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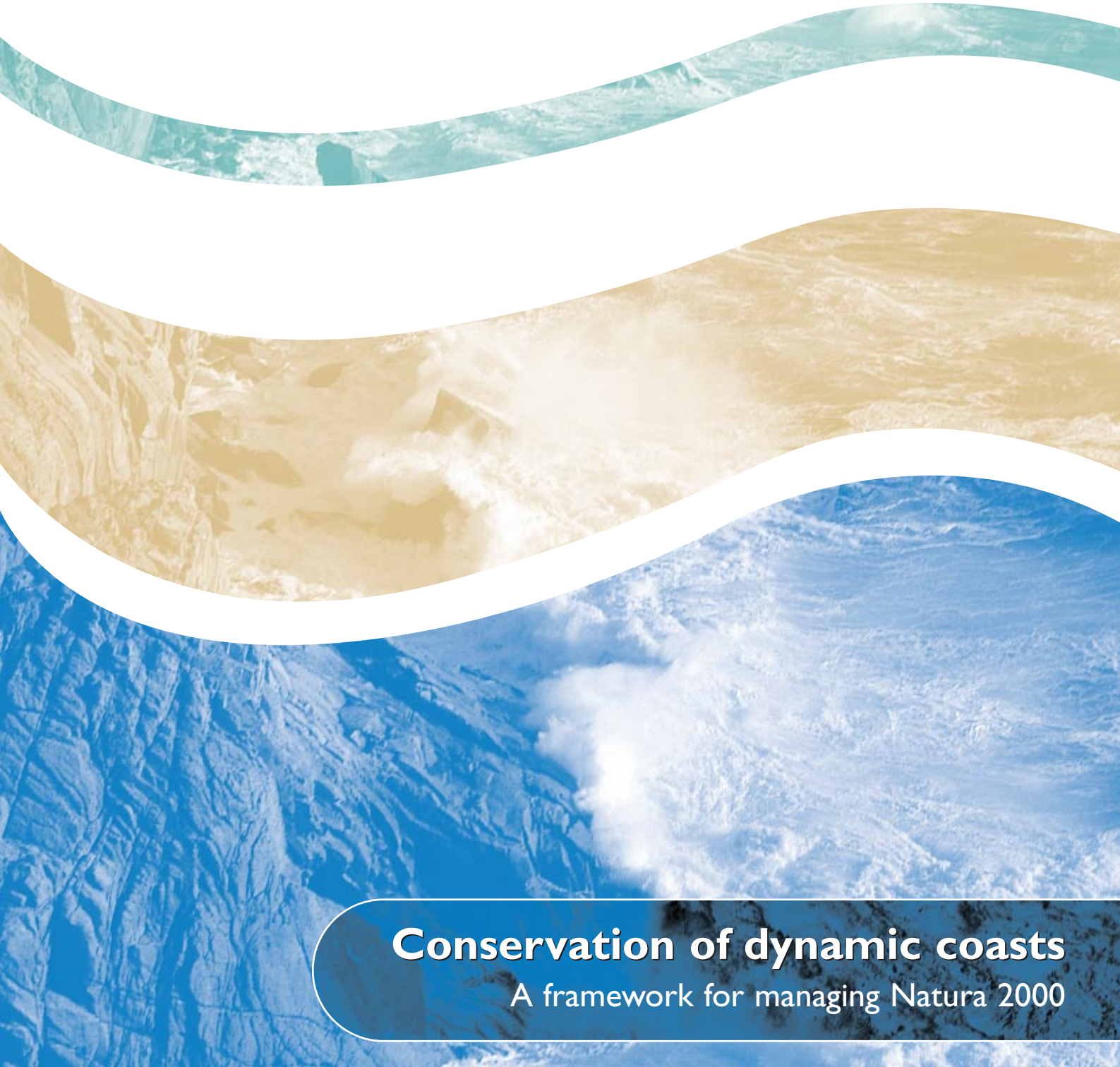

Conservation of dynamic coasts

A framework for managing Natura 2000

Sandunes, Denmark. R Sorensen & J Olsen/NHPA

Conservation of dynamic coasts

A framework for managing Natura 2000

This report represents the views of the project and does not necessarily reflect the current policy position of the individual partners.

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Foreword

Against a background of climate change, development pressure and heightened environmental awareness, our coastal habitats are the focus of much attention. Inter-tidal habitats, in particular, are naturally dynamic and rely on change to develop and maintain their diversity of form and function. But, as a result of historic coastal land claim and engineering works, many of our internationally designated sites are now unable to accommodate rising sea levels - resulting in coastal squeeze. Climate change could also result in changes to wave climate, with impacts on sediment transport processes, as well as more extreme events.

Through this report, the Living with the Sea project is exploring the relationship of coastal habitats with the European and UK legislation, which has enabled the designation, protection and enhancement of the Natura 2000 series. The aim is to make best use of the legislative tools currently available, to meet the particular requirements of coastal habitats and species, particularly in relation to flood management. Many opportunities lie in how we interpret European Directives and our UK enabling legislation. The driving principle should always be to facilitate the environments' response to global pressures such as climate change, being aware of the consequences for all habitats, and to resist the temptation to regulate the environment.

This work will be of particular use to UK and European government organisations that are involved in formulating and implementing our environmental legislation. The Habitats Directive provides a lead in viewing and managing our designated sites as a coherent network. This is an opportunity to really understand how coastal habitats and species rely on dynamic change to form a robust ecosystem. Adopting the principle of having a coherent network of sites and implementing this approach will secure the long-term future of our coastal wilderness. This approach will also underpin solutions to many of the current challenges that threaten the sustainability of our coastal environment, aiding coastal planning and management decisions for the communities that live, work and relax in this dynamic environment.

Stephen Worrall
Living with the Sea Project Manager

Dungeness SSSI Kent, annual vegetation of drift lines. Sue Rees/English Nature

Executive Summary

This report provides the conclusions from one of the Living with the Sea (LWTS) Life project tasks. It focuses on some of the issues affecting coastal Natura 2000 sites, especially flood management and the need to build on current approaches to coastal policy and management.

It is targeted at organisations responsible for implementing the Habitats and Birds Directives in England, together with those involved in strategic coastal management and the planning and funding of flood defence works. Production of this report drew upon experience elsewhere in Europe. Although the recommendations are presented in an England context, they will have relevance to the rest of the UK and other Member States in developing approaches to changing environments.

The outcomes of this task will help to promote:

- A better understanding of the role of flood defence measures in delivering the aim of the Habitats Directive on the coast of the UK;
- A better appreciation of the application of the Habitats Directive amongst other Member States and stakeholders as a result of the two European workshops;
- Actions for England to promote management of coastal Natura 2000 sites to deliver favourable conservation status, taking forward the overall results of the project in the context of the issues of site boundary designation and promoting the development of a clear understanding of the concept of a coherent network in the UK.

Dynamic processes are essential for the conservation of coastal habitats, but can result in change to other habitats of equal nature conservation importance in the coastal zone. The full implications of such potential change are not yet fully understood with regard to our obligations under European legislation.

This report explores the consequences for site boundaries where the designated features are mobile, together with the implications for decision-making in a flood management context where features have conflicting ecological requirements impossible to reconcile on the same area within the existing boundary. Meeting multiple objectives on one site is not always achievable. Flood defence can play a beneficial or detrimental role in the maintenance of designated features by preventing flooding of freshwater habitats or by causing coastal squeeze. This creates dilemmas for organisations advising on and implementing flood defence.

Other elements of the LWTS project have highlighted similar issues. For example, Coastal Habitat Management Plans (CHaMPs) provide the necessary information to help make flood defence decisions for site complexes compliant with the Habitats and Birds Directives. They have also highlighted the need to take a wider perspective across the network on site designation and management issues, and to examine attitudes to dynamic coastal environments and the implications of change.

Through analysis of the information, there appeared to be three key aspects of European legislation to consider:

- The need for a clear definition of favourable conservation status, building on the definition in the Habitats Directive, and its application in decision-making;
- The need to define and understand the concept of a coherent network to help with decision-making in situations of dynamic change;
- The need to identify and resolve limitations of fixed boundaries imposed on dynamic features at a national level.

This report promotes a more strategic approach to site management and the response to dynamic change. The proposed actions will help to implement the Habitats and Birds Directives.

Summary of recommendations

- Manage sites as part of a coherent network to ensure that it can respond to environmental change. Through this, promote closer integration of the aims of the Habitats Directive and the Birds Directive.
- Take a strategic approach to the management of the network, with greater emphasis on the role of the wider environment and linking measures within and beyond sites to achieve favourable conservation status.
- Integrate data and spatial information to improve the adequacy of use for monitoring and management, and apply scientific understanding of predicted coastal evolution to management decisions.
- Carry out periodical reviews of site management, conservation objectives, and incorporate better understanding of predicted change across the network.
- In the long-term, move towards a presumption to restore functional coastlines, linked to a major programme of habitat restoration in more sustainable locations.
- Actively promote sustainability through engagement with all stakeholders and the development of joint projects. Regularly review stakeholder views and understanding of the implications of climate change.
- Focus on systems, not features, to develop a more innovative approach to habitat compensation arising from flood defence schemes.
- Develop a national strategic plan for habitat restoration required to deliver sustainable flood defence.
- Address form and function of features within and beyond sites and inform management decisions through monitoring and surveillance.
- Review and update European site designation mechanisms to deal with dynamic change.
- Co-ordinate action across Europe in response to environmental change.
- Base policy development on real examples, to improve management practice and achieve the aims of the Habitats and Birds Directives.

Boats moored at Brancaster Staithe, North Norfolk. Martin Smith/FLPA

1. Introduction

This document provides the concluding report from one of the four tasks of the *Living with the Sea* (LWTS) LIFE project[1]. Through the integration of its four tasks, this project aims to aid the UK's delivery of the aims of the European Birds[2] and Habitats[3] Directives on Natura 2000 sites in dynamic coastal areas. These Directives were adopted by the European Community to implement the 1979 Bern Convention in Europe, which aims to conserve species and their habitats, and the 1992 Convention on Biological Diversity, which promotes the sustainable management of resources.

This task addresses some of the difficult issues emerging from the implementation of the Habitats and Birds Directives on dynamic coastlines. The aim was to develop a policy and management approach to deal with dynamic change and its impact on the ecological requirements of designated features and promote best practice to achieve consistency in addressing these issues.

Duddon Estuary SSSI, Cumbria. Peter Wakely/English Nature 7,279

[1] www.english-nature.org.uk/livingwiththesea.
[2] Council Directive of 2 April 1979 on the conservation of wild birds (79/409/EEC Birds Directive).
[3] Council Directive of 21 May 1992 on the conservation of natural habitats and wild fauna and flora (92/43/EEC Habitats Directive).
[4] Stroud D.A *et al.* 2001. *The UK SPA network: its scope and content Volume 1: Rationale for the selection of sites.* JNCC, Peterborough.

Natura 2000 is a European network of sites designated for their European importance for habitats and species. These sites are intended to form a coherent network of protected areas that will contribute to the achievement of favourable conservation status and maintain populations of wild birds.

The network is based on two types of sites: Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). SACs are selected according to criteria set out in the Directive, for habitats and species listed in the Habitats Directive under Annex I and Annex II. SPAs are classified under the Birds Directive according to criteria based on bird populations. In the UK there are overlaps between the boundaries of SPAs and candidate (cSACs), on the coast and elsewhere, with different selection criteria applied to the same area of habitat.

Selection guidelines for SPAs in the UK are based primarily on numbers of birds, population density, use of the area and species range, with natural or semi-natural habitats favoured for selection[4]. Selection criteria for SACs are set out in Annex III, stage 1 of the Habitats Directive and are based on representativity, area covered by the habitat/population size and density, conservation of structure and function and the relative importance of the site for the conservation of the species or habitats concerned within the national territory. Structure can relate to a variety of biotic and abiotic features, including species composition, the physical architecture of the vegetation, the ground morphology, the successional status of the vegetation, and species assemblages of plants, animals or both. Function relates to the way in which the biotic and abiotic features interact over time. Functions may include energy flows, biogeochemical cycles, hydrology and many other processes. Many habitat types occur not as isolated examples surrounded by intensive land use, but in mosaics of habitats, notably on the coast and in the uplands. In these situations the juxtaposition of communities and the transitions between them have been seen as an important element of habitat structure. The resulting combination of habitats and transitions between them are of great importance to nature conservation. For coastal habitats in particular, the degree of conservation of habitat structure and function has been of importance for SAC selection in the UK[5].

The very nature of dynamic habitats is that they change in time and space. Site boundaries have to be clearly delineated, but it is unclear what actions should be taken when a habitat migrates beyond the fixed site boundaries. This can occur as a result of shoreline evolution, or by design, if the only way of maintaining the extent and function of a habitat is to recreate it or allow it to migrate outside the presently defined site boundary.

England's coast has numerous existing flood defence structures. These constrain natural coastal change in order to reduce the risk of flooding of people, property and agricultural land. These defences can also provide protection from tidal inundation to many wetlands on the coastal flood plain.

Flood defence can play two roles, either as a conservation measure, or as a factor that can result in habitat deterioration by affecting functionality. Where such situations occur together on Natura 2000 sites and the flood defences form a boundary between dynamic coastal features and those with other wetland interest, this has led to difficulties in making management decisions for coastal defence purposes. This cannot be resolved on a site-by-site basis. A strategic solution is needed in relation to flood defence to help with decision-making and to balance the long-term needs of Natura 2000 sites on dynamic coastlines.

Morecambe Bay, Lancashire, oystercatchers at Hest Bank. Peter Wakely/English Nature 9,768

The naturally dynamic nature of the marine and coastal environment and the challenge that this poses for implementing this legislation has been highlighted previously, for example through projects such as the European Commission Demonstration Programme on Integrated Coastal Zone Management (ICZM)[6]. Some of the issues for implementation of the Habitats Directive in marine and coastal areas were highlighted by a seminar held in 1997[7]. However, a practical means of meeting these challenges still has to be found, to determine a way forward for Natura 2000 sites on dynamic coasts.

The LWTS project has made some key steps in examining these issues through Coastal Habitat Management Plans (CHaMPs). These have been produced for seven English SPA/cSAC complexes, based on guidance published in 2000[8]. CHaMPs provide the necessary information to ensure that coastal defence management decisions for those areas are compliant with the requirements of the Habitats and Birds Directives. On their completion, these pilot CHaMPs confirmed the need to consider the Habitats Directive and its key principles more closely and to identify necessary actions to address outstanding issues, as well as attitudes to habitat change.

[5] McLeod, C.R, Yeo, M, Brown, A.E, Burn, A.J, Hopkins, J.J, & Way, S.F (eds) (2002) *The Habitats Directive: selection of Special Areas of Conservation in the UK. 2nd Edn.* Joint Nature Conservation Committee, Peterborough. www.jncc.gov.uk/SACselection
[6] http://europa.eu.int/comm/environment/iczm/home.htm
[7] European Commission (1998). *Implementing the Habitats Directive in marine and coastal areas.* Proceedings of a seminar at Morecambe Bay June 1997.
[8] Living with the Sea (2000). *Coastal Habitat Management Plans: an interim guide to content and structure.*

2. Living with the Sea LIFE Project

This project was funded by LIFE Nature and a partnership with English Nature, Environment Agency, Department for Environment Food and Rural Affairs (Defra) and the Natural Environment Research Council (NERC). The project has focused on developing sustainable flood and coastal management approaches based on better knowledge and understanding of likely future change and identifying the requirements for habitat creation to offset any losses. The other three project elements are shown in Table 1, covering management planning, guidance on habitat restoration and practical works on the ground. Full details of the overall aims can be found on the project website[8].

Table 1. Other elements to the *Living with the Sea* project and links with this task

Project tasks	Outcomes	Links with this report
Development of Coastal Habitat Management Plans (CHaMPs). Production of seven pilot CHaMPs for dynamic coastal areas in England where research has indicated significant habitat change over the next 50 years.	CHaMPs will become an effective way of identifying the measures required to address dynamic change within the context of the Habitats Directive and established as a strategic management tool for Natura 2000 site complexes.	Input into the revised CHaMP guidance to ensure it incorporates relevant aspects of the recommendations.
Development of best practice guidance on the re-creation and/or restoration of coastal habitats.	To provide assistance to engineers and conservationists in designing habitat schemes to promote more effective ways of sustaining the Natura 2000 network through habitat restoration and re-creation where features are not sustainable in their current locations.	Better understanding of Natura 2000 network coherence and its future management requirements. Consideration of future designation of newly created habitats and their role in the network.
Implementation of the North Norfolk Coast Management Plan Overview (MPO) to examine actual, on the ground coastal habitat re-creation and restoration, and understanding the role of this work in maintaining the ecological integrity of features of European importance.	The habitats restored at Brancaster in North Norfolk will have a more sustainable coastal form and their ecological integrity will be maintained in the longer term.	Brancaster used as a case study in the European workshop to illustrate key issues in a practical context.

The project addresses coastal flood defence policy in relation to Natura 2000 sites. A previous study covering England and Wales[9] highlighted the situation. If shoreline management policies were to be implemented as they stood at that time, the ensuing effects would result in deterioration of sites within the Natura 2000 network over the next 50 years. This is because many sites are located on coastlines on the south and east of England and will be affected by relative sea level rise. This work identified the need to review shoreline management polices in the light of the requirements of the Habitats and Birds Directives.

Natura 2000 sites in coastal areas are designated for a wide variety of Annex I habitats, Annex II species and bird populations. There is often considerable overlap between the boundaries of cSAC and SPA designations, both equally important in making up the Natura 2000 network. Many of the same sites are also designated as Wetlands of International Importance (Ramsar sites) under the Ramsar Convention[10]. A UK Government policy statement in 2000[11] treats all Ramsar sites in the same way as Natura 2000 sites. These boundary overlaps can lead to situations on Natura 2000 sites where management measures to conserve one feature could lead to the deterioration of another.

The problem of conflicting site management measures can be illustrated by the different ecological requirements of saline and freshwater habitats. Wetlands such as reedbeds and grazing marshes support important populations of birds. In many cases where these habitats occur on the coastal flood plain, they depend on the maintenance of artificial coastal defence structures, for example, sea walls, or the damaging manipulation of natural features such as a shingle ridge, to prevent saline flooding. However, in the face of relative sea level rise and shoreline change, these defences will lead to a continued 'squeeze' on designated intertidal habitats from sea level rise, resulting in deterioration of the features for which the site was designated. The measures necessary to maintain coastal features often require the restoration of coastal processes, whereas the protection of the freshwater habitat depends on the maintenance of defence structures in their current location.

The project outputs will contribute to the development of current practice in the UK to meet the requirements of the Directive and contribute to the conservation of biodiversity in the coastal zone. The findings and recommendations will have relevance to policy and decision-makers facing similar issues in other Member States. The outputs and benefits arising from this project will be taken forward beyond its completion in 2003.

The four main project tasks included one to explore the issue of how to reconcile dynamic change with the management of designated features. It is this part of the project that this report focuses on.

Baltic Sea coast, Mecklenburg. Silvestris/FLPA

[9] Lee, M.1998. *The implications of future shoreline management on protected habitats in England and Wales.* Environment Agency R&D Technical Report W150.

[10] http://www.ramsar.org/
[11] http://www.defra.gov.uk/

Groynes on shingle bar, Aldeburgh. Sue Rees/English Nature

3. Development of a framework for dynamic coasts

This task looked at the UK experience and gathered information on approaches to dynamic coastal situations elsewhere in Europe. This included two European workshops, contact with UK and European organisations, discussion with other specialists and a working group. The working group referred to throughout this report consisted of the representatives of project partners, the RSPB, the Wildlife Trusts and a coastal Local Authority. It was set up to analyse the issues identified at the European workshops and contribute to a series of discussion papers that formed the basis of the draft report. Members of the working group also facilitated the second European workshop in Porto in 2002.

England has a significant proportion of Europe's vegetated shingle, with the largest site being Dungeness in Kent. Peter Wakely/English Nature 20,889

The outcomes of this task will help to promote:

- A better understanding of the role of flood defence measures in delivering the aim of the Habitats Directive on the coast of the UK;
- A better appreciation of the application of the Habitats Directive amongst other Member States and stakeholders as a result of the two European workshops and the reports;
- Actions for England to promote management of coastal Natura 2000 sites to deliver favourable conservation status, taking forward the overall results of the project in the context of the issues of site boundary designation and promoting the development of a clear understanding of the concept of a coherent network in the UK.

In 2003 the draft report was circulated to contacts established during this study, to find out the extent to which the main issues were relevant across a range of organisations. Those who responded recognised the importance of these issues, were generally in support of the need to address the issues and provided useful feedback on presentation.

This report has been amended in the light of those comments and provides the outcomes of the analysis, together with recommendations for the way forward.

The report does not provide a legal interpretation of the Directive. It can be used as broad guidance and principles that can be drawn upon by Member States when faced with similar situations arising from some form of dynamic change.

Grazing marsh behind sea wall, Burnham Norton, Norfolk. Allan Drewitt/English Nature

4. Clarifying the issues

The focus for implementation of the Habitats Directive in the UK has been on the selection of sites and the implications of Article 6 for plans or projects. The latter has been covered by European Commission (EC) guidance[12,13]. From the UK experience, there appears to be limited guidance on the application of the Habitats and Birds Directives on coastal Natura 2000 sites where the maintenance of some of the present interest features may not be sustainable *in situ*. Information from climate change studies has highlighted this key management issue[14,15]. The need to develop policies for nature conservation in the face of climate change has been identified[16], not just in relation to the coast but also for other habitats such as peat bogs, grasslands and montane habitats. This report aims to identify a way forward to address coastal habitats that are already experiencing impacts from rising sea levels which must be addressed sooner rather than later. Some of the outcomes of this work may be applicable to other types of habitat where change has yet to be detected.

Shingle migrating across saltmarsh, Norfolk.
Sue Rees/English Nature

The overall aim of the Habitats Directive is clearly set out in Article 2. It is to contribute to the conservation of biodiversity by maintaining or restoring the favourable conservation status of habitats and species of European importance. The aim of the Birds Directive is to maintain populations of all naturally occurring birds in the wild state. Both Directives require the establishment of sites, development of networks and the application of conservation measures corresponding to the ecological requirements of the natural habitat types and species. These measures may be designed to maintain stability or allow for variation and change depending on the feature concerned.

Sea holly. Paul Glendell/English Nature 24,501

The workshops and the working group identified three issues that appear to be fundamental to dynamic coastal features.

These are:

- Issue one. The need for a clear definition of favourable conservation status, building on the definition in the Habitats Directive, and its application in decision-making;
- Issue two. The need to define and understand the concept of a coherent network to help with decision-making in situations of dynamic change;
- Issue three. The need to identify and resolve the limitations of fixed site boundaries imposed on dynamic features at a national level.

These are examined in further detail in Section 5.

The socio-economic impacts that are associated with the management of dynamic coastal sites were also considered as important to address. However, although the working group and the LWTS Project Board agreed that this was very relevant, it was not part of the original remit. Socio-economic factors will be addressed in relation to coastal management by the development of Shoreline Management Plans and various other initiatives for example to take forward Integrated Coastal Zone Management. Improving understanding and clarity of the ecological objectives will help integration with socio-economic objectives. This is a critical area affecting all habitats and is being addressed at European level to ensure that Natura 2000 becomes central to sustainable rural and regional development[17].

[12] European Commission 2000. *Managing Natura 2000 sites: the provisions of Article 6 of the Habitats Directive 92/43/EEC.* Brussels, European Commission.
[13] European Commission 2001. *Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive.* Brussels, European Commission.
[14] Hulme, M., Turnpenny, J., Jenkins, G., (2002). *Climate Change Scenarios for the United Kingdom: The UKCIP02 Briefing Report.* Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK. 14pp
[15] Harrison, P.A., Berry, P.M. & Dawson, T.P. (eds) (2001). *Climate Change and Nature Conservation in Britain and Ireland: Modelling natural resource responses to climate change.* UKCIP Technical report, Oxford. www.ukcip.org.uk
[16] Hossell, J.E., Briggs, B. & Hepburn I.R (2000). *Climate change and UK nature conservation: A review of the impact of climate change on UK species and habitat conservation policy.* DETR, HMSO London.
[17] Background report for European Conference on *Promoting the Benefits of Natura 2000* Brussels, November 2002. Report by Patrick ten Brink, Claire Monkhouse and Saskia Richartz, IEEP.

Gibraltar Point NNR, Lincolnshire. Limonium sward on old saltmarsh. Peter Wakely/English Nature 12,575

5. Discussion of the key issues

The three issues are discussed in turn below, and the main concerns and actions needed are identified in section 7. Although issues are tackled separately here, they are closely inter-related and there is a degree of overlap. For example, conservation objectives for features on a site should help towards understanding the contribution of the site to favourable conservation status as well as relating to the role of the site in the coherent network.

Issue one: Favourable conservation status

There is a need for a clear definition of favourable conservation status, building on the definition in the Habitats Directive, and its application in decision-making.

Defining, and then assessing, the conservation status of dynamic features must take account of the fact that there will be changes in extent and distribution. Monitoring is currently focused on sites, but needs to be developed to cover the whole range of features. The relationship of favourable conservation status to the Birds Directive needs to be clarified to help with management decisions.

Background and definition

The Habitats Directive requires that *'measures taken pursuant to the Directive should be designed to maintain or restore the favourable conservation status of natural habitats and species of Community interest'* (Article 2.2). The achievement of favourable conservation status is intended to underpin all measures taken under the Directive, both within the Natura 2000 network and in the wider environment.

The Directive's definition of favourable conservation status for habitats is set out below. Conservation status for species is defined in Article 1(i) of the Directive, based on population dynamics, species range and adequate area of habitat to support the species.

Favourable conservation status does not apply directly to the Birds Directive, where similar, although less specific requirements are applied. Under Articles 2 and 3 of the Birds Directive, Member States are required to take the requisite measures to maintain the populations of bird species referred to in Article 1. They must also maintain or re-establish a sufficient diversity and area of habitats for those species, and address the ecological needs of species both inside and outside the protected areas. Although achievement of 'favourable conservation status' is not an aim of the Birds Directive, it could be seen as a tool for determining the ecological requirements of bird species, particularly in relation to setting conservation objectives in order to meet the requirements of Article 6(2) and 6(3) of the Habitats Directive, which apply to the Birds Directive.

Conservation status is defined as the whole range of a species or habitat and will therefore require a complementary mix of site-based conservation measures and actions to be taken outside the Natura 2000 network through planning or wider environment measures. Both the Birds Directive and the Habitats Directive promote conservation actions outside protected sites.

Assessing conservation status

In order to assist Member States in their information-gathering activities for reporting on the conservation status of the Natura 2000 network, the EC Habitats Committee has set up the *Nature conservation monitoring project*. This work aims to establish guidance for surveillance of habitats and species of European interest and a common approach to assessing conservation status. This initiative has the support of the UK through the Joint Nature Conservation Committee (JNCC). This addresses all relevant habitats and species and has begun to clarify which factors are most important to consider in relation to monitoring. Information needs, scales of assessment and the relationship between site-specific or contextual information have been raised as key aspects to take forward. The response of habitats or species to climate change and the need to develop indicators for structural and functional integrity at a site level have also been identified. These are fundamental to improving the understanding of dynamic habitats at a site level and at a broader scale.

'Conservation status' for habitats is defined in Article 1(e) as:

Conservation status of natural habitats means the sum of influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species.

The conservation status of natural habitats will be taken as 'favourable' when:

- its natural range and areas it covers within that range are stable or increasing, and
- the species structure and functions which are necessary for its long term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable as defined in Article 1(i).

Sea wall breached by storm, Cley 1996.
Sue Rees/English Nature

The development and implementation of a national programme of monitoring and surveillance, refined as necessary in future using guidance from the EC, will provide useful information and help to inform local decisions. This programme will evaluate the wider impacts of site management, based on the conservation status of features. For example, in the UK on the Suffolk Coast, lagoons at Benacre are being reduced in extent by coastal evolution resulting in landward movement of a shingle ridge. An understanding of their conservation status at a functional ecosystem and national level will help to determine restoration requirements.
The working group identified a number of issues relating to the monitoring of dynamic features to determine conservation status. Assessment of conservation status of habitats will need to be based on information about extent, functionality and typical species. Measurement of extent alone would not be sufficient because of the way in which dynamic habitats change over time and space. Many habitats, for example dunes, are successional systems, some elements of which undergo change on a regular basis and may even be reduced in extent. The capacity to adjust and remain resilient in the face of coastal change is therefore an important consideration for determining conservation status.

In the UK, the approach to monitoring of designated sites has been developed to meet the requirements of the Habitats Directive. Work to assess the condition of designated features of national interest on Sites of Special Scientific Interest (SSSIs), was already underway before adoption of the Habitats Directive in 1992. This formed the basis for assessment of features of European importance. For marine features, usually not included within SSSIs, the UK Marine SACs LIFE project[18] has developed approaches and techniques for the management and monitoring of European features in the marine environment. This work has helped in the consideration of how to monitor dynamic features. Conservation objectives have subsequently been developed for designated features on individual Natura 2000 sites by the country conservation agencies. A conservation objective is a statement of the nature conservation

[18] www.ukmarinesac,org.uk

aspirations for the interest feature at a site level, aimed at the achievement of 'favourable condition' of the SSSI. Condition is defined with reference to broad targets for measurable attributes of that feature. If monitoring shows that the targets are met, the condition of the feature on that site is said to be 'favourable'. Targets are set to ensure that habitats and species populations are maintained in, or restored to, a condition likely to be sustainable into the foreseeable future (not necessarily the condition it was in when the site was designated). Where dynamic change is fundamental to features, targets need to allow for change; otherwise some of the designated features will never achieve favourable condition. Favourable condition can be considered as the state that needs to be achieved by an interest feature if it is to contribute to favourable conservation status. Monitoring will generate information on the condition of features in Natura 2000 sites and will be used to fulfil reporting requirements under the Habitats Directive.

On sites where coastal flood defences have resulted in freshwater, brackish or intertidal habitats being present in close proximity, targets for all features will be more difficult to achieve in the face of sea level rise. Any flood defence management option (for example, either to retain it in its current location or realign it landward) is likely to have a negative effect on at least some of the features. It will not be possible to achieve favourable condition for all features within that site. Clear choices need to be made, based on the most sustainable management option.

The issue of conflicting objectives for different features on the same site is not confined to the coast. Sites supporting upland heath, for example, may have different targets for vegetation structure depending on whether the site supports breeding waders or if it is important for rare plants.

The means of resolving conflicting requirements of interest features has been considered by the UK Inter Agency Monitoring Group, chaired by JNCC, to steer the Common Standards Monitoring process. This has suggested that a suitable way forward would be to take an ecosystem management approach to identifying conservation priorities. For example, the draft guidance suggests that rather than trying to restore small areas of habitat within every site, it may be better to attempt this on an extensive scale on a smaller number of sites. Such an approach may deliver significant nature conservation benefits, but can only be delivered within the context of a wider strategy.

Aerial view of coastal system, North Uist, Scotland.
Sue Rees/English Nature

Dee Estuary SSSI, Merseyside.
Peter Wakely/English Nature
20,675

In the UK, monitoring has been focused on sites. It is expected that the work on Common Standards Monitoring will help to meet the UK's international reporting obligations. Conservation status does, however, require an assessment across the whole range of habitats or species to determine if it is stable or increasing. This requires extension of the monitoring programme beyond sites to the wider environment. The approach to conservation status needs to be based on functioning ecosystems, with the designated features clearly being seen as part of these wider systems. Favourable conservation status also clearly includes a forward look, for example will the feature continue to be favourable in the foreseeable future?

In the UK, complementary site-based and wider environment measures are part of the implementation of the UK Biodiversity Action Plan (UKBAP)[19]. The UKBAP can therefore contribute to the achievement of favourable conservation status across the whole range of habitats and species, beyond the Natura 2000 network. Coastal habitats and species are covered by individual action plans, with actions designed to meet habitat protection and restoration targets. Wider environment measures need to be harmonised with the aims of the Habitats Directive, with management objectives developed to link designated sites and the wider countryside. This approach would clearly correspond with the requirement under Article 10 of the Habitats Directive, which encourages Member States to take measures to manage features in the wider environment.

The 2002 UK BAP reporting[20] was the first assessment of progress on Habitat Action Plans for coastal habitats. This has indicated that some habitats continue to decline while the status of others is unknown due to a lack of information.

The working group considered that delivering favourable conservation status should be a clear objective of local action for biodiversity.

There are several scenarios where a more comprehensive assessment of the conservation status of a feature could help inform local choices.

To help prioritise local decisions the following information could be combined:

- the conservation status of features at a national level;
- an understanding of the factors affecting conservation status;
- other considerations such as the opportunities for the restoration or re-creation of different features.

There is a real need for spatial information and data to be collated using geographical information systems (GIS) to help determine management actions that take account of the above.

[19] www.ukbap.org.uk
[20] www.ukbap.org.uk/2002OnlineReport/2002Report.htm

Pagham Harbour SSSI, Sussex. Peter Wakely/English Nature 13,244

A recent initiative, Infrastructure for Spatial Information in Europe (INSPIRE)[21], has been launched by the European Commission and developed in collaboration with Member States and accession countries. This may help in the collection of data in such a way as to aid delivery of policies, by making available relevant, harmonised and quality geographic information to support the formulation, implementation, monitoring and evaluation of Community policies with a territorial dimension or impact.

European practice

Practices elsewhere in Europe provide an insight into the possibilities of a more strategic approach to decision-making, priority setting and site assessment with reference to the favourable conservation status of habitats and species.

For example, in Denmark, the conservation status of natural habitat types is assessed both at the locality level and national level. This can result in the conservation status of a habitat or species being defined as 'unfavourable' at one locality but, because of its favourable status at other localities, be judged to qualify as 'favourable' at a national level. Conservation status has been classified in four categories: favourable, unfavourable, uncertain (where it might be unfavourable but cannot be verified on the basis of existing data), and unknown (where data is insufficient). However, current assessments are considered to be preliminary because insufficient information is available to make a reliable assessment[22]. One area where a need for improved information was identified is to better understand the factors that determine when a feature changes from favourable conservation status to unfavourable conservation status. The establishment of conservation objectives depends on this understanding. Nonetheless, a national assessment has been made of the priority habitat types based on information from all known national localities. Assessment requires consensus of opinion on the description of the habitat types, their range, variety and boundaries, compared with other naturally occurring habitats.

The Wadden Sea Trilateral Monitoring and Assessment Program[23] provides a common framework for the assessment of the status of the Wadden Sea ecosystem. It aims to provide a scientific assessment of the status and development of the ecosystem and assess the status of implementation of the trilateral targets. There are proposals to adapt this approach to take account of the reporting requirements of the EU Habitats Directive and a suggestion for a composite Natura 2000 report instead of separate Birds and Habitats Directive reports[24].

In France, considerable importance is given to the ecological conditions and functionality of habitats needed to maintain them in favourable conservation status[29]. A number of habitats can be grouped into a single objective e.g. 'to conserve a dynamic natural river' linked to a programme of actions for management and monitoring.

Above: Chesil Bank and The Fleet, Dorset. Allan Drewitt/English Nature

Below: Holkham NNR, Norfolk. Peter Wakely/English Nature

[21] http://inspire.jrc.it/home.html

[22] Pihl, S., Ejrnaes, R., Søgaard, B., Aude, E., Nielsen, K.E. Dahl, K. & Laursen, J.S. 2001. *Habitat and Species covered by the EEC Habitats Directive. A preliminary Assessment of distribution and Conservation Status in Denmark.* NERI technical report no. 365.

[23] Common Wadden Sea Secretariat (2000) *Monitoring the Wadden Sea. The Trilateral Monitoring and Assessment Program* (TMAP).

[24] Fels, P. (2001) *Implementation of the EU Habitat Directive for monitoring and reporting in the Wadden Sea Area.* Common Wadden Sea Secretariat, Wilhelmshaven, Germany.

Issue two: The concept of a coherent network

There is a need to define and understand the concept of a coherent network to help with decision-making in situations of dynamic change.

The development of a *'coherent European ecological network'* is a key objective of the Habitats Directive. There is a limited understanding of how this network would operate; yet this is crucial for determining compensatory measures. A coherent network would be more resilient to change. Management of dynamic features would benefit from development of the network approach, to help determine priorities in a more strategic way.

Background

The Habitats Directive establishes the concept of a coherent ecological network of Natura 2000 sites consisting of SPAs and SACs. The designation and management of this network is intended to be one of the principal means of achieving the aims of the Directive. Along with the achievement of favourable conservation status for habitats and species of Community interest, the ecological coherence of the Natura 2000 network is a primary emphasis that runs through the Directive. The requirement of Article 4.4 to establish priorities also relates to the coherence of the network. The EC guidance on Article 6 considers that assessment of habitat deterioration is made according to the contribution of the site to the coherence of the network[25].

Selection of the current list of candidate SACs and SPAs has been based on an iterative process between Member States and the EC. Although the list is not yet complete for the Atlantic Biogeographical Region, it should reflect a representative area and geographical spread of sites for the features.

The working group set up for this task agreed that, to progress the current list of sites into a network, it would be beneficial to develop thinking on the ecological coherence of the network in the UK to help inform site based management decisions. In particular it was felt that more could be done to highlight the role of each site in promoting the ecological coherence of the Natura 2000 network. Currently, decision-making is based on an expectation that, once sites are designated, management should aim to maintain all features on the site, to the same extent in all their current locations. Within a dynamic environment this is not always sustainable and could be damaging to the form and function of some features. A robust and coherent network would be able to accommodate a greater degree of change, for example where environmental factors result in habitat succession.

The principle of habitat change was discussed at the workshops. Overall, there was agreement that dynamic coastal change was a functional requirement of many habitats and should not be prevented. There was discussion in the workshops and the working group about how such change would affect the coherence of the network. An 'accounting' mechanism is needed, at an appropriate scale, to maintain the coherence of the network.

Saline Lagoons behind shingle bank, Salthouse, Norfolk. Allan Drewitt/English Nature

Sand dunes, Norfolk. Sue Rees/English Nature

The following criteria were suggested, to define the functions of a coherent network:

- to include representative diversity of relevant habitats, species and ecological conditions;
- to provide ecological resilience of habitat and populations to extreme events;
- to provide mechanisms for dispersal and migration, especially in the face of climate change;
- to provide habitats at different stages of succession;
- to provide habitats for species at different stages of the life cycle.

With further development, and linked with information from monitoring and surveillance on the conservation status of habitats and species, these criteria could help with the development of conservation objectives and help with management priorities that will maintain the ecological coherence of the Natura 2000 network.

Strategic evaluation of impacts on the coherent network

In the UK, where coastal defence works are considered to be 'plans or projects', choices are made with reference to consideration of the impact on the integrity of the site flowing from the requirements of Article 6.3 of the Habitats Directive. The integrity of the site with reference to the Directive has been further defined in the UK[25] as 'the coherence of its ecological structure and function, across its

[25] Department of the Environment, 1994, Planning Policy Guidance Note 9: Nature Conservation. HMSO.

Shingle beach at Rye Harbour SSSI, Sussex. Sue Rees/English Nature

whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified'. This has proved to be a useful elaboration because it emphasises the significance of the ecological function of the site in line with the wording of the Directive. However, it focuses on the ecological coherence of the site not the network, suggesting that site-based decisions cannot be made with reference to the network. This fails to take account of the contribution of the site to the network and the possible wider impacts this could have on other sites. Existing European guidance is clear that it is unacceptable for a plan or project to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will still be favourable within the European territory of the Member State[25]. Because of the extent and nature of coastal engineering around England's coast, this reinforces the need for a national strategic flood defence plan that identifies changes and associated habitat restoration to avoid overall deterioration of the network. This plan would help to make an assessment of whether a feature was sustainable in its present location.

European practice

Contacts with other Member States revealed a variety of approaches to site management with reference to maintaining the coherence of the Natura 2000 network.

On the Wadden Sea there is trilateral co-operation between Denmark, the Netherlands and the Federal Republic of Germany in recognition of its wider significance and the common responsibilities of the three countries for their joint protection and management of the area. A joint approach dates back to 1982 (prior to the adoption of the Habitats Directive), in which the three countries declared their intention to co-ordinate activities and measures for the protection of the whole system. This has included the development of common principles for management and these are set out in the Trilateral Wadden Sea Plan, with an emphasis on the need to increase and sustain natural dynamics and morphology[26]. Regional management plans, developed in participation with the various interested parties, address questions such as how to introduce more flexibility in the coastal zone to reduce the growing costs for coastal defence and improve the conservation interests of the site.

Issue three: Natura 2000 site boundaries

The need to identify and resolve limitations of fixed site boundaries imposed on dynamic features at a national level.

There are different approaches across Europe in the designation of site boundaries and methods for regulating the activities affecting sites. The approach in the UK is to have tightly defined boundaries around the interest features. A mechanism is needed to ensure that the network of sites can be updated to deal with dynamic change.

Background

The Habitats Directive defines a site as *'a geographically defined area whose extent is clearly delineated'*. If the extent of the site is to be clearly delineated, it follows that the boundaries of the site also need to be clearly defined. These issues were discussed at the workshops and the working group, highlighting some of the differences between the UK and other Member States in site boundaries. These included size of sites and zonation of uses. Adding sites to the Natura 2000 network in future was also considered.

European practice

Discussions in the workshops, desk studies and contacts made during the course of the task revealed a variety of approaches between Member States on boundary selection in dynamic coastal environments. For example, coastal change in Finland is different to the situation in parts of England, in that isostatic uplift is affecting coastal sites (i.e. equivalent to falling sea levels). As a result, boundaries for Natura 2000 sites are drawn to include sub-tidal marine areas that will develop into intertidal or coastal habitats in the future[27]. Most coastal and marine sites in Finland are large enough to allow for habitat change within the boundary.

At the second workshop, Swedish delegates described their approach to site boundaries, where the interest feature covers 15 to 20% of the site area, and the rest is included as a buffer zone. The workshop was informed that the Netherlands has also begun to consider how dynamic coastal changes will affect existing sites. Several other Member States have included terrestrial land within the boundaries of sites selected for the Annex I 'estuaries' feature either for demarcation purposes, to act as a buffer area or as land to provide opportunities to restore or recreate relevant habitats[28]. In some countries, for example Denmark and Germany, the national legislation focuses on the protection of habitats rather than sites thus allowing for the boundary of protection to change with the habitat. The German Federal Nature Conservation Act contains provisions for general protection of defined biotopes and species. The Act lists these biotopes, but it is the responsibility of the individual states or Länder to implement the biotope protection by adopting state legislation. Most coastal habitat types are protected through this approach. All activities that might significantly alter or endanger the condition of these habitats are forbidden or regulated. Exceptions are only allowed in the case of overriding public interest and where compensation for the impact of the alterations is provided.

Gibraltar Point, Salicornia marsh at north end of reserve. Peter Wakely/English Nature 12,555

In France the concept of zoning is promoted[29] in the development of management plans for Natura 2000 sites. The three zones include *centres of biodiversity* where the habitats and habitats of species must be maintained or restored at a favourable conservation status; *zones of influence* in which management or changes in management can have direct or indirect impacts on the conservation status of a centre of biodiversity, (examples include water quality, hydrographic regime, fire, microclimate and sediment transport) and *zones intersticielles* for which there is no objective in relation to the Habitats Directive. Action in terms of management, administrative treatment or integration of political policies is set out in relation to the zones. Activities likely to be of concern are identified in a Document d'objectif for the site. These plans are produced in consultation with the local stakeholders and define the management principles needed to meet the requirements of the Habitats and Birds Directives. Document d'objectifs have been useful in arbitrating between conflicting uses of an area by integrating the objectives for conservation with the management measures for the site.

[26] Common Wadden Sea Secretariat 2001 *Final Report of the Trilateral Working Group on Coastal Protection and Sea Level Rise*
Common Wadden Sea Secretariat 1997, *Stade Declaration, Ministerial Declaration of the Eighth Trilateral Governmental Conference on the Protection of the Wadden Sea.* Trilateral Wadden Sea Plan.

[27] Ekebom, J. 2001. *Managing Coastal Change in Finland.* Finnish Environment Institute presentation to Living with the Sea first European Workshop.
[28] English Nature 2002. *Boundaries of proposed Sites of Community Importance for estuaries in the Atlantic Biogeographic Region.* Project 1130.
[29] Valentin-Smith, G. *et al* 1998 *Guide Méthodologique des documents d'objectifs Natura 2000.* Réserves Naturelles de France/ Atelier Technique des Espaces Naturels, Quétigny.

UK experience

In England the Habitats and Birds Directives are transposed into national legislation by the Habitats Regulations 1994[30]. The UK Government has chosen to implement the Habitats and Birds Directives by augmenting existing conservation legislation and mechanisms to achieve the aims of the Directives. The existing series of Sites of Special Scientific Interest (SSSIs) were used as the basis for the designation of cSACs. The same approach had already been used for the classification of SPAs. In the background to the UK selection of SACs it is stated[31]: '*Where appropriate, the same boundary has been used to simplify administrative arrangements and to assist in identification of the boundary on the ground. However, SSSI are often notified for features of national importance but which are not Annex I habitats or Annex II species. As a general principle, SAC boundaries have been drawn closely around the qualifying habitat types or the habitats of species for which the sites have been selected, taking into account the need to ensure that the site operates as a functional whole for the conservation of the habitat type(s) or species and to maintain sensible management units'*. Consequently, Natura 2000 sites above mean low water are underpinned by notification as Sites of Special Scientific Interest (SSSI).

Fixed boundaries around unchanging sites have been the cornerstone of UK nature conservation for many years. Specially protected sites will always be needed, but this mechanism alone will be less likely to deliver the long-term conservation outcomes in dynamic environments, especially in the face of climate

Embryo dunes, South West Texel, The Netherlands. G Radley/English Nature

Holkham NNR, Norfolk. Peter Wakely/English Nature 13,711

change. In finding ways forward, the working group agreed that a more dynamic approach was needed that can deal with change to sites and management of the outcomes, by addressing the approach to site selection, monitoring, legislative and administrative tools as well as attitudes to nature conservation. Notification as an SSSI is primarily a legal mechanism to protect a representative series of nationally important sites for nature conservation because of the biological or geological features present. Operations that might damage the features of interest are regulated, and there is also a strong emphasis on securing the right type of management needed to maintain those features.

Boundaries of biological SSSIs are selected according to specific scientific criteria set out in published guidelines[31,32]. The criteria include size, fragility and naturalness of sites and the types of species or habitats they support, both typical and rare.

Designations are supported by scientific evidence about the existing conservation interests of the site. There is a consultation process with owners, occupiers and statutory bodies. Sites remain the property of the existing landowner, but there are legal obligations on those notified of the designation. Thus, there is an administrative and legal need to clarify the position of the boundary. With the exception of the position of mean low water, which may define the lower boundary of an intertidal site, the mapped boundary of an SSSI is fixed. Any alteration to the boundary of the site or the reasons for notification involves a further legal process. The Countryside and Rights of Way Act 2000 introduced a mechanism to vary existing SSSIs to take account of natural changes or new information.

Under the current criteria SSSI boundaries do not include buffer zones or areas that have potential for restoration. There are mechanisms to control damaging activities beyond an SSSI boundary, but these do not promote positive management or habitat restoration. For example, consultation zones[33] can be defined to prevent certain types of development beyond the site boundary that could impact on the SSSI. These zones affect new developments requiring planning permission. Additionally, any plan or project that is likely to have a significant effect on a Natura 2000 site is required to have an appropriate assessment in accordance with the Habitats Directive, even if it is not within the SSSI boundary[33].

As a result, in the UK, site boundaries defining SACs and SPAs are drawn tightly around existing interest features and are difficult to modify. Many of the coastal interest features are mobile and may need to move, to maintain or restore their contribution to favourable conservation status. Variation of SSSI boundaries as a result of change is only possible by a process of re-notification and consultation to include additional land within the site. The need for re-notification is being increasingly identified through the use of GIS, allowing for comparison of mapped boundaries with recent digitised aerial images that can show habitat change and movement.

Selection of Natura 2000 sites, as well as SSSIs, depends upon the existence of habitats or species: sites cannot be selected solely as locations for restoration. This presents a number of challenges when working through the regulatory requirements of Article 6 of the Habitats Directive, particularly when planning coastal defence. Where a requirement for compensatory habitat is identified, for example arising from Coastal Habitat Management Plans, it will be some time before these areas meet the biological criteria for site selection. The timetable set out in the Habitats Directive anticipates completion of the network by 2004. Member States can, however, propose adaptations to the list of SACs in the light of surveillance of the conservation status of habitats and species of Community importance (Article 11). Further guidance needs to be developed by the EC and Member States on how the network can be adapted where necessary.

If the ecological coherence of the Natura 2000 network is to be maintained in the face of change, it will be essential to review and update the mechanism for site designation to better deal with predicted change.

Fal Estuary SSSI, Cornwall. Peter Wakely/English Nature 13,320

[30] Statutory Instrument 2716 (1994) The Conservation (Natural Habitats &c.) Regulations 1994. HMSO, London.
[31] Nature Conservancy Council, 1989. *Guidelines for selection of biological SSSIs.* NCC, Peterborough.
[32] Joint Nature Conservation Committee, 1996. *Guidelines for selection of biological SSSIs: intertidal marine habitats and saline lagoons.* JNCC, Peterborough.

[33] English Nature 1997. Habitats Regulations Guidance Note 1. The appropriate assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations 1994.

Case Study 1

Essex Estuaries

The Essex Estuaries is a cSAC and there are five classified SPAs covering intertidal and coastal flood plain habitats. Many of the SPAs include habitats behind sea walls.

Prior to designation, much of the intertidal area of the Essex coast was subjected to historic land claim, drainage and the construction of sea walls to prevent tidal flooding of the farmland created by this practice. This has resulted in the removal of over half of the intertidal area from the coastal ecosystem. Sea walls have constrained the ability of the intertidal habitats, especially saltmarsh, to migrate over the coastal flood plain in response to relative sea level rise. As a result, the saltmarsh has been substantially reduced in area and continues to erode. Studies were carried out in 1988[34] and 1999[35] to assess this rate of habitat loss. Overall, the studies found a loss to erosion of a quarter of the saltmarsh, equivalent to 1,000 hectares, in the 25 years from 1973 to 1998 within the Natura 2000 site. In the Blackwater Estuary alone, part of the Essex Estuaries cSAC, 142 hectares of saltmarsh were lost between 1973 and 1988, with a further 55 hectares lost between 1988 and 1998. With the rate of sea level rise predicted to increase on the Essex coast to 6mm per year over the next 50 years, if the current walls are retained there will be further significant loss of intertidal habitats.

To consider the scale of the loss and possible management options, a CHaMP[36] was initiated as part of the Living with the Sea Life project. One management approach to reduce and offset these losses is to carry out 'managed realignment', by breaching or removing the sea wall. This restores intertidal habitat and transitions to other habitats. As a management method, it has been carried out in a few locations in the UK, with pioneering demonstration projects being carried out in the Blackwater Estuary from 1991 onwards.

For example, a site at Tollesbury has been the subject of extensive study to assess the results of this approach. In 1995 work was carried out to create an area of intertidal habitat by breaching the old sea wall to inundate 22 hectares of arable land on the coastal flood plain. By 2002, intertidal mudflat and saltmarsh had developed on the site and it was being regularly used as a roosting and feeding area by birds.

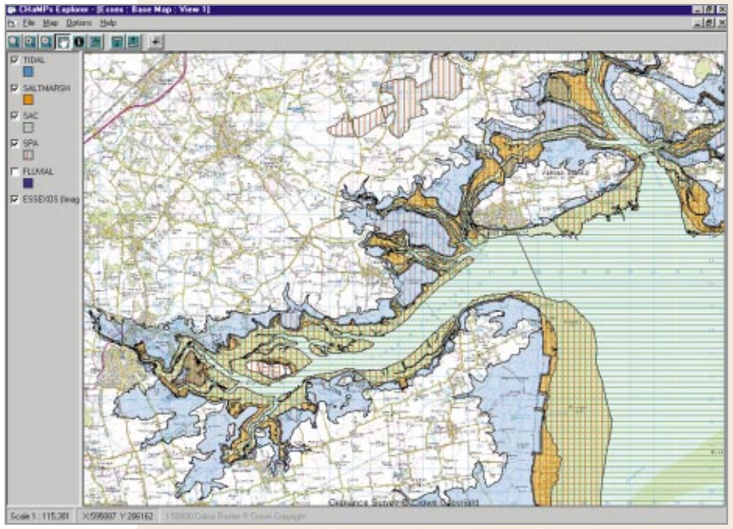
Although adjacent to the designated area, and part of the same ecological system, the newly created habitat at Tollesbury is not legally part of the designated area. The site could now be put forward as additional land to the Blackwater Estuary SSSI to test the procedures for extending the SSSI. At some point in the future the site could meet the criteria for selection as SPA and SAC. Monitoring must therefore continue, in order to provide evidence for the essential extension of the Natura 2000 sites.

Although the Tollesbury site was initiated as a demonstration project, the future management of the Essex Estuaries and Natura 2000 sites facing similar issues will require the provision of compensatory habitat outside current site boundaries. Measures are now being taken by relevant authorities to acquire more land to create new areas of intertidal habitats to offset the 'coastal squeeze' effects. Other sites in Essex, for example at Abbotts Hall and Hullbridge, are already being considered as compensation to allow the maintenance of a wider programme of flood defence to continue. Although these locations are adjacent to the existing cSAC, in other cases it may be necessary to take compensatory measures some distance from the site in order to maintain the coherence of the Natura 2000 network. This will also apply to the freshwater features that may need to be re-created in more sustainable locations.

Summary

This example demonstrates:

- The need to be able to extend site boundaries in response to change
- The importance of monitoring to provide evidence of change in location of quality
- The need to take a strategic approach to habitat restoration



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Blackwater Estuary

Map produced from the CHaMPs Explorer. Full details of this are on the Living with the Sea website.

This map shows the Blackwater Estuary, in the Essex Estuaries complex of SAC and SPAs , and indicates the extent of the SPA (orange vertical lines) and the SAC (green horizontal lines). Orange shading shows the current extent of saltmarsh. The blue shading shows the coastal flood plain area currently defended by sea walls. This is the area that could be restored to saltmarsh.

The Tollesbury part of the site is not yet part of the cSAC or SPA.

Managed retreat breach point on day one - high tide. Tollesbury, Essex.
Peter Wakely/English Nature 19,856

[34] Burd, F. 1992. *Erosion and vegetation change on the saltmarshes of Essex and north Kent between 1973 and 1998.* Research and survey in nature conservation No 42 Nature Conservancy Council, Peterborough.
[35] Cooper, N. 2000. *Erosion of the saltmarshes of Essex between 1988 and 1998.* Report to the Environment Agency.
[36] Essex Estuaries Coastal Habitat Management Plan. 2002. Living with the Sea Life Project.

Case Study 2

Suffolk Coast

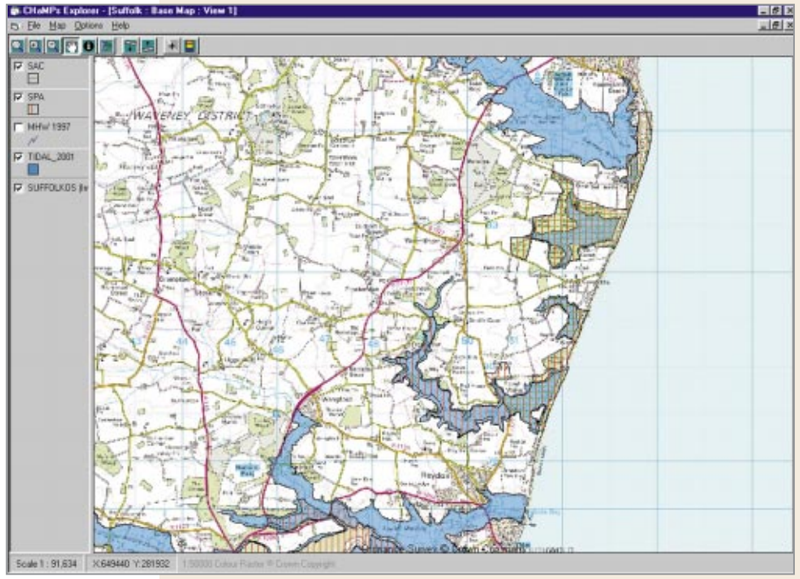
The Suffolk coast area has several Natura 2000 sites. It is also one of the most rapidly receding coastlines in England due to its geological and geomorphological history. Records show that it has been subject to erosion for several hundred years and any acceleration of sea level rise will exacerbate this process. The coastal landscape is dominated by a series of estuaries with sand and shingle features on the open coast. Within the estuaries, the issues of addressing coastal squeeze are similar to those of the Essex Estuaries described above.

In the northern part of the Suffolk coast a series of lagoons have formed in valleys behind natural shingle barriers, which separate them from the sea. Some of these lagoons were formed naturally when glacial drift formed lakes by blocking off the outflow to the sea, others were originally a series of gravel pits, excavated over 60 years ago. Seawater enters the lagoons by percolation through the shingle barriers, or by overtopping during high spring tides or storms. The lagoons display a wide range of salinity, supporting a number of specialist lagoon species. In recent years, the landward movement of the shingle bars has resulted in a reduction in the size of the lagoons and overtopping has caused a partial dieback of reeds. In response to this change, low clay banks have been constructed in places within the lagoons to limit the influence of salt water, and the shingle ridges have then been mechanically re-profiled to reduce the overtopping. The construction of clay banks within the site has retained the freshwater features, but has potentially damaged some of the ecological transitions within the site. Mechanically re-profiling the shingle structures has reduced the likelihood of them overtopping but this also reduces their natural resilience and increases the probability of a catastrophic breach.

The Suffolk CHaMP[37] indicates this area will continue to experience geomorphological change, taking account of predicted sea level rise and coastal evolution over the next 50 years. The studies highlighted the important role of coastal evolution, particularly the natural migration of shingle features along the coastline, thus influencing the location and extent of features in the Natura 2000 sites.

Allowing dynamic change would require acceptance of the fact that these features may undergo adjustment and possible reduction in area over the next 100 years. Equally, intervention to stop change could be just as damaging by stabilising a system that is, by nature, highly dynamic.

Maintaining all the features in their current extent and location is irreconcilable within the boundary of the existing site. Off-site restoration measures to offset the losses of features are more likely to maintain their favourable conservation status, and, if there was a better understanding of the contribution of the affected sites to the overall network, this would help with prioritisation of management choices.



Suffolk Coast

Map produced from the CHaMPs Explorer. Full details of this are on the Living with the Sea website.

This map shows part of the Suffolk coast, and indicates the extent of the SPA (orange vertical lines) and the SAC (green horizontal lines). The blue shading shows the coastal flood plain area that would be inundated by tidal flooding. In the estuaries, sea walls prevent flooding, although there are areas that rely on the shingle bar. Benacre is one of these areas and will become more vulnerable to saline flooding as the coast evolves.

Summary

This example demonstrates:

- The need to consider the whole system and the saline/freshwater interface
- The importance of taking account of coastal geomorphology in sustainable site management
- The need to understand the role of one site within the coherent network
- The requirement to consider off-site restoration measures in a strategic way

[37] Suffolk Coast and Estuaries Coastal Habitat Management Plan. 2002. Living with the Sea Life Project.

Benacre NNR, Suffolk. Eroding cliff. Peter Wakely/English Nature 21,447

Case Study 3

North Norfolk Coast

Brancaster lies within a complex of designated sites on the North Norfolk coast. There are three Natura 2000 sites designated for different features: two adjacent SACs, divided by the mean high water mark, and one SPA that straddles both intertidal and coastal wetland habitats. The existing dune ridge acts as a flood defence for 40 hectares of low-lying freshwater grazing marsh and reed bed in the SPA. The dune ridge was artificially stabilised until 2002, but this reduced functionality of the sand dune system. In addition, winter storms regularly damaged the structures and affected their ability to protect the land from flooding. There is a long-term trend of foreshore erosion on the North Norfolk Coast, related to an under-supply of coarse-grained material to supply the barriers. This results in the landward migration of the barrier systems and an overall narrowing of the foreshore.

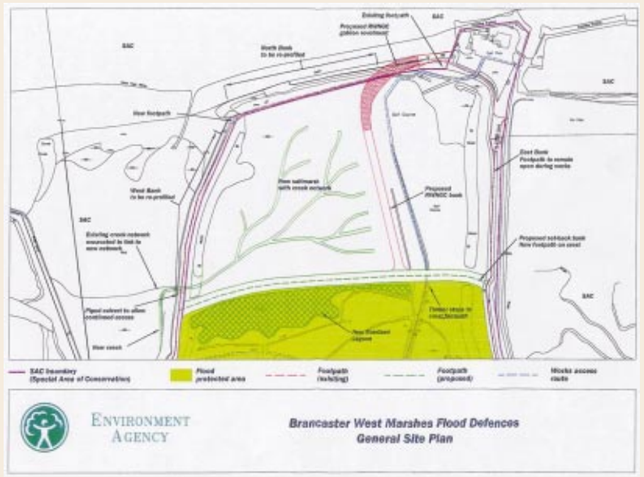
It was concluded that the current line of defence was not sustainable. A partial realignment of the site was implemented in 2002, to secure conservation for all the features of interest within the three designated sites.

This involved the construction of a new clay bank landward to allow for 7.5ha of grazing marsh to revert to intertidal saltmarsh. Behind the new bank, some freshwater features have been created and others enhanced, to mitigate for losses resulting from building it. All artificial structures were then removed from the dunes and re-profiling of the dune system was carried out to allow the natural coastal processes to operate and restore this as a functional feature. Careful management during construction was necessary. Intertidal habitats created by this work will help to reduce wave energy on the new defence.

The realignment scheme is likely to achieve its aims of re-creating saltmarsh in areas of coastal grazing marsh and mitigation measures will ensure that the freshwater habitats are maintained, although over a smaller area. Further details of the work can be found in the Coastal Habitat Restoration Guide produced as part of this project[1,38]

This site was used as a case study in the second European workshop, and delegates considered that the action taken met the requirements of both Directives, but that consideration of the impacts at a wider scale may have led to a different solution. It protects only a relatively small area of habitat. In particular, the questions arose: 'was there an evaluation of the importance of the freshwater wetland compared to other sites further inland? Did the wetland have to be at the coast to support the present assemblage of species? Could it be re-created elsewhere?' There was also concern that it might result in a very artificial system, with limited scope to allow operation of dynamic processes.

Orwell Estuary SSSI, Suffolk. Peter Wakely/English Nature 9,504



Brancaster Realignment Plan

This map shows the works carried out by the Environment Agency to resolve the situation at that site. Full details are in the Good Practice Guide produced as part of this project. Further information is on the project website.

Grazed saltmarsh, Morecambe Bay SSSI.
Peter Wakely/English Nature 7,325

Summary

This example demonstrates:

- It is possible to carry out practical flood defence measures on site to meet the needs of different European interests
- Implementing the scheme provided the opportunity to improve the quality of the remaining grazing marsh through better water level management
- The measures carried out at this site will not, however, result in a permanent solution if erosion continues. Future additional work may be needed if there are changes to the erosion rate and the decision as to whether to maintain the new sea wall will still need to be made by future generations
- The importance of understanding the long-term trends in coastal evolution
- Sea walls protecting freshwater wetlands will not be sustainable in the long term in locations affected by sea level rise
- We must learn from experience gained during the course of this project

[38] Coastal Habitat Restoration: Towards good practice. 2003. Living with the Sea Life Project

7. Conclusions and recommendations

There are a number of conclusions and key principles arising from the issues covered by this report that will provide a framework for integrating measures for Natura 2000 sites on dynamic coasts with flood management policy and practice.

1. Management of coastal Natura 2000 sites as part of an ecologically coherent network requires understanding of the relationship between ecosystems and the underpinning geomorphological processes. This should inform priorities at a site level to maintain ecological coherence and favourable conservation status in the face of environmental pressures such as shoreline evolution, relative sea level rise, climate change and extreme events. Network coherence should be expressed as a set of criteria defining the functions of a network that will help to achieve the aims of the Habitats and Birds Directives.

2. To achieve favourable conservation status and the ecological coherence of the network, a more strategic approach linking measures for individual Natura 2000 sites and those for the wider environment is required.

3. A range of factors, including poor integration of data collection and accessibility, means we are not achieving maximum use of data. These factors need to be addressed to improve our scientific understanding of coastal change, to enable management decisions to adequately take account of future coastal evolution.

4. It is essential to regularly review site management plans and conservation objectives as a result of monitoring and developments in the predictive tools for climate change scenarios.

5. Some freshwater wetlands at the coast depend on artificial flood defences to prevent tidal inundation. In the longer-term, maintaining these in their current location will not be sustainable in the face of climate change and coastal evolution. As indicated by this report, and the CHaMPs studies, there will be increased losses of intertidal habitats as a result of coastal squeeze that will need to be addressed. In future, the presumption should be to restore coastal form and function and not to preserve isolated, artificially maintained habitats. A strategic plan needs to be initiated now to achieve this by 2055. This should include allowance for:
   • Relocation of freshwater wetlands to more sustainable locations
   • Restoration of intertidal and brackish transitions.

6. Effective management of coastal systems cannot be achieved without the full engagement of all stakeholders at national and local level. To demonstrate commitment and build understanding, closer working is needed, for example through partnership projects between stakeholders.

7. Habitat compensation arising from the implementation of flood and coastal defence schemes for reasons of overriding public interest should be designed to be an integral part of coastal and fluvial systems. These measures should aim to develop innovative and sustainable solutions that maintain the coherence of the Natura 2000 network.

8. The approach developed through CHaMPs, based on site complexes, should be used to build up a **national** strategic plan for flood defence. This should encompass a national 'accounting' system for habitat change and outline the most sustainable management responses.

9. The contribution of individual sites to favourable conservation status is likely to change over time as a result of environmental pressures. Monitoring should be based on a better understanding of the ecological requirements of all species and habitats of Community importance together with the processes essential to support form and function, and not just relate to the extent of habitats in sites. Member States are required to implement national programmes of monitoring and surveillance; this should address features within designated sites and the wider environment. This information will contribute to developing a European consensus on favourable conservation status.

10. Monitoring has shown that, as a result of coastal change, there is a need for adding sites to the Natura 2000 network after 2004. Development of national monitoring programmes will need to be designed to identify any future needs. Member States will need to work in association with the EC in developing a process for future designation of additional SACs.

11. Action *across* Europe may be needed if a Member State is unable to maintain favourable conservation status of a habitat or species due to environmental change within its territory. This is necessary to ensure the coherence of the network at a biogeographic scale.

12. Information from real examples where features have undergone change need to be used to assist the development of policy and practice and to understand the implications for delivery of the aims of the Habitats and Birds Directives.

This work has identified a number of actions that need to be progressed to realise the overall aim of the Habitats Directive. The England Action Plan proposes a way forward for the project partners to take these areas of work beyond the timescale of the LIFE project, taking account of the following key principles.

Key principles

A number of key principles have arisen out of this and the other elements of the LWTS work that need to be integrated into the management of dynamic coastal features. These may be relevant to all Member States in their approach to management of dynamic coastlines.

Saltmarsh creation in Essex. Sue Rees/English Nature

- It is essential that there is an understanding of the contribution that dynamic processes make to the ecological requirements of coastal habitats and habitats of species.
- Form and function of ecosystems is a key factor in the determination of conservation status, across the network of sites and the wider environment, and should be taken account of in conservation measures.
- The criteria for favourable conservation status and ecological coherence should take account of the relationship between dynamic processes and habitat quality and extent.
- Site management plans and conservation measures at a wider level should facilitate the response to dynamic change, promoting form and function and transitional features. Putting change at a site level into a broader context helps to determine management decisions
- Site management plans (including strategic plans), conservation objectives and subsequent management decisions to achieve favourable conservation status should be focused on delivering habitats in the most naturally sustainable location.
- Information is an essential component in achieving all of the above. Development of systems that can integrate data and spatial information will help to visualise actual and predicted changes and incorporate data from existing monitoring and new research.

Saline lagoons and saltmarsh behind managed shingle ridge, Norfolk. Sue Rees/English Nature

8. A proposed England Action Plan

This report demonstrates the need to implement a more effective approach to the application of the Habitats Directive in site management decisions. The LWTS project partners must continue to work in an integrated way, together with other key organisations to develop clear policy and guidance on the issues identified by this report. The LWTS project focuses on particular issues affecting England, but to fully address these will require UK dialogue and agreement.

A series of initial actions are proposed, for putting into place by 2006, before the next UK report to the EC on the implementation of measures taken under the Habitats Directive. At this stage, only the project partners are listed to take forward particular actions. Their next steps should be to develop this plan in more detail during 2003, to identify clear targets and milestones and identify responsibility with other organisations and stakeholders for progressing actions. These will include organisations such as JNCC and other country conservation agencies, as well as linking in with existing groups such as the UK Climate Change Group and the UK SPA Scientific Working Group and building on contacts established through this project especially those who attended the Living with the Sea Advisory Group. English Nature will review progress within six months in co-operation with the other project partners.

Conclusions of this report	What action should be taken and outcome required	Project partner organisations
1. Manage sites as part of a coherent network to ensure that it can respond to environmental change. Through this, promote closer integration of the aims of the Habitats Directive and the Birds Directive.	Develop and agree criteria for the functions of a coherent network by 2004. Apply criteria to the management of the network. Review conservation objectives to reflect the role of individual sites in the network.	English Nature, Defra
2. Take a strategic approach to the management of the network, with greater emphasis on the role of the wider environment and linking measures within and beyond sites to achieve favourable conservation status.	Review habitats and species of European importance that are outside the network of sites and assess their contribution to favourable conservation status by 2006. Ensure that the achievement of favourable conservation status is a clear objective of action for local biodiversity. Clarify the balance between favourable conservation status and populations of birds to help determine management action for overlapping SACs and SPAs in dynamic situations.	English Nature, Defra
3. Integrate data and spatial information to improve the adequacy of use for monitoring and management, and apply scientific understanding of predicted coastal evolution to management decisions.	By 2005, identify and address factors that limit use and disseminations of scientific knowledge, and the steps needed to improve its use to help with delivery of conservation measures. Link in with European initiatives for data management.	NERC, Defra, English Nature, Environment Agency
4. Carry out periodical reviews of site management, conservation objectives and incorporate better understanding of predicted change across the network.	Use monitoring to identify where change has occurred. Collate this information by 2006 and use it in conjunction with predictions of change, for example from the MONARCH studies, to review and update site management plans and conservation objectives.	English Nature
5. In the long-term, move towards a presumption to restore functional coastlines, linked to a major programme of habitat restoration in more sustainable locations.	By 2004, identify coastal freshwater wetlands behind sea walls that cannot be sustained in the long term. Develop a 50-year programme to relocate these and restore functional coastal wetlands and transitions, using the approach and process developed by the CHaMPs studies to develop a shared vision of habitat restoration and re-creation needs to maintain the network.	English Nature, Defra, Environment Agency
6. Actively promote sustainability through engagement with all stakeholders and the development of joint projects. Regularly review stakeholder views and understanding of the implications of climate change.	Use English Nature's Maritime Strategy, started in 2003, to engage a wide range of stakeholders, build on existing partnerships and develop new ones. Identify opportunities for and initiate joint projects to achieve sustainable coastal management that will meet the aims of the Habitats and Birds Directives. Involve stakeholders in reviews of site management plans and conservation objectives.	English Nature, Environment Agency, Defra, NERC.
7. Focus on systems, not features, to develop a more innovative approach to habitat compensation arising from flood defence schemes.	Design sustainable solutions to habitat creation, using the Good Practice Guide to coastal habitat restoration and keeping this updated in the light of new experience.	Environment Agency, English Nature
8. Develop a national strategic plan for habitat restoration required to deliver sustainable flood defence.	Produce revised CHaMP guidance during 2003. Use the outcomes of CHaMPs to develop a national overview and accounting system. Integrate strategic planning for coastal and fluvial flood management, seeking solutions that provide multiple benefits.	Defra, Environment Agency
9. Address form and function of features within and beyond sites and inform management decisions through monitoring and surveillance.	Agree generic interpretation of favourable conservation status. Develop mechanisms to monitor dynamic features effectively across the whole range of features. Demonstrate this approach to other Member States and the EC.	English Nature, Defra
10. Review and update European site designation mechanisms to deal with dynamic change.	Provide examples to demonstrate the need for sites to be added to the network after 2004. Work with the EC to develop a process for future designations of SACs. Ensure that new site boundaries can accommodate predicted change.	English Nature, Defra
11. Co-ordinate action across Europe in response to environmental change.	The criteria to be developed for the network by 2004, will be at a UK scale. The criteria must address environmental change and the relationship of the UK to the whole Atlantic Biogeographical region.	English Nature, Defra
12. Base policy development on real examples, to improve management practice and achieve the aims of the Habitats and Birds Directives.	Collate data on real examples where features have changed in response to environmental change, starting in 2003. Identify where these changes have had a positive or negative impact and the management responses needed.	English Nature, Environment Agency, NERC

Glossary of terms used in the report

1. This list is not exhaustive and some definitions are summarised from the relevant documents. These should be referred to for the full definition.

Appropriate Assessment — A self-contained step in the decision-making process required by the Habitats Directive, which must be undertaken for plans or projects which, either alone or in combination with other plans and projects, not directly connected with or necessary for the management of the site, would be likely to have a significant effect on a Natura 2000 site. Its purpose is to determine whether the proposals would not adversely affect the integrity of the Natura 2000 site for the species and habitats for which it was designated.

Annex I habitat type(s) — Natural habitat(s) listed in Annex I of the Habitats Directive for which Special Areas of Conservation can be selected.

Annex II species — Species listed in Annex II of the Habitats Directive for which Special Areas of Conservation can be selected.

Annex 1 birds — Bird species listed on Annex 1 of the Birds Directive for which SPAs are selected.

Biogeographical region — A region separated from adjacent regions by barriers or a change in environmental conditions that determines the natural geographical range of habitats or species. The Habitats Directive recognises 9 regions. SACs are selected in the context of biogeographical regions. The UK is within the Atlantic Biogeographical Region.

Compensatory habitat — Habitat created to offset loss or damage to a Natura 2000 site to maintain the coherence of the network.

CHaMP — Coastal Habitat Management Plan - a new approach being tested in England to provide a strategic overview quantifying habitat change, (loss and gain), of coastal habitats over a 30-100 year period and identifying options to prevent future losses, and including the necessary habitat restoration or re-creation works to provide compensatory habitat for unavoidable losses.

Coastal squeeze — The process by which coastal habitats are progressively reduced in area and lose functionality when caught between rising sea level and fixed sea defences or high ground.

cSAC — candidate SAC prior to it becoming a Site of Community Importance (treat as SAC).

The Conservation (Natural Habitats) Regulations 1994 — Legislation to transpose the Habitats Directive into UK law. Also known as Habitats Regulations.

Department for Environment Food and Rural Affairs (Defra) — Government Department in England with responsibility for Habitats Directive implementation and flood and coastal defence. Sponsoring department for English Nature and Environment Agency.

Dynamic coastline — A coastline that is eroding and/or accreting and resulting in change such as the distribution or extent of different habitats. Such changes may be rapid or more long-term.

Environment Agency (EA) — Government funded environmental protection agency for England and Wales. Operating Authority for flood and coastal defence.

English Nature — Government agency for nature conservation for England.

Favourable conservation status — A key aim of the Habitats Directive. Conservation status is determined by the sum of environmental influences acting on a natural habitat or species throughout its whole range (air, water, soils etc.); it is favourable when these influences result in stable or increasing distribution, abundance, and structure or function necessary for habitat maintenance will continue in the long term throughout the biogeographical region.

Favourable condition — A term used in the UK to describe the desired state of an interest feature at a site level. Condition if favourable if monitoring shows that it meets a series of targets for measurable attributes of the feature. The site assessments will be used in reporting on the Habitats and Birds Directives.

Habitats Directive — Abbreviated term for Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora.

Interest feature — A natural or semi-natural feature for which a Natura 2000 site has been selected. This includes: - any Habitats Directive Annex I habitat, or any Annex II species: - any population of an Annex I bird species for which an SPA has been designated under the Birds Directive.

Intertidal — Zone of seashore between high and low water mark. Also called littoral.

LIFE Nature — One of three areas funded under the EU LIFE Financial Instrument for the Environment, set up to co-finance actions aimed at conservation of natural habitats and wild fauna of European interest under the Habitats and Birds Directives to support implementation of nature conservation policy and the Natura 2000 network.

Natura 2000 — The European network of classified SPAs and SACs.

Natural Environmental Research Council (NERC) — One of seven UK research councils that fund and manage scientific research and training in environmental sciences, including environmental change.

Operating Authority — Body which undertakes flood and coastal defence or coast protection activities in England, usually the Environment Agency or a Local Authority.

PPG 9 — Planning Policy Guidance note 9 on Nature Conservation - sets out the planning evaluation of plans or projects that could impact on Natura 2000 sites in England.

Ramsar Convention — International convention on conservation of wetland habitats and species.

Special Area of Conservation (SAC) — Site of Community Importance designated by a Member State through a statutory, administrative and/or contractual act where the necessary conservation measures are applied to maintain Favourable Conservation Status.

Site — Defined in the Habitats Directive as a geographically defined area whose extent is clearly delineated.

Site of Community Importance (SCI) — A site that contributes significantly to the maintenance or restoration of favourable conservation status in the biogeographic region in which it occurs. These sites are selected by the EC from the list of SACs designated by Member States.

Shoreline Management Plans (SMP) — Plans used in England that decide flood and coastal defence policy for a geographic coastal unit with identifiable coastal processes. It considers the wider environmental and socio-economic requirements when deciding the policy. Produced by operating authorities under guidance from DEFRA.

SPA — Special Protection Area classified under Article 4 of the Birds Directive.

SSSI — Site of Special Scientific Interest. National conservation designation in England, Wales and Scotland. In Northern Ireland these are called Areas of Special Scientific Interest (ASSI).

United Kingdom (UK) — The UK comprises England, Northern Ireland, Scotland and Wales (but excludes the Channel Islands and the Isle of Man).

UK Biodiversity Action Plan (BAP) — The UK's initiative to maintain and enhance biodiversity. English Nature and other organisations from across all sectors are committed to achieving the Plan's conservation goals over the next 20 years and beyond. Contains species and habitat plans with targets for habitat creation and restoration.

Living with the Sea LIFE Project
English Nature
Northminster House
Peterborough PE1 1UA

Telephone: 01733 455100

www.english-nature.org.uk/livingwiththesea

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