural adjustments within estuaries can take many forms. One important example is the tendency of estuaries to accumulate sediment, thereby changing their form from their original Holocene morphology to a state where tidal energy is dissipated by subtidal and intertidal sediment banks or features. This, with other natural processes, will therefore cause the width and depth of the estuary to change over time, moving towards a state of dynamic equilibrium or 'most probable state'. As part of this process, the location and extent of saltmarshes and mudflats may change, provided there is capacity to accommodate readjustment. However, where this process is constrained, the capacity of habitats to accommodate readjustment may be affected.

Box 2: Key food plants of Bewick's swan

eg *Agrostis stolonifera, Alopecurus geniculatus, Glyceria geniculatus* **

Box 3: Key intertidal invertebrate prey species of dunlin and redshank

eg *Carcinus, Crangon, Hydrobia, Macoma, Hediste,* and *Talitrus* spp. **

Box 4: Key food plants of European white-fronted goose

eg *Alopecurus bulbosus, Festuca rubra*, *Hordeum marinum*, *Lolium perenne; Puccinellia maritima* **

Box 5: Key intertidal invertebrate prey species of shelduck

eg *Carcinus, Corophium* , *Hydrobia, Macoma, Mytilus,* and *Hediste* spp.**

Box 6: Key intertidal invertebrate prey species of the waterfowl assemblage

eg *Arenicola, Carcinus, Corophium, Crangon*, *Gammarus, Hydrobia, Macoma, Hediste*, *Notomastus and Talitrus* spp. **

Box 7: Key saltmarsh food plants

eg *Puccinellia maritima*, *Salicornia* spp., *Agrostis stolonifera*, *Atriplex* spp., *Hordeum marinum, Festuca rubra, Alopecurus bulbosus, Lolium perenne* **

** these lists are examples and are not exhaustive

Favourable Condition Table

The favourable condition table specifies the following (in columns from left to right):

Features: interest features for which the SPA is classified, namely the species populations themselves (from Table 1).

Supporting Habitats: the habitats that support the interest feature.

Attributes: particular characteristics of the features or supporting habitats which provide an indication of the condition of the feature (eg total population size, extent of a habitat type).

Measures: what exactly about the attributes will be measures, in terms of the units of measurement to be used.

Targets: These define the attribute values that equate to favourable condition. If changes are observed that are "significantly" different from the target, this will act as a trigger for further investigation as to the cause of the change, or remedial management action.

Comments: notes on the rationale for the use of each attribute and measure.

The favourable condition table is intended to supplement the conservation objectives only in relation to management of established and ongoing activities and future reporting requirements on monitoring the condition of the features of the site. The table **does not by itself** provide a comprehensive basis on which to assess plans and projects as required under Regulation 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 a separate activity to condition monitoring, requiring consideration of issues specific to individual plans or projects. English Nature and the Countryside Council for Wales 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 specifies the main types of information that English Nature and the Countryside Council for Wales will use to assess the condition of interest features. On many terrestrial European sites, we know sufficient about the preferred or target condition of qualifying species and habitats to be able to define measures and associated targets for all attributes. In European marine sites favourable condition is generally harder to define precisely since our knowledge of features is still developing. Accordingly, in the absence of such information, condition of interest features in European marine sites will be assessed against targets based on their condition at the time the sites were selected, which may need to be established through baseline surveys in many cases.

The assumption that interest features on European marine sites are currently in favourable condition will be reviewed in the 2000 – 2006 Habitats Directive reporting period, and changes may be made in the light of new information arising during that period. If it becomes clear that certain attributes are a cause for concern, management actions will need to be taken to restore the interest feature from unfavourable to favourable condition. It is the intention of English Nature and the Countryside Council for Wales to provide quantification of targets in the favourable condition table during the 2000 – 2006 reporting period.

This information provides the basis for discussions with management and advisory groups, and the attributes and associated measures and targets may be modified over time. The selection of attributes is based on the current understanding of the habitats and species and the available measuring techniques. 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.

The appropriateness of individual attributes as indicators of condition will be reviewed as more knowledge of the condition of interest features is obtained and/or survey and monitoring techniques develop. Monitoring of the attributes may be of fairly coarse methodology, underpinned by more rigorous methods on specific areas within the site.

The favourable condition 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 of interest features. The monitoring programme will be developed as part of the management scheme process through discussion with the relevant authorities and other interested parties. English Nature and the Countryside Council for Wales will be responsible for collating the information required to assess condition, some of which may be collected by other organisations, and for judging the condition of each feature within the site, taking into account all available information and using the favourable condition table as a guide.

Table 3a Favourable Condition Table for supporting habitats in the Severn Estuary SPA European marine site

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.

Feature	Supporting Habitat	Attribute	Measure	Target	Comments
Internationally important Annex 1 species: Bewick's swan	Saltmarsh	Habitat extent	Area (ha) measured once per reporting cycle.	At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh provides an important feeding and roosting habitat for Bewick's swans on The Dumbles - saltmarsh/transition wet grassland in front of sea defences.
		Vegetation characteristics	Abundance of suitable soft leaved herbs and grasses - % cover (frequency to be determined)	Greater than 25% cover during the winter season.	Bewick's swans graze on soft wet meadow grasses such as *Agrostis stolonifera, Glyceria fluitans* and *Alopecurus geniculatus* which are found in the transition of saltmarsh to grassland.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines. Areas of vegetation with an effective field size of >6ha	Bewick's swan require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	At Frampton Sands, Waveridge Sands and the Noose, no decrease in extent from 980 ha.	The intertidal mudflats and sandflats at The Noose, Frampton Sand and Waveridge Sand are used as disturbance refuge for Bewick's swan. The extent and distribution of this sub-feature are important to maintain the population in favourable condition.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Bewick's swan require unrestricted views >500m to allow early detection of predators when feeding and roosting.

Feature	Supporting Habitat	Attribute	Measure	Target	Comments
Internationally important populations of regularly occurring migratory species and Internationally important assemblage of waterfowl	Saltmarsh	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,400 ha. At The Dumbles, no decrease in extent from 76 ha.	Saltmarsh and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable saltmarsh food plants measured periodically (frequency to be determined).	Presence and abundance of suitable saltmarsh food plants should not deviate significantly from an established baseline. [19]	European white-fronted geese graze on a range of saltmarsh grasses and herbs. Wigeon feed on well-grazed saltmarsh with *Puccinella maritiae*, *Salicornia* and *Agrostis*. Teal and pintail feed on seeds from *Salicornia* and *Atriplex*.
		Vegetation characteristics	Range of vegetation heights measured periodically (frequency to be determined).	Sward height and density throughout areas used for roosting should not deviate significantly from an established baseline.	Vegetation of <10 cm is required throughout areas used by roosting waders. This is managed by grazing.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

[19] Baselines to be determined during the first reporting cycle

Feature	Supporting Habitat	Attribute	Measure	Target	Comments
Internationally important populations of regularly occurring migratory species and Internationally important assemblage of waterfowl	Intertidal mudflats and sandflats	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 15,000 ha. At Frampton Sands, Waveridge Sands and The Noose no decrease in extent from 980 ha.	Intertidal mudflats and sandflats and their communities are important habitats as they provide both roosting and feeding areas.
		Food availability	Presence and abundance of suitable prey species measured periodically (frequency to be determined).	Presence and abundance of suitable prey species should not deviate significantly from an established baseline. [20]	Most of the waders and waterfowl within the assemblage including the internationally important regularly occurring migratory birds feed on invertebrates within and on the sediments. Diet includes *Arenicola, Crangon, Hydrobia,Hediste, Corophium, Macoma, Gammarus,* small molluscs and strandline plankton and seeds.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.
	Shingle and rocky shores	Habitat extent	Area (ha), measured once per reporting cycle.	No decrease in extent from 1,500 ha.	This habitat is used for feeding and roosting, particularly by waders.
		Food availability	Presence and abundance of suitable intertidal invertebrates, measured periodically (frequency to be determined).	Presence and abundance of suitable food species should not deviate significantly from an established baseline. [20]	Waders feed on worms, crustaceans and molluscs.
		Unimpeded sightlines at feeding and roosting sites	Openness of terrain unrestricted by obstructions	No increase in obstructions to existing bird sightlines.	Waterfowl require unrestricted views >500m to allow early detection of predators when feeding and roosting.

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 Severn Estuary and may well be missed by routine monitoring

[20] Baselines to be determined during the first reporting cycle

Table 3b Favourable Condition Table for qualifying features in the Severn Estuary European marine site

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	Supporting Habitat	Attribute	Measure	Target	Comments
Internationally important Annex 1 species: Bewick's swan		Population size	5 year peak mean number of individuals	No less than 289 individuals [ie the 5 year peak mean between 1988/9 - 1992/3]	Mainly found in the Upper Severn Estuary at Slimbridge
		Proportion of biogeographic population	% of NW European population	% of NW European population	WeBS counts provide this information
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline[21]	WeBS low tide counts display distribution information by sector (not annual counts) Birds use certain sectors to a greater or lesser degree from year to year
		Disturbance in feeding and roosting areas	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline[21]	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

[21] Baselines to be determined during the first reporting cycle

Feature	Supporting Habitat	Attribute	Measure	Target	Comments
Internationally important populations of regularly occurring migratory species and Internationally important assemblage of waterfowl		Population size	5 year peak mean number of individuals	No less than 68,026 individuals in the assemblage [ie the 5 year peak mean between 1988/9 - 1992/3] Target number of Annex II bird species: Dunlin – >41,683; European White-fronted Goose >3,002; Shelduck >2,892; Redshank >2,013; [ie the 5 year peak mean between 1988/9 - 1992/3].	Figures derived from WeBS counts.
		Distribution	Number and location of sectors occupied at low tide	No decrease in use of the number of sectors and their distribution established as baseline[22].	In some years birds use certain sectors to a greater or lesser degree. WeBS low tide counts display distribution information by sector (not annual counts).
		Disturbance in feeding and roosting areas.	Reduction or displacement of wintering birds	No significant reduction in numbers or displacement of wintering birds attributable to disturbance from an established baseline[22].	Significant disturbance attributable to human activities can result in reduced food intake and/or increased energy expenditure. Five year peak mean information on populations will be used as the basis for assessing whether disturbance is damaging.

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 Severn Estuary and may well be missed by routine monitoring.

[22] Baseline to be determined during the first reporting cycle

5. Advice on operations

English Nature and the Countryside Council for Wales have 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 and the Countryside Council for Wales have developed this advice is given in section 5.2, and on how it may be reviewed and updated in the future, in section 5.4.

The advice is provided in summary form in Table 4 and Section 5.5 and with more detail in Table 5 and Section 5.8, including advice in relation to specific interest features and their supporting habitats.

5.1 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 Severn Estuary European marine site. The advice is linked to the conservation objectives for interest features and has helped provide the basis for detailed discussions within the management group to formulate and agree a management scheme to agreed timescales for the site. The advice given here will inform on, but is without prejudice to, any advice given to relevant and competent authorities under Regulation 48 or Regulation 50 on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

It should be noted that the general advice on sensitivity, exposure and therefore vulnerability contained within this package is only presented at the broad category level. It reflects both activities and plans and projects. Generic examples of some of the types of operation that are covered under the broad category headings are given for illustration. It is based on best available information at the time of drafting this Reg 33 advice. For activities this advice has been greatly refined under Regulation 34 of the Habitats Regulations in producing the Severn Estuary scheme of management where specific activities rather than broad categories have been investigated at the local level on the site. A detailed explanation of the process of production of the scheme of management is available at the Asera web. For a current assessment of levels of disturbance of specific types of activity across the Severn Estuary reference should be made to the Scheme of Management, also available at the Asera website **(http://www.severnestuary.net/asera/).**

However, certain activities are still being investigated further under the Severn Estuary Scheme of Management. In addition, it is not the purpose of the Scheme of Management to address the deterioration or disturbance potentially caused by plans or projects. The Scheme can not therefore reflect all of the advice and discussions below.

5.2 Methods for assessment

To develop this advice on operations English Nature and the Countryside Council for Wales have used a three step process involving:

- an assessment of the sensitivity of the interest features or their component supporting habitats to operations;
- an assessment of the exposure of each interest feature or their component supporting habitats to operations; and
- a final assessment of current vulnerability of interest features or their component supporting habitats 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 and the Countryside Council for Wales to both explain the reasoning behind our advice and identify to competent and relevant authorities those operations which pose the most immediate threats to the favourable condition of the interest features on the European marine site.

The assessment of relative sensitivity, exposure and vulnerability is 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).

5.2.1 Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features or the component supporting habitats of the Severn Estuary 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 supporting habitats of the Severn Estuary 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 Review (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 commissioned the Marine Biological Association of the UK, through its Marine *Life* Information Network (MarLIN) to provide detailed sensitivity information to underpin this advice. This information is available over the internet (www.marlin.ac.uk).

5.2.2 Exposure assessment

This has been undertaken for the Severn Estuary European marine site by assessing the relative exposure of the interest features or their component supporting habitats 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 (August 2003). As an example, wintering birds' feeding and roosting grounds may be considered highly exposed to toxic contamination from synthetic compounds due to the locations and intensity of discharges into an area.

5.2.3 Vulnerability assessment

The third step in the process is to determine the vulnerability of interest features or their component supporting habitats 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 Table 5.

5.3 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 and Wales 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 and the Countryside Council for Wales.

Sensitivity, exposure 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 or operations under their responsibility. The more detailed information in Table 5 provides competent authorities with a context against which to consider an assessment of 'significant effect' of 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 or competent authorities to consult English Nature or the Countryside Council for Wales formally over individual plans and projects where required to do so under the Regulations.

5.4 Update and review of advice

Information as to the categories of 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 and the Countryside Council for Wales know about current activities and patterns of usage at the Severn Estuary European marine site. The general information on current activities and patterns of usage (which was used in part to derive Table 5) has now been refined at the local level in producing the management scheme for the site, and through further discussion with the relevant authorities. This management scheme is now available at the Asera website (http://www.severnestuary.net/asera/). 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 supporting habitats (Table 5) 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.

5.5 Summary of advice on operations

5.5.1 Internationally important populations of regularly occurring Annex 1 species

In pursuit of the conservation objective for "populations of and habitats supporting internationally important populations of regularly occurring Annex 1 species" (Section 4.1), the relevant and competent authorities for the Severn Estuary 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 through removal;
- noise or visual disturbance;
- contamination by synthetic and/or non-synthetic toxic compounds.

5.5.2 Internationally important populations of regularly occurring migratory species and internationally important assemblage of waterfowl

In pursuit of the conservation objective for "populations of and habitats supporting the internationally important populations of regularly occurring migratory species and waterfowl assemblage" (Sections 4.2, 4.3, 4.4, 4.5 and 4.6), the relevant and competent authorities for the Severn Estuary 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 through removal;
- damage by abrasion or selective extraction;
- noise or visual disturbance;

- contamination by synthetic and/or non-synthetic toxic compounds;
- changes in nutrient and/or organic loading;
- biological disturbance through the selective extraction of species.

5.6 Plans and Projects

Under Regulation 48(1), an appropriate assessment must be undertaken by competent authorities in respect of any plan or project which:

a. either alone or in combination with other plans or projects is likely to have a ***significant effect*** on a European site; and
b. is not directly connected with or necessary to 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 proposed SPAs and listed Ramsar sites.

English Nature and the Countryside Council for Wales have both produced 'Habitats regulations guidance notes' and can provide the most up to date information on appropriate assessments if required.

Table 5 provides competent 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 competent authorities to formally consult English Nature or the Countryside Council for Wales over individual plans and projects where required under the Regulations.

5.7 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 it were to be 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 after classification of the European marine site. Consents will need to be reviewed in the light of these objectives.

Table 4 Summary of operations which may cause deterioration or disturbance to the Severn Estuary European marine site interest features at current levels of use[23]

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 populations of regularly occurring Annex 1 birds	Internationally important populations of regularly occurring migratory species	Internationally important assemblage of waterfowl
Physical loss			
Removal	✓	✓	✓
Smothering			
Physical damage			
Siltation			
Abrasion		✓	✓
Selective extraction		✓	✓
Non-physical disturbance			
Noise	✓	✓	✓
Visual	✓	✓	✓
Toxic contamination			
Introduction of synthetic compounds	✓	✓	✓
Introduction of non-synthetic compounds	✓	✓	✓
Introduction of radionuclides			

[23] This advice has been developed using best available scientific information and informed scientific interpretation and judgement (as at August 2003). 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 Table 5. 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.

Standard list of categories of operation which may cause deterioration or disturbance	Internationally important populations of regularly occurring Annex 1 birds	Internationally important populations of regularly occurring migratory species	Internationally important assemblage of waterfowl
Non-toxic contamination			
Changes in nutrient loading		✓	✓
Changes in organic loading		✓	✓
Changes in thermal regime			
Changes in turbidity			
Changes in salinity			
Biological disturbance			
Introduction of microbial pathogens			
Introduction of non-native species & translocation			
Selective extraction of species		✓	✓

The precise impact of any category of operation occurring on the site will be dependent upon the nature, scale, location and timing of events. More detailed advice is available from English Nature and the Countryside Council for Wales to assist relevant authorities in assessing actual impacts and cumulative effects. Assessment of this information has been undertaken in the development of the management scheme for the site and 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 August 2003. 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.

5.8 Specific advice on operations

This section provides information to help relate general advice to each of the specific interest features of the Severn Estuary European marine site. Where specific examples are given they are provided to aid understanding of possible impacts and are not intended to be a comprehensive list of all relevant operations.

This advice relates to the vulnerability of the interest features and supporting habitats of the Severn Estuary European marine site as summarised in Table 4 and set out in more detail in Table 5. An explanation of the sensitivity of the interest features or supporting habitats 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.

5.8.1 Internationally important populations of regularly occurring Annex 1 species

i) Physical loss through removal

The physical loss of areas of intertidal habitats may be caused directly through change of land use or indirectly as a consequence of changes to sedimentation processes (e.g. coastal defences) as well as via the effects of smothering by artificial structures (e.g. jetties) or the disposal of spoils. Activities or developments resulting in physical loss of the intertidal supporting habitats are likely to reduce the availability of feeding and roosting habitat and thus be detrimental to the favourable condition of the SPA interest features including the Annex 1 species, Bewick's swan. The intertidal mudflats and sandflats and the saltmarsh are highly sensitive to removal by land reclamation and barrage construction. Large areas of the European marine site are not currently under threat which is reflected in the low exposure score, however when combined with the high sensitivity score this leads to a moderate vulnerability.

ii) Noise or visual disturbance

Overwintering birds are disturbed by sudden movements and sudden noises. This can displace the birds from their feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and thus survival. There is intermittent disturbance from both the landward and seaward side of the site. Bewick's swans are mainly affected by disturbance from the landward side and any increase in disturbance should be avoided. At present the Annex 1 species are moderately vulnerable to noise and visual disturbance on the intertidal mudflats and sandflats and highly vulnerable to this category of operation on the saltmarsh.

iii) Toxic contamination through the introduction of synthetic and/or non-synthetic compounds

Waterfowl are subject to the accumulation of toxins through the food chain or through direct contact with toxic substances when roosting or feeding. Their ability to feed can also be affected by the abundance or change in palatability of their prey caused by toxic contamination. At the moment there is no evidence to show that this is the case, but the estuary is vulnerable to oil spills and there is a continuous discharge of toxins into the estuary, some of which bind to the sediments. This is an area which requires further assessment. The Bewick's swans are currently moderately vulnerable to toxic contamination.

5.8.2 Internationally important waterfowl assemblage including populations of regularly occurring migratory species

i) Physical loss through removal

The physical loss of areas of intertidal habitats may be caused directly through change of land use or indirectly as a consequence of changes to sedimentation processes (e.g. coastal defences) as well as via the effects of smothering by artificial structures (e.g. jetties) or the disposal of spoils. Eelgrass beds are being affected by siltation due to changes in sediment movement after construction of the Second Severn Crossing which has resulted in smothering. Activities or developments resulting in physical loss of the intertidal supporting habitats are likely to reduce the availability of food and roosting habitat and thus be detrimental to the favourable condition of the SPA interest features including all the migratory species and waterfowl assemblage. All three supporting habitats are highly sensitive to removal by land reclamation and barrage construction. Although large areas of the European marine site are not currently under threat which is reflected in the low exposure score, combined with the high sensitivity score this leads to a moderate vulnerability.

ii) Physical damage by abrasion and/or selective extraction

Saltmarsh may be physically damaged from overgrazing or eroded when boats are moored on it and when paths are worn through it to reach moored boats on foot or via vehicles. Currently all supporting habitats are considered to be moderately vulnerable to abrasion.
Intertidal habitats are highly sensitive to damage by direct and indirect effects of aggregate dredging The intertidal mudflats and sandflats and the shingle and rocky shore are therefore considered highly vulnerable to selective extraction.

iii) Noise or visual disturbance

Overwintering birds are disturbed by sudden movements and sudden noises. This can have the effect of displacing the birds from their feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and

thus survival. There is intermittent disturbance to the internationally important migratory species and the waterfowl assemblage from both the landward and seaward side of the site which has increased in recent years, due to the estuary becoming more populated and the development of all weather recreational pursuits. All supporting habitats are currently highly vulnerable to noise and visual disturbance.

iv) Toxic contamination through the introduction of synthetic and/or non-synthetic compounds

Waterfowl are subject to the accumulation of toxins through the food chain or through direct contact with toxic substances when roosting or feeding. Their ability to feed can also be affected by the abundance or change in palatability of their prey caused by toxic contamination. At the moment there is no evidence to show that this is the case on the Severn Estuary, but the estuary is vulnerable to oil spills and there is a continuous discharge of toxins into the estuary, some of which bind to the sediments. This is an area that requires further assessment. The intertidal mudflats and sandflats and the saltmarsh are currently highly vulnerable to the introduction of synthetic and non-synthetic compounds.

v) Changes in nutrient and/or organic loading

Changes in organic or nutrient loading can change the species composition of the plants on the saltmarsh and thus the structure of the sward. Increases in nutrients can also cause excessive algal growth on the mudflats, denying the birds access to their invertebrate prey and changing the invertebrate species composition in the sediment. Though the water quality has been improved in recent years there are still local areas of concern and any increase in nutrient loading should be avoided. At present the intertidal mudflats and sandflats are moderately vulnerable to this category of operation.

vi) Biological disturbance through the selective extraction of species

Wildfowling is carried out all around the estuary. It has not been established that it has a detrimental effect on the overall bird populations but wildfowling needs to be exercised in a managed and sustainable manner preferably by a British Association of Shooting and Conservation (BASC) affiliated association, applying the BASC wildfowlers code of conduct.
Bait digging is also carried out around the estuary. If too large an area is regularly dug over, it can change the availability of prey in the sediment as the area needs a period of recovery and recolonisation. There is no evidence to show this is currently detrimental to the birds on the European marine site, although the moderate sensitivity score combines with medium exposure to give a moderate vulnerability.

The removal of strandline vegetation by beach cleaning removes an important habitat for invertebrates, as well as many of the invertebrates themselves, reducing the quantity and variety of prey available to the birds.

Much of the saltmarsh is managed by grazing and changes in management can alter the availability of prey and suitability of roosting sites.

The saltmarsh is currently highly vulnerable to the selective extraction of species.

Table 5. Assessment of the relative sensitivity, exposure and vulnerability of interest features and supporting habitats of the Severn Estuary European Marine site to different categories of operations

Categories of operations to which the features or supporting habitats of the site are highly or moderately vulnerable are indicated by shading. Table also incorporates relative sensitivity and exposure scores used to derive vulnerability.[24]

Key **Matrix used to determine relative vulnerability (i.e. Exposure x Sensitivity = Vulnerability)**

High sensitivity	OOOO	High Exposure	××××	High vulnerability	⊗⊗⊗⊗ ⊗⊗⊗O ⊗⊗⊗×
Moderate sensitivity	OOO	Medium Exposure	×××	Moderate vulnerability	⊗⊗OO ⊗⊗× × ⊗⊗⊗
Low sensitivity	OO	Low Exposure	××		
No detectable sensitivity	O	No exposure	×		

[24] English Nature and the Countryside Council for Wales advice on operations is derived from an assessment combining relative sensitivity of the features or supporting habitats with information on human usage of the site (as at August 2003), 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. The sensitivity of interest features, or supporting habitats, 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.

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		
	Intertidal mudflats and sandflats	Saltmarsh	Intertidal mudflats and sandflats	Saltmarsh	Shingle and rocky shore
Physical Loss					
Removal (eg harvesting, land claim, coastal development)	⊗⊗O O	⊗⊗O O	⊗⊗O O	⊗⊗O O	⊗⊗O O
Smothering (eg coastal development, artificial structures, disposal of dredge spoil)	⊗⊗O	⊗⊗O	⊗⊗O	⊗⊗O	⊗⊗O
Physical Damage					
Siltation (eg run-off, channel dredging, outfalls, coastal development)	⊗⊗	⊗⊗	⊗⊗ ×	⊗⊗	⊗ × ×
Abrasion (eg boating, anchoring, trampling, land-based recreation, bait collection)	⊗⊗	⊗⊗O	⊗⊗⊗⊗	⊗⊗⊗	⊗⊗⊗⊗
Selective extraction (eg aggregate dredging, grazing)	⊗⊗O	⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗	⊗⊗⊗⊗
Non-physical disturbance					
Noise (eg land/water-based recreation, boat activity, coastal development)	⊗⊗O O	⊗⊗⊗O	⊗⊗⊗O	⊗⊗⊗⊗	⊗⊗⊗O
Visual presence (eg land/water-based recreation, boat activity, coastal development)	⊗⊗O O	⊗⊗⊗O	⊗⊗⊗O	⊗⊗⊗⊗	⊗⊗⊗O
Toxic contamination					
Introduction of synthetic compounds (eg domestic/industrial effluent, pesticides, anti-foulant paints (TBT), PCBs)	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗×	⊗⊗⊗×	⊗× × ×
Introduction of non-synthetic compounds (eg domestic/industrial effluent, heavy metals, hydrocarbons)	⊗⊗⊗	⊗⊗⊗	⊗⊗⊗×	⊗⊗⊗×	⊗× × ×
Introduction of radionuclides (eg industrial effluent)	⊗⊗	⊗⊗	⊗⊗	⊗⊗	⊗ ×

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		
	Intertidal mudflats and sandflats	Saltmarsh	Intertidal mudflats and sandflats	Saltmarsh	Shingle and rocky shore
Non-toxic contamination					
Changes in nutrient loading (eg agricultural run-off, domestic/industrial outfalls)	⊗⊗O	⊗⊗ ×	⊗⊗⊗	⊗⊗ ×	⊗ × ×
Changes in organic loading (eg mariculture, domestic/industrial outfalls)	⊗⊗O	⊗⊗	⊗⊗⊗	⊗⊗ ×	⊗ × ×
Changes in thermal regime (eg outfalls, power stations)	⊗ ×	⊗ ×	⊗⊗	⊗ ×	⊗ ×
Changes in turbidity (eg run-off, dredging)	⊗⊗	⊗ ×	⊗⊗	⊗ ×	⊗ ×
Changes in salinity (eg water abstraction, outfalls)	⊗⊗ ×	⊗⊗ ×	⊗⊗O	⊗⊗	⊗ ×
Biological disturbance					
Introduction of microbial pathogens	⊗⊗	⊗ ×	⊗⊗ ×	⊗ ×	⊗ ×
Introduction of non-native species & translocation (eg *Sargassum muticum*, ballast water)	⊗⊗O	⊗⊗O	⊗⊗O	⊗⊗O	⊗ ×
Selective extraction of species (eg bait digging, wildfowling, commercial & recreational fishing)	⊗⊗O	⊗⊗O	⊗⊗⊗	⊗⊗⊗×	⊗ ×

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7. 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 or supporting habitat which provides an indication of the condition of the feature or supporting habitat to which it applies.
BASC	British Association of Shooting and Conservation
Benthos	Those organisms attached to, or living on, in or near, the seabed, including that part which is exposed by tides.
Birds Directive	The abbreviated term of *Council Directive* 79/409/*EEC of 1979 on the conservation of wild birds*
Biodiversity	The total variety of life on earth. This includes diversity within species, between species and ecosystems.
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.
BTO	British Trust for Ornithology
CCW	Countryside Council for Wales
Characteristic	Special to, or especially abundant in, a particular situation or biotope. Characteristic species should be immediately conspicuous and easily identified.
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.
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
Epifauna	Benthic animals living on the seabed.
EN	English Nature
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.
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 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.
Favourable conservation status (FCS)	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.
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.
Habs Regs	The Conservation (Natural Habitats &c.) Regulations 1994.
HAT	Highest Astronomical Tide
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 any Annex II species and any population of a bird species for which an SPA has been designated under the Birds Directive.
JNCC	Joint Nature Conservation Committee
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.
MNR	Marine Nature Reserve
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.
NNR	National Nature Reserve
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.
PCB	Polychlorinated Biphenyls
Peak mean counts (5 yr)	The Severn Estuary 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 the Severn Estuary are then averaged over a five year period to give the 5 yr peak mean count.
Plan or project	Any operation that is within a competent authority's (including relevant authorities) function to control, or over which a competent authority (including relevant authorities) has a statutory function to decide on applications for consents, authorisations, licences or permissions. There is no generally accepted definition of the term "plan or project". This definition may be subject to review and may require further discussion in the context of developing a management scheme for the Severn Estuary SPA.
Ramsar	Site designated under the 1971 Ramsar Convention as a wetland of international importance.
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.

Reporting period	The cycle within which a definitive report on the condition of features protected within the site series will be produced, set as once in every 6 years.
Restore	The action required for an interest feature when it is not considered to be in a favourable condition.
SAC	Special Area of Conservation
Sensitivity	The intolerance of a habitat, community or individual species to damage from an external force.
SPA	Special Protection Area for birds
SSSI	Site of Special Scientific Interest
Strandline	The organic matter particularly rotting seaweed deposited by the tide anywhere along the intertidal.
Supporting Habitats	The key habitats within the European marine site necessary to support the interest feature.
(TAN)5	Planning Guidance (Wales) Technical Advice Note (TAN)5: Nature Conservation and Planning (Welsh Assembly Government)
TBT	Tri-butyl tin
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.
WWT	Wildfowl & Wetlands Trust

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