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**An implementation framework for the conservation, protection
and management of nationally important marine wildlife in the UK**

Prepared by the statutory nature conservation agencies, Environment Heritage Services
(Northern Ireland) and JNCC for the DETR Working Group on the Review of Marine Nature
Conservation

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Context

The Department of the Environment, Transport and the Regions (DETR) established a working group to review marine nature conservation. This forum was set up to help Government develop possible future mechanisms to protect, conserve and manage nationally important marine wildlife in the seas around England. The original remit of the Working Group focussed on territorial waters, but this position was revised in the summer of 2000 to cover the continental shelf and superjacent waters under UK jurisdiction (usually up to 200 nautical miles from the coast). The Working Group has a wide membership drawn from statutory and non-statutory organisations, industry and user groups with a particular interest in the marine environment.

This report is one of four submitted by English Nature to the Working Group in 2000. The four documents in the series, sequentially, are:

LAFFOLEY, D. d'A. & Bines, T. 2000. Protection and management of nationally important marine habitats and species. Prepared by English Nature based on the views of a sample for the members of the DETR Working Group on the Review of Marine Nature Conservation. Peterborough: *English Nature Research Reports*, No. 390. 20 pp.

LAFFOLEY, D. d'A. 2000. Historical perspective and selective review of the literature on human impacts on the UK's marine environment. Prepared by English Nature for the DETR Working Group on the Review of Marine Nature Conservation. Peterborough: *English Nature Research Reports*, No. 391. 20 pp.

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Copies of these reports can be obtained from the enquiry team at English Nature in Peterborough.

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Preface

This paper, the fourth in the series prepared by English Nature for the DETR Review of Marine Nature Conservation Working Group, focusses on an implementation framework for the conservation, protection and management of nationally important marine wildlife. It sets out the thoughts of marine conservation staff and other specialists within the country agencies, Environment and Heritage Services (Northern Ireland) and JNCC on what form such a framework might take. In so doing it provides a complete package of measures which need to be taken as a whole. To do this the paper incorporates information and advice obtained from scientists and marine conservationists in Britain, across Europe and from around the world. It actively seeks to embrace the evolving practices emerging from OSPAR, ICES, the European Environment Agency, and concepts from Canada and the United States.

This paper makes four key points. First, that the eventual success of any marine conservation programme is dependent on establishing, at the outset, the right overall approach encompassing clear objectives focussed at appropriate spatial scales. Second, that most of the elements needed to build the recommended approach, with the exception of offshore conservation mechanism(s), already exist in the UK, albeit often in a fragmentary or rudimentary state. Third, that within the UK, effort needs to be invested at four principle spatial scales if national marine conservation measures are likely to succeed. Finally, new conservation mechanism(s) will need to be developed to deliver marine conservation measures out to sea, which actively try to address concerns of the fishing industry, and seek to provide a single multipurpose site-based approach, thus reducing the potential for a possible plethora of offshore designation types and terms. This paper proposes 'conservation boxes', a form of MPA, which could provide an appropriate framework for marine conservation action offshore, whilst, at the same time, inevitably leading to an integration between management of marine fisheries and the marine conservation resource.

Whilst the current DETR Review is focussed on England, the principles and proposals set out in this paper should be applied throughout UK waters and, ideally, more widely to involve adjacent countries. More comprehensive integration between the considerations of the DETR Working Group, OSPAR, ICES and the European Environment Agency are likely to hold the key to the success of such endeavours.

Dr D Laffoley & Dr T Bines
English Nature
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1. Introduction

- 1.1 At the Working Group meetings held on 30 March 2000 and 22 June 2000 English Nature tabled three papers which sequentially focussed on:
- the protection and management of nationally important marine habitats and species (Laffoley & Bines, 2000);
 - a historical perspective and selective review of the literature on human impacts on the UK's marine environment (Laffoley, 2000); and
 - nationally important marine seascapes, habitats and species. A recommended approach to their identification, conservation and protection (Laffoley et al, 2000).
- 1.2 This paper, the fourth in the series, focuses on the implementation framework within which any national marine conservation measures might be applied. In so doing, the paper seeks to provide the way by which the principles and approaches set out in the previous papers could be expressed in a structured, integrated and appropriate manner across territorial and continental shelf waters, to the limits of UK jurisdiction.
- 1.3 Within this document reference is made to 'offshore areas'. For the purposes of this paper, this is generally taken to be more than 3 nm out to sea, and 'coastal waters' to be the area inshore of this point. This distinction is based solely on the general availability of biological information, a key consideration in the overall construction and functioning of a marine conservation framework. Inshore of 3 nm generally far more is known about the marine environment, with detailed information available for habitats and species and able to support equally detailed management measures. The term 'traditional marine protected areas' is used to denote marine nature reserves or European marine sites (ie SACs and SPAs), whilst 'marine wildlife' is sometimes used as shorthand for marine landscapes, habitats and species.

2. Rationale

- 2.1 The need for a framework for implementation of any national marine conservation measures within the UK should be self apparent. The more obvious reasons relate to issues such as consistency, coordination of action, matters of environmental scale and previous experience. There are also international obligations in force which may be best serviced through such an integrated approach. For example, the 1992 Convention on Biological Diversity, now supported by the 1995 Jakarta Mandate, commits governments to protect the functioning of their marine ecosystems as well as establishing (or consolidating) representative systems of marine and coastal protected areas (Lutter, Christiansen & Gawler, 2000). Similarly Annex V of the OSPAR Convention, also ratified, sets out important obligations including protection against adverse effects of human activities, conservation of marine ecosystems, restoration of marine areas and the development of strategies for the conservation and sustainable use of biological diversity.
- 2.2 Developing and recommending an implementation framework within which to apply national marine conservation measures is, however, a challenging process. It is challenging because the overall design of the framework is crucial to the benefits

arising from, or the failures of, the ensuing actions to conserve, protect and/or manage marine wildlife. Many factors must be considered and balanced in deciding on the approach to be recommended including:

- establishing a vision of the approach (building, where relevant, on existing UK nature conservation policy and procedure, and experience from overseas);
- the cost and effort that would be required to implement the approach, and how this can be reasonably balanced across the framework to achieve the maximum cost-benefits while involving an acceptable regulatory burden;
- the level of information available, or that could reasonably be made available, to support the overall approach - too much required resulting in higher costs and slow or patchy progress, whilst too little leading to an increased reliance on the precautionary approach and shallow or patchy knowledge;
- the minimum level of information the approach would require in any case in order to operate;
- the ecological constraints shaping the marine environment, the processes responsible for pattern, and the dominant scales of physical and biological variability involved, reflected by the fact that marine habitat and species assemblages tend to be more mobile and seasonal than those on land (eg sea fronts, thermoclines, upwellings etc);
- the need to rationalise and minimise the number of different designation types and terms, seeking to find single site-based solutions that are sufficiently flexible as to support conservation, protection and management action arising from a variety of legal and policy sources: and
- an understanding of the nature and structure of the framework within which to implement the approach and how this would integrate with established policy and procedures within other sea use sectors e.g. oil and gas, aggregates, fisheries, shipping etc.

2.3 In effect, there is a need to balance these issues so that whatever framework may be put in place is practical, achieves maximum conservation cost-benefit and is easily understood by, and integrates with, other sea use sectors, incurring the least necessary regulatory burden on sea users and other sectoral interests.

2.4 In doing so it is important to recognise that measures and approaches which may be appropriate for coastal areas, and with which many members of the Working Group may be most familiar, may not prove operational further out to sea. This is because offshore (ie in relation to this paper, ‘offshore’ is generally considered to be more than three miles from the coast) conservation, protection and management will require a different approach. This arises because, **in broad terms**:

- the level of information on habitats and species that is available, or that could reasonably be made available, to policy makers and decision-takers decreases with increasing distance from the coast, with c3 nm from the shore seeming to represent a general ‘information watershed’ in UK waters;

- the cost of gathering data, monitoring habitats and species, and reporting on their ecological condition generally shows the reverse trend and increases significantly with increasing distance out to sea, due to greater transportation and equipment costs;
- the offshore environment is generally more uniform than the coast, dominated by large scales of time and space, with changes occurring over seasons and decades and large distances. Recognisable seabed features may extend or be distributed over larger areas of seabed than nearer the coast so larger areas may be of conservation interest;
- the scope of regulation of human activities to support conservation, protection and management becomes increasingly focussed and specific further offshore due to a marked reduction in the range of key players accompanied by a comparative increase in their importance, eg oil and gas extraction, fisheries activities, shipping; and
- sovereignty and jurisdiction changes occur offshore, with regulation and management being achieved through the European Union or directly by Government Departments, compared to nearshore areas where regional Government Departments and Agencies have particularly established and prominent roles. Offshore it becomes increasingly difficult for citizens to participate/influence decision making.

2.5 It is therefore desirable to develop an overall approach which recognises and integrates the generally different spatial scales, levels of information available and jurisdictional issues from offshore areas with the more information-hungry and detailed regulatory framework, and associated implementation mechanisms, such as ‘traditional’ marine protected areas, more prevalent closer inshore.

2.6 Such challenges, particularly concerning dilemmas around implementation in offshore areas and what approach to take for both benthic and pelagic systems, have already been encountered elsewhere in the world, notably in Canada (Roff & Taylor, 2000) and America (Hyrenbach, Forney & Dayton, 2000 in press). Such issues are now also starting to be considered by OSPAR, ICES and the European Environment Agency. This paper therefore attempts to integrate, in a single UK marine conservation framework, the most relevant principles and practice arising from:

- the established UK policies and approaches to nature conservation on the land and at the coasts (drawing on the existing national statutory conservation framework, the implementation of the Habitats Directive, English Nature and Scottish Natural Heritage’s work on Natural Areas, and other characterisation initiatives including the Countryside Character project and the Landscape Assessment Initiative, both led by the Countryside Commission);
- the existing and developing UK approaches to nature conservation in the seas around the UK (the MNCR habitat classification, mechanisms for site identification, ‘traditional’ marine protected areas and new concepts such as CCW’s ‘seascapes’ project);
- the developing international approach to the protection, conservation and management of offshore marine landscapes, habitats and species (drawing on

the ‘seascapes’ approach pioneered in Canada (Roff & Taylor, 2000), proposals for the conservation of pelagic systems from the USA (Hyrenbach, Forney & Dayton, 2000 in press) and the work of OSPAR, ICES and the European Environment Agency); and

- the developing international approach to the identification of biogeographic selection areas to support conservation action on marine habitats and species in the north-east Atlantic (OSPAR) .

3. Framework overview

- 3.1 An effective approach to national marine conservation will be one that addresses the ecological requirements of marine wildlife at the appropriate range of spatial and, for species, temporal scales. This may range from the need to tackle diffuse issues such as shipping and pollution throughout the seas, to the management requirements of habitats or species at specific localities. Thus it becomes apparent that ‘traditional’ marine protected areas (ie in the UK sense, small highly protected areas) are only one part of the overall framework required to conserve, manage and protect the UK’s nationally important marine landscapes, habitats and species.
- 3.2 The basic principles of any approach were set out in Laffoley and Bines (2000). These are, *inter alia*, that a single framework is required to safeguard and promote effectively in the public interest the sustainable conservation of marine habitats and species. This would need to include a balance between a network of marine conservation areas, measures for the conservation of wide-ranging marine species and measures which support marine conservation in the wider seas.
- 3.3 This paper, therefore, recommends that, in practical terms, conservation and management of marine wildlife in the seas, across the territorial waters and continental shelf, to the limit of UK jurisdiction, should be developed within an overall framework which has at least four principal elements. These elements represent the different spatial scales required to address the needs of benthic habitats and species, mobile wide ranging species and ecosystem health. They are a complete package of measures and need to be taken together if a successful approach to national marine conservation is to be sought and, hopefully, achieved.
- 3.4 These elements are not mutually exclusive, and, as such, are artificial to a degree, representing points on a continuum. They nevertheless represent a convenient framework within which to deliver the conservation, protection and management of marine wildlife. They are summarised below, and in table 1, in decreasing order of magnitude:
 - **The wider sea.** This includes all territorial waters, the continental shelf and superjacent waters under UK jurisdiction. This is the scale at which to address wider sea issues such as pollution, water quality and the protection of wide ranging marine species, as well as to report on environmental change and on overall ecosystem health, for example through the development of Government ‘quality of life’ sustainability indicators to complement those already in use on land.

- **Regional/subregional seas.** An approach based on ecologically meaningful subdivisions of the wider sea - sometimes described as an 'ecosystem approach'. This would have many, varied uses, ie a framework within which to map and describe marine biodiversity, identify conservation priorities and assess the marine resource and engage with industry, articulate the values to society of marine ecosystems in terms of the goods and services they supply to mankind, support the implementation of OSPAR recommendations and support the selection of nationally important examples of marine landscapes, habitats and species for conservation action, implement regionally based conservation initiatives (eg Particularly Sensitive Sea Areas), and relate marine biodiversity, at an appropriate scale, to other regional sectoral interests and concerns, such as the agenda of Regional Development agencies, inshore fisheries management or the possible regionalisation of the Common Fisheries Policy.
- **Marine landscapes.** A physiographic/hydrographic approach (currently not comprehensively put in place or formally recognised) which would be at an appropriate scale to comprehensively classify the UK's marine environment and would make the delivery of site-based conservation actions in the seas around the UK a reality. It would enable marine landscapes with their constituent wildlife resource (including pelagic systems) to be identified, documented and afforded appropriate conservation, protection and management. This may be through mapping, documentation and information dissemination, policy decisions, 'traditional' marine protected areas (nearshore) or the development of new conservation, protection and management approaches appropriate for offshore areas, such as 'conservation boxes' - a form of MPA.
- **Habitats and species.** The established UK and European classification systems and process for the assessment of environmental sensitivity, providing the essential building blocks for the existing 'traditional' level of approach to marine conservation,. Often the required level of detail to assess marine conservation concerns in relation to detailed and localised development or management proposals. Sometimes the level to take conservation action through the designation of 'traditional' marine protected areas to deliver specific wildlife gain, within a tightly legally defined framework (cf Habitats Regulations), over areas containing valued combinations of habitats and species, with core areas to address the high sensitivities of some habitats and species.

3.5 The consequence of this 'nested approach' is that the eventual framework could deliver conservation action across the wider sea, at a regional/subregional seas level within an ecologically meaningful framework, supported by appropriate conservation mechanisms applied, where needed, to conserve, protect and manage nationally important examples of marine landscapes, habitats and species, throughout UK waters.

- 3.6 The remainder of the paper considers particular elements of the above framework in more detail, the distribution of effort required across such a framework for its implementation, and ends by recommending a number of actions in order to take the concepts and principles recommended in this paper forward.

4. A wider sea focus

- 4.1 A wider sea focus, covering all waters under UK jurisdiction, is necessary to address factors affecting overall marine ecosystem health and functioning, and the conservation, protection and management of wide ranging marine species which may use UK waters seasonally or for all or parts of their lives, whether on migration or for feeding or breeding purposes.
- 4.2 Much effort is already focussed at this level, dealing with particular aspects, ranging from the implementation of:
- international Conventions and agreements eg MARPOL for shipping, CITES, The Bern and Bonn Conventions, Ramsar, Biodiversity Convention through relevant parts of the UK Action Plan, and, in due course, OSPAR;
 - European Directives eg the Environmental Assessment Directive, more recently the Habitats and Birds Directives and in due course, limited marine application of the Water Framework Directive; and
 - Domestic legislation and policies, including species provisions of the Wildlife and Countryside Act 1981 and ‘whole sea’ policies such as those prohibiting incineration at sea or sewage sludge dumping.
- 4.3 With many of the above, they apply not just within UK waters but more widely, often on a European scale. This is the level at which the Common Fisheries Policy is applied.
- 4.4 There are, however, some important deficiencies in action which need to be addressed in order to support the overall conservation, protection and management of nationally important marine wildlife throughout UK waters. Such work should include:
- better legislation, integrated enforcement and policing, and penalties to act as real deterrents, to support the inclusion of wide ranging marine species on relevant schedules of the Wildlife and Countryside Act. Relevant details have already been given in Laffoley and Bines (2000);
 - a better understanding of how to maintain or enhance wider marine environment ecosystem health through, for example, more detailed considerations of the links between marine wildlife and water quality issues. After fishing, diffuse pollution is now seen as a key threat to the continued survival and health of marine ecosystems and the wildlife they support. The relationship between water quality and ecosystem health is relatively poorly understood and needs to be better understood if overall improvements are to be achieved;

- a better understanding of environmental change, how to recognise when it is occurring, cause and effect, and how this can influence the overall health of marine ecosystems and the distribution of habitats and species;
- a better understanding and integration of sea-use management across sectors, through well structured and effectively targeted communication within (and between) the various management levels, supported by an appropriate overall and agreed planning and management framework; and
- better mechanisms for reporting on marine ecosystem health through the development of an appropriate Government indicator set.

4.5 With respect to the last point, in December 1999 the Government published *Quality of life counts* (DETR, 1999b), a baseline assessment comprising a core set of about 150 indicators of sustainable development, which are central to monitoring and reporting on future progress. They cover social, economic and environmental dimensions. This followed up the earlier Government publication of *A Better Quality of Life: a strategy for Sustainable Development in the United Kingdom* (DETR, 1999a). The protection of marine habitats and species is an objective under one of the 150 or so indicators, but the indicators of biodiversity in coastal and marine areas have not been developed. Accordingly, the related absence of any reference to the marine environment in the headline indicator set will become an increasingly obvious omission which may need to be considered in due course.

5. A regional/subregional seas focus

5.1 Introduction

- 5.1.1 Recently there has been a growing awareness amongst international and national experts and groups that some sort of regionalised framework needs be put in place through which to implement nature conservation in the seas around the UK and Europe. This would be to both enable conservation policy to be applied in a meaningful and structured manner, but also ensure that the marine conservation agenda can be consistently expressed at a scale more relevant to industry and sea users.
- 5.1.2 OSPAR in their discussions within the Annex V IMPACT Working Group (now the Biodiversity Committee) reached this conclusion and last year agreed that such a framework, based on biogeographically meaningful units, operating across the north east Atlantic, would be an essential component of any approach to establish and implement recommendations on marine habitats and species. Work is well advanced in determining the likely structure of such a framework (Dinter 2000).
- 5.1.3 UK Fisheries advisors also reached a similar view, but as a result of proposing the most appropriate framework and approach to deliver a more ecosystem-based solution to the European fisheries crisis (Symes & Pope, 2000). They considered that a regional/subregional seas approach was an essential part of the way forward and have already proposed a possible structure.

- 5.1.4 There has similarly been a growing realisation within the JNCC, Environment Heritage Services (Northern Ireland) and the country agencies that such an approach will be needed to assist in the implementation of not just any national measures which may arise from current Working Group deliberations or elsewhere, but also to assist the implementation of national and international commitments, such as the Biodiversity Action Plan and the Habitats and Birds Directives, throughout UK waters, including the continental shelf.

5.2 Role of a regional/subregional seas focus

- 5.2.1 The development of an regional/subregional seas focus for the marine environment would therefore be timely. There is no such established approach to marine conservation in the UK at present but, if it were to be put in place, it would have a number of important functions for implementing national marine conservation actions.
- 5.2.2 In short, the formal adoption of such a regional/subregional seas approach would greatly aid people's understanding of the marine environment by enabling marine biodiversity to be described, and objectives to be presented, at a scale that readily relates to how the sea is used. This point is equally applicable to marine landscapes, the next level down, described in later sections. In particular a regional/subregional approach would provide a framework:
- to support an ecologically meaningful approach to the identification and selection of nationally important marine landscapes, habitats and species for conservation action (similar to the approach taken on land to help implement SSSIs, but in this case biogeographically based);
 - to implement OSPAR recommendations on marine biodiversity. It would also make it easier to relate subsequent domestic marine conservation issues to any relevant information or actions arising from OSPAR quality status reports and its constituent reporting areas;
 - to break down overall Biodiversity Action Plan targets to a more manageable/deliverable level and in so doing, build on this, in order to articulate the priorities and objectives for marine biodiversity; articulate the values to society of marine ecosystems in terms of goods and services; and enable both aspects to be related to the responsibilities, interests and environmental performance of key economic players at a meaningful and useful scale (English Nature's Natural Areas initiative will be attempting to do this for the seas around England in the near future);
 - to enable marine biodiversity objectives to be expressed at an equivalent scale to the regional management agenda within other sectors, such as inshore fisheries management, Regional Development Agencies, and the future, possible regionalisation of the Common Fisheries Policy;
 - to provide a basis for regional/subregional assessments of the marine resource to support sustainable development; and

- as an ecologically meaningful basis on which to implement specified regional-based initiatives, when deemed necessary, such as Particularly Sensitive Sea Areas.

5.2.3 From the above, and given the remit of the Working Group, it is worth considering in more detail the role that such an area-based framework could play in the implementation of criteria for the identification and selection of nationally important marine landscapes, habitats and species, and how this can be used to harmonise approaches both on the land and in the sea. Criteria for marine conservation were recommended in Laffoley et al (2000).

5.3 Using a regional/subregional seas focus for ‘Areas of Search’

- 5.3.1 On land, the identification and selection of nationally important conservation sites (Sites of Special Scientific Interest (SSSIs) in England Scotland and Wales, Areas of Special Scientific Interest (ASSIs) in Northern Ireland) has been supported by ‘Areas of Search’. The term ‘Areas of Search’ originates from work undertaken by the Nature Conservancy Council between 1975 and 1979, building on the earlier work of the Nature Conservancy, to develop guidelines for the selection of SSSIs. This resulted in the publication of formal guidelines aimed at establishing consistent criteria and standards for SSSIs throughout Great Britain (Nature Conservancy Council, 1989). ‘Areas of Search’ were developed to ensure that there was a standardised UK-wide geographical framework within which to apply any selection criteria.
- 5.3.2 The definition of such a framework is to ensure that for each habitat type there would be consistent application of the selection criteria and, in particular, both an adequate total area and a good geographical spread of the best examples within the statutory protection framework. It was suggested that on land 2,500 square kilometres (50 x 50 km) was the desirable extent for each Area of Search but it was recognised that for practical purposes and to best interact with planning matters, it would be appropriate to use administrative county or district boundaries (figure 1). Subdivision of Britain into biogeographical areas would have given the best basis for site selection, but there was no agreed system in use at that time.
- 5.3.3 By the mid 1990s the original SSSI guidelines were extended to include intertidal marine habitats and species (Joint Nature Conservation Committee, 1996) in order to help underpin and accordingly implement the Habitats Directive introduced two years earlier. In so doing the Areas of Search framework was also extended over the intertidal zone drawing from the MNCR classification system, but based on ‘coastal sediment cells’ as a more appropriate and ecologically meaningful basis for notification work (Figure 2). These sediment cells are inshore coastal areas within which localised coastal sediment processes are considered to be largely contained (Motyka & Brampton, 1993; HR Wallingford, 1995).
- 5.3.4 Given that the application of SSSIs only extends to the point of mean low water in England and Wales, and point of mean low water spring tides in Scotland, and given the current lack of any truly effective marine conservation mechanism(s), there is a need to provide a more substantive framework to cover the marine environment as a whole. A regional/subregional seas framework could now be used for such a purpose.

- 5.3.5 Thus using a regional/subregional seas approach in such a way would enable meaningful comparative assessment of marine protected areas and other measures to be made in a consistent way to that on land. Whilst there would be differences in conservation outcomes and the spatial scales of such areas at sea, consistency in approach and policy would be maintained across the land/sea interface.

5.4 Defining regional/subregional seas

- 5.4.1 There are three principal ways in which a regional/subregional seas approach could be defined:
- administrative boundaries, for example, ‘sea areas’ using in shipping forecasts;
 - part administrative/part ecologically meaningful boundaries, eg the ICES framework; or
 - ecosystem-based boundaries eg based on biogeography and associated factors.
- 5.4.2 OSPAR have already given thought to the development of a framework of manageable and useful units within which to implement any proposals arising for the protection and management of biodiversity in the north-east Atlantic and also in order to fulfil the demands of the Convention on Biological Diversity (Dinter, 2000).
- 5.4.3 In an approach which reflects the views of the JNCC and country agencies, they are fairly advanced in their thinking of proposing a system based on ecologically meaningful biogeographical provinces (figure 3). It is evident that such a framework presents the most logical way through which to articulate and implement marine biodiversity initiatives. Such an approach is a commonly used basis on which to select marine protected areas e.g. Ramsar, IMO criteria for Particularly Sensitive Sea Areas, IUCN guidelines for establishing marine protected areas, Natura 2000, Baltic Sea Protected Areas, Nordic Council of Ministers, OSPAR Annex V/Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area 1998.
- 5.4.4 The OSPAR approach, which has now been discussed and adopted by OSPAR workshops held at Oban and Brest in 1999 and Vilm in 2000, is based on a synthesis of a review of existing biogeographical classifications combined with research on biological distribution patterns, and oceanographical, climatological, geological and geographical information. This approach has been applied to the North-East Atlantic, covering the maritime area of OSPAR and the Atlantic portion of the European Register of Marine Species. It has been recommended by workshop participants for application of biodiversity protection across the OSPAR area (selection of habitats and species, including MPAs, within biogeographically meaningful subunits of the OSPAR area).

5.5 Detailed considerations

- 5.5.1 Despite the fact that the OSPAR framework is still under discussion and may be subject to further refinement, it does provide a structure within which to consider what level of approach would be needed to provide an effective and meaningful framework for UK use, rather than for the north east Atlantic.
- 5.5.2 The UK is located within two of the biogeographical units proposed by OSPAR (figure 3):
- **Boreal** - covering Shetland, Orkney, the east coast of Scotland, the east and south coast of England and the Irish Sea; and
 - **Boreal-Lusitanian** - covering the southwest and southwest- approaches, west coast of Ireland, the west of Scotland and the Outer Hebrides.
- 5.5.3 It is probable that this framework, consisting of only two distinct areas, would provide too coarse a scale within which to implement UK marine conservation initiatives. Whilst helpful, it would still present considerable practical problems when applying the selection criteria recommended by JNCC and English Nature (Laffoley et al, 2000) to such extensive areas. Further subdivisions for implementation at a national level are required.
- 5.5.4 Such subdivisions can be defined on the factors which are known to influence our marine ecosystems. Experience gained from the countryside characterisation project should be called upon, with principal factors for the sea likely to include:
- Water depth
 - Water temperature
 - Geology
 - Nutrients (particularly N and P)
 - Turbidity
 - Salinity
 - Frontal systems
 - Wave height
 - Currents
- 5.5.5 Such an approach of overlaying these factors on the OSPAR framework could result, for example, with the following regional/subregional seas being defined around England within UK continental shelf limits:
- Northern North Sea
 - Southern North Sea
 - Mid and Eastern English Channel

- South Western Peninsular
- The Western Approaches
- The Irish Sea

Additional areas would need to be defined for waters off Scotland, Wales and Northern Ireland, leading to a suggested 10 - 14 areas in total for the waters of the UK.

- 5.5.6 The extent of individual regional/subregional sea units would more or less fall between the orders of magnitude for the areas of each Regional Development Agencies in England or the National Assembly for Wales, and the larger possible part administrative/part biogeographical areas that could be used to establish a more regional approach to European fisheries management (Symes & Pope, 2000).
- 5.5.7 If such regional/subregional sea units were used as Areas of Search for the application of conservation criteria and the selection of sites, each resultant area would be far more extensive than any Areas of Search used on land but established at a scale appropriate for management and conservation of UK waters. This is hardly surprising given that the terrestrial areas have been defined on a purely administrative basis and that, in any case, the temperature-buffering effect of water produces less marked gradients over far greater distances than the more pronounced effects of temperature and elevation on habitats, species, landscape and geology experienced on land.

5.6 Further development

- 5.6.1 This approach has considerable potential in providing a multipurpose framework for articulating and implementing UK national marine conservation policy and programmes at the meaningful regional scale over the coming decades. There is, however, the need for further discussion before any such framework can be established and used for implementation in the UK. It is unclear, for example, how tightly defined the boundaries of areas should be, whether just temperature and depth could or should be used to develop the OSPAR framework and whether truly meaningful boundaries or imposed 'straight lines' should be used in this three dimensional environment.
- 5.6.2 Equally it is unclear how such regional/subregional seas should relate to the sediment cell approach taken in the intertidal habitats SSSI guidelines or indeed whether any of these considerations actually matter, given the large geographical scale on which regional/subregional seas would operate.

6. A marine landscapes focus

6.1 Introduction

- 6.1.1 The development of a regional/subregional seas focus can provide the framework within which to implement and articulate many varied elements of a national approach to marine conservation. It does not, however, resolve the issue of how to

best protect, conserve and manage marine wildlife, using site-based mechanisms, especially out at sea.

- 6.1.2 As stated earlier in this document, an effective approach will not only depend on ‘traditional’ marine protected areas and the established manner in which they are identified and implemented; it would also need to embrace the development of a new approach which can operate on the lower levels of environmental information which may only be available offshore and in a manner that can be successfully applied, if necessary, over larger areas of sea and seabed in the least legislatively burdensome manner. Fundamental to this is the development of coherent marine conservation management units to which specific policies and use-management could be applied.
- 6.1.3 Such issues have already been encountered in Canada (Roff & Taylor, 2000) which has the longest coastline in the world, bordering three oceans. Any national solution which is workable there should have application in other countries. The approach they propose is based on geophysical features, recognising as on land that landscape controls, and can thus be used as a surrogate for, the biological communities it supports. Similarly, in the United States, suggestions have been made that hydrographical features should form the basis for conservation of pelagic ecosystems (Hyrenbach, Forney & Dayton, 2000 in press).
- 6.1.4 Their approaches also draw from the realisation that conservation should perhaps be striving to conserve representative *spaces* or *landscapes*, rather than just to preserve individual species. An ecosystem approach (using landscape types as a surrogate) may often be more effective than approaches based on single species. This ‘spaces’ concept suggests working in a ‘top-down’ manner, from geophysical through to biological, which is the approach the Canadians favour. They proposed using the term ‘seascapes’ to describe this approach, but given the apparent confusion that could arise in the UK, ‘marine landscapes’ have been used as the equivalent term in this paper. Marine landscapes also express the same concept described as ‘physiographic types’ in the MNCR habitat classification, and encompasses the slightly narrower concept of ‘habitat complexes’ being developed for the EUNIS (European Union Nature Information System) under the aegis of the European Environment Agency. Marine landscapes include persistent or temporary hydrographic features.
- 6.1.5 An approach, using geophysical features within a defined hierarchical classification system, appears to be the only feasible way to tackle marine conservation in Canadian waters due to the difficulty of obtaining sufficient biological data for widespread direct mapping of community types (Roff & Taylor, 2000). The data necessary to operate the geophysical approach is available from mapped sources and from remote sensing. Roff and Taylor readily acknowledge the role for biological based systems, such as the classification being developed by MNCR, in providing the link between abiotic (physical landscape) and biotic (habitats and species) elements. They have not fully decided, however, how best their system could be used for conservation purposes.

6.2 Developing the marine landscapes focus

- 6.2.1 The physiographic/hydrographic approach, if appropriately developed, would form a useful focus for site-based delivery within any national UK marine conservation

framework, representing convenient and recognisable management units. The physiographic approach is, in any case, already in operation in the UK marine environment, through the implementation of the Habitats Directive (eg Annex 1 types such as ‘estuaries’ or ‘large shallow inlets and bays’) and helps form the framework for implementation of the UK Biodiversity Action Plan in the maritime environment (eg broad habitat types). If this approach were implemented in a properly structured and comprehensive manner it could:

- resolve a key problem of how to implement site-based measures, particularly in offshore areas, where knowledge is generally less, and costs and practicalities of gathering information, other than through broadscale remote sensing methods, high;
- provide an appropriate scale for implementation and at an appropriate resolution to best relate to other area-based sea uses such as aggregate extraction, dump sites, pipeline and cable laying, oil and gas licencing, and area based fisheries management (‘boxes’); and
- provide ecologically meaningful units on which to base strategic environmental assessments to gauge the likely effects arising for future possible developments.

- 6.2.2 It would avoid the need to ‘unpack’ the biology of a given area down to its constituent habitats and species before any basic action can be taken. This assumes that the links between abiotic (landscape) features and biotic elements (constituent habitats and species) are understood, and how faithful the latter elements are to particular marine landscapes types.
- 6.2.3 Within the UK, using a marine landscape focus, as part of an overall framework, has the considerable advantage that it can apparently be operated from available information sources and could be initiated in a comprehensive manner to map the marine landscapes in all UK waters reasonably quickly. It should also not be underestimated the amount of seabed mapping information held or currently being gathered/planned for offshore areas of UK waters which would support such an approach. It would thus make it a workable and more affordable proposition to implement marine conservation in territorial waters and over all the UK continental shelf.
- 6.2.4 Such an approach would, however, need to operate alongside the biologically-based classification system of the MNCR. The MNCR approach would continue to play a fundamental role in providing targeted and also comparative information on marine communities and verifying the links between landscape and biological parameters.
- 6.2.5 Progress has already been made at a European level to develop this type of approach for use in conservation policy, through the development of the EUNIS classification by the European Environment Agency, working in close collaboration with specialists from OSPAR and ICES, and their ideas of mapping marine landscapes across the entire OSPAR area. At a recent workshop in Southampton this matter was considered and physiographic types proposed for OSPAR waters (table 2). This work is subject to further development but represents a good basis from which to view the potential of the approach.

- 6.2.6 Once established, the marine landscape classification could be applied to describe all waters under UK jurisdiction, and develop conservation actions drawing from the criteria and approach recommended in Laffoley et al 2000. The condition of marine landscapes could be evaluated and prioritised. Where action was seen to be needed appropriate measures could be put in place. Where no action was currently seen to be needed, the documentation and dissemination of information on the various marine landscapes could be used to both encourage and support sustainable development, especially if such knowledge were integrated into the policies and decision-making of all sea use sectors.
- 6.2.7 The effectiveness of a marine landscape approach to marine conservation is, however, dependent on conservation, protection and management actions also being taken forward at an equivalent scale. This will require a new site-based approach to be developed to support marine conservation, especially for offshore areas, where ‘traditional marine protected areas, by the very structuring of their regulatory framework, are of little relevance. Such a new approach could take the form of ‘conservation boxes’, drawing strongly from existing site-based policy and procedures already in place to deliver the requirements of other categories of sea use. This type of approach may seem ‘new’ for marine conservation purposes but, in the broader context, it is merely a logical development of how the UK already manages its marine resources. These issues are considered in more detail below.

6.3 Conservation, protection and management of marine landscapes

- 6.3.1 Building from the approach outlined above, a conservation tool could be developed for application in offshore areas around the UK, to complement the scale and nature of marine landscapes. This would not be a direct application of the approach so far documented in Canada but would be selective, remain faithful to their concepts but taking the best elements forward and building in UK and European requirements.
- 6.3.2 The approach, termed ‘conservation boxes’ in this paper, could consist of the following elements. Being based on marine landscapes, any ‘site’ warranting conservation action may cover a larger area than most ‘traditional’ marine protected area, but regulation should aim to be less burdensome. Whilst the basic framework would need to be established in legislation, management could be achieved through policies in favour of, or against, specific activities, implemented through the existing regulatory bodies. This would produce a highly flexible framework adaptable to the many and varied situations that would be encountered. It would leave sea users that do not impact upon the conservation interests of the ‘site’ unaffected - thus akin to a form of targeted sea-use planning.
- 6.3.3 The rationale for such an approach stems from the well established mechanisms, policies and procedures used over many years to manage the site-based activities of other sea use sectors, for example, oil and gas exploration and extraction, aggregate extraction, and area based fisheries management. All use some form of boxes that are roughly within the same broad order of magnitude. Not so small as to suffer ‘edge effects’ and difficulties with policing or enforcement, not too large to form unmanageable units, and just the relevant size to support the planned management objectives, activities or environmental gains desired.

- 6.3.4 It should be a clear principle that implementation of any marine conservation mechanisms in the seas, subject to the same risks and operational constraints, should build on such established frameworks and attempt to operate at roughly the same geographic scale. In so doing, there are also clear advantages in maximising the possibilities of integration and cooperation between marine conservation and other sectors. Certainly any nature conservation approach which incorporates such established principles and approach would be no worse off in terms of policing and management than any of the existing sectors of use. If such an approach was implemented, where problems were identified (eg enforcement being a particular example), there would be much more opportunity for common solutions to be sought for common problems, most likely at overall reduced financial costs within sectors.
- 6.3.5 Creating an approach which uses marine landscape units and associated targeted policy framework would provide the basis by which management could be actively encouraged, supported and achieved through targeted incentive schemes and eco-labelling systems. This flexible approach, which could be readily tailored to the particular management requirements of different marine landscapes, would also be flexible enough to include pelagic ecosystems and management of marine species where necessary. Thus ‘conservation boxes’ could be:
- permanent to address the particular needs of landscapes that are intrinsically sensitive to categories of human use; or
 - temporary to enable dynamic, particularly sediment, landscapes to recover from the pressures of human activities, especially particular fishing operations.
- 6.3.6 A temporary approach to some ‘boxes’ would, in effect, take areas out of fisheries production, and could be on a rotational basis for, say, five years or so, subject to review. Fishermen should have a large involvement in their location and management, and they could accordingly help bridge the gap between conservation and fisheries management.
- 6.3.7 Where conservation boxes were seen to be permanent policies might be:
- for the whole year, for landscape features of high sensitivity to particular categories of human use; or
 - seasonally based for seabirds, marine mammals or ‘temporary’ marine landscapes, such as those which are associated hydrography, including marine fronts which predictably form each year in roughly the same location.

In some areas, it might also be considered appropriate for policies to exclude all types of fishing throughout the year, such areas would equate to the ‘no take zones’ which have been the subject of recent debate and discussion in the UK.

- 6.3.8 By way of illustration, a key marine landscape might be seamounts with its associated communities. One or more of the best examples in UK waters could be delineated within a large ‘conservation box’. Simplistically, the policies within this ‘conservation

box', to achieve the conservation, protection and management of this feature and its associated wildlife, and encouraged by targeted incentives, might be:

- a presumption against any fishing activities which directly, or through by-catch, deplete populations of certain species of deep water fish which are so slow growing they can not be sustainably exploited (thus helping to implement a part of the relevant Biodiversity Action Plan); but
- a presumption in favour of particular fishing operations which do not impact the associated ecological communities of such features; and
- a presumption against exploratory and extractive actions which would damage the landscape and hence its wildlife.

6.3.9 Evidently this is a simplistic example, given the issues connected with regulation of fisheries in UK and European waters. It is presented, however, to illustrate the potential of the approach as an alternative to the more regulatory and data-intensive system used to implement 'traditional' marine protected areas, and one that can also embrace landscape, habitats and species, hydrography and earth science considerations at source.

6.3.10 It is interesting to note, however, with regard to this example, that the Common Fisheries policy allows Member States to act unilaterally if emergency action is required. It is not clear though whether this relates to commercial species or species of wildlife interest. What is clear, however, is that MAFF have now acted, on several occasions in recent years, on conservation grounds involving marine wildlife, thus taking positive and practical steps towards integration between fisheries management and marine wildlife conservation.

6.3.11 The establishment of 'conservation boxes' which blur the boundaries between fisheries management and nature conservation, could also provide the basis for more detailed consideration of 'effort' quotas. This would be instead of Total Allowable Catch (TACs) which equate to total allowable landings with the associated discards problem.

6.3.12 The use of policies that have a 'presumption against' specific activities over an area of sea would not totally preclude such activities from occurring, but would ensure that unintentional damage to particularly valued marine landscapes and their wildlife does not occur. The potential for providing a platform for environmentally based incentive schemes could result in greater acceptance of conservation mechanisms at sea.

6.3.13 This approach, of using conservation boxes, to target and achieve particular area-based gains for marine conservation would be comparable to area-based measures used to achieve gains by, for example, fisheries managers or oil and gas companies and regulators. Such actions, across sectors, must embrace the principles of sustainable development which now needs to include, at its centre, marine and coastal biodiversity indicators. A physiographic approach to marine protected areas would appear to have particular merits for offshore areas, where there are less data and fewer user groups, and would complement the use of traditional marine protected areas more prevalent in near-shore areas. The marine landscape approach could reduce the

increasingly complex mosaic of many small protected areas, with associated regulation, that might otherwise arise.

- 6.3.15 The financial considerations alone, of operating any marine conservation framework out to sea, are likely to drive the formal consideration and further development of ‘conservation boxes’ as a least burdensome way towards achieving site-based actions.

7. Overall framework design considerations

- 7.1 Previous sections have outlined in some detail key elements that could form parts of a framework for implementation of national-level marine conservation. There are, however, some final important considerations to be made in developing a framework and these relate to the relative distribution of effort, in the form of time and money, invested in the principal elements.
- 7.2 Whilst it is probably too soon to give definitive views on all aspects, what is becoming clear is that effort must be reasonably balanced across such a framework. At present effort is directed towards the establishment of European marine sites under the UK Regulations implementing the Habitats Directive. This does, however, seem to be to the detriment of measures for wider ranging species and overall ecosystem health. This is borne out, to a degree, by the emphasis in the discussions within the Working Group. Such issues must be addressed, although this may only be successfully achieved through increased capacity to handle such matters within Government and the conservation community.
- 7.3 What is also evident, is that at a broad level, there is an overall balance which must be achieved between species protection and ecosystem measures throughout the wider seas, and the numbers of area-based measures eg traditional marine protected areas and ‘conservation boxes’ that are established on the ground. Too few area-based measures and further damage may occur to sensitive marine landscapes, habitats and species. If, however, too many are put in place, the benefit of such measures as a conservation, protection or management tool may be eroded by overly complex enforcement and monitoring measures, or confusion due to the number of conservation initiatives in a given area. It would perhaps be wise to examine how other sea use sectors have tackled equitable issues to gain some insight into design elements, and equilibrium points which may, or may not have been reached, which could be used to further develop a suitable approach to national marine conservation in the UK.

8. Recommendations

- 8.1 If the approach outlined in this paper were to be taken forward, actions needed would include:
- the development of a regional/subregional seas focus to assist in implementing conservation initiatives across territorial and UK continental shelf waters. Based on a positive view from the DETR Working Group, JNCC would lead a process with the country agencies, Environment Heritage Services (Northern

Ireland), and invite other neighbouring countries to participate, in order to agree a framework, possibly by December 2000.

- the development of a comprehensive UK marine landscape classification system, its application to map all marine landscapes in UK waters, and the selection of marine landscapes targeted for conservation action. This would need to be integrated with the considerations of OSPAR, ICES and the European Environment Agency, and supported by establishing the relationship between abiotic landscape features and the MNCR biologically-based habitat system;
- further development, documentation and consultation over the 'conservation box' approach;
- the development of an appropriate legislative and policy framework to deliver the overall recommended framework and individual elements; and
- the development of linked and appropriate environmentally based incentive schemes and eco-labelling systems to foster and support delivery of the policy objectives.

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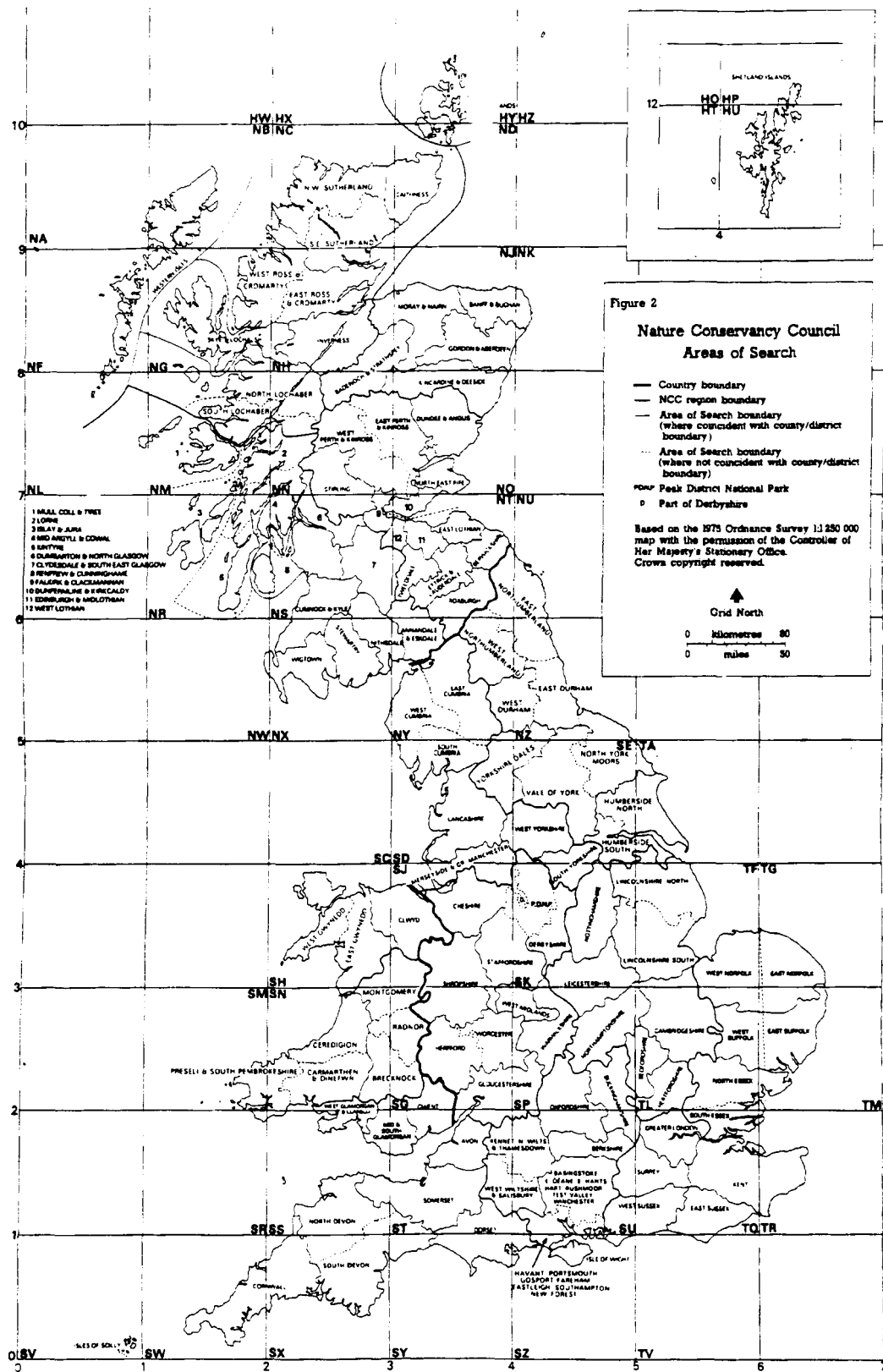


Figure 1 Areas of Search established by Nature Conservancy Council to select biological SSSIs on land (Nature Conservancy Council, 1989).

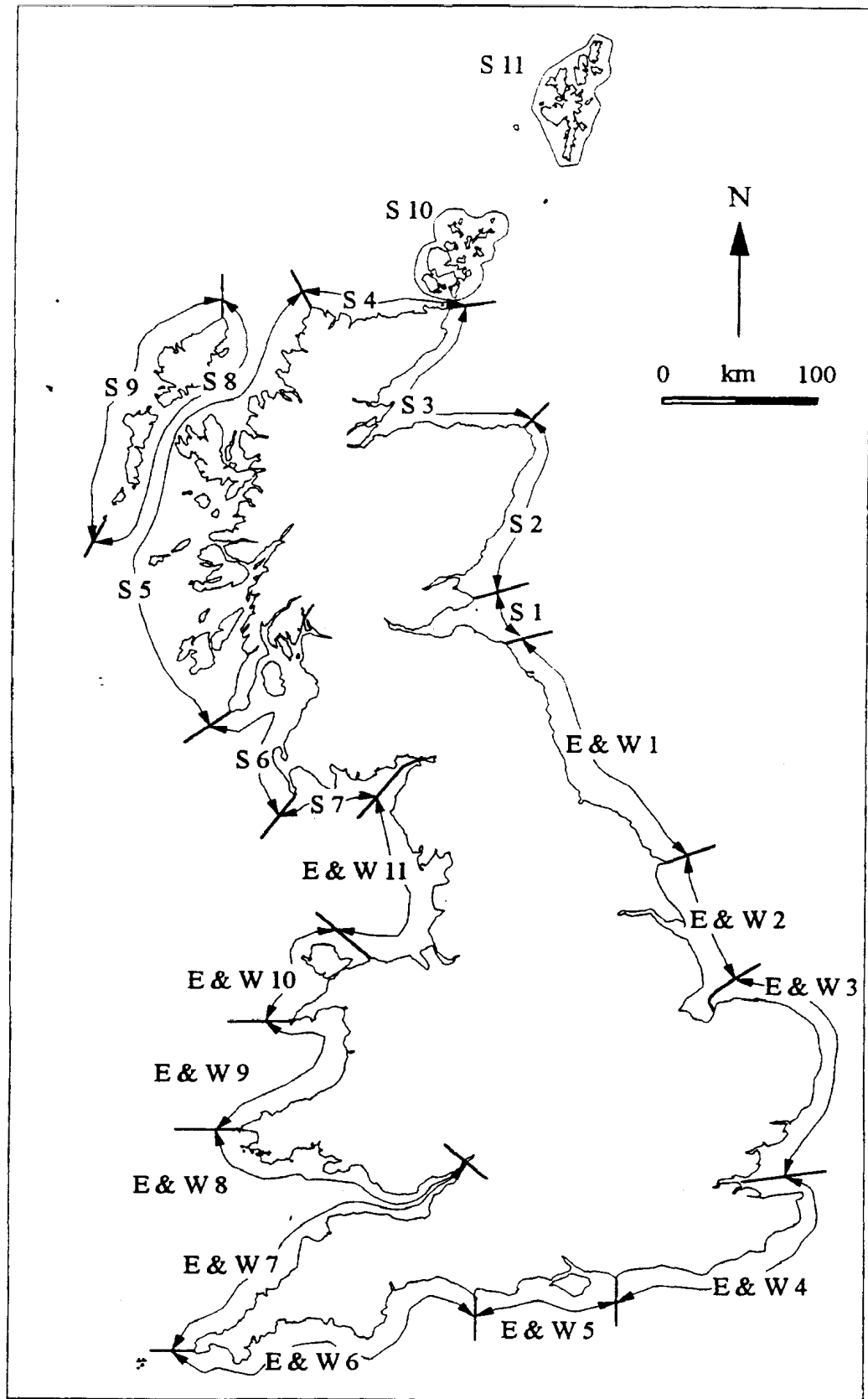


Figure 2 Areas of search developed by the Joint Nature Conservation Committee to assist in the selection of SSSIs for intertidal marine habitats and saline lagoons (Joint Nature Conservation Committee, 1996).

Biogeography of the OSPAR maritime area

Holopelagic, Shelf-Upper Continental Slope, Neritic, & Ice units combined

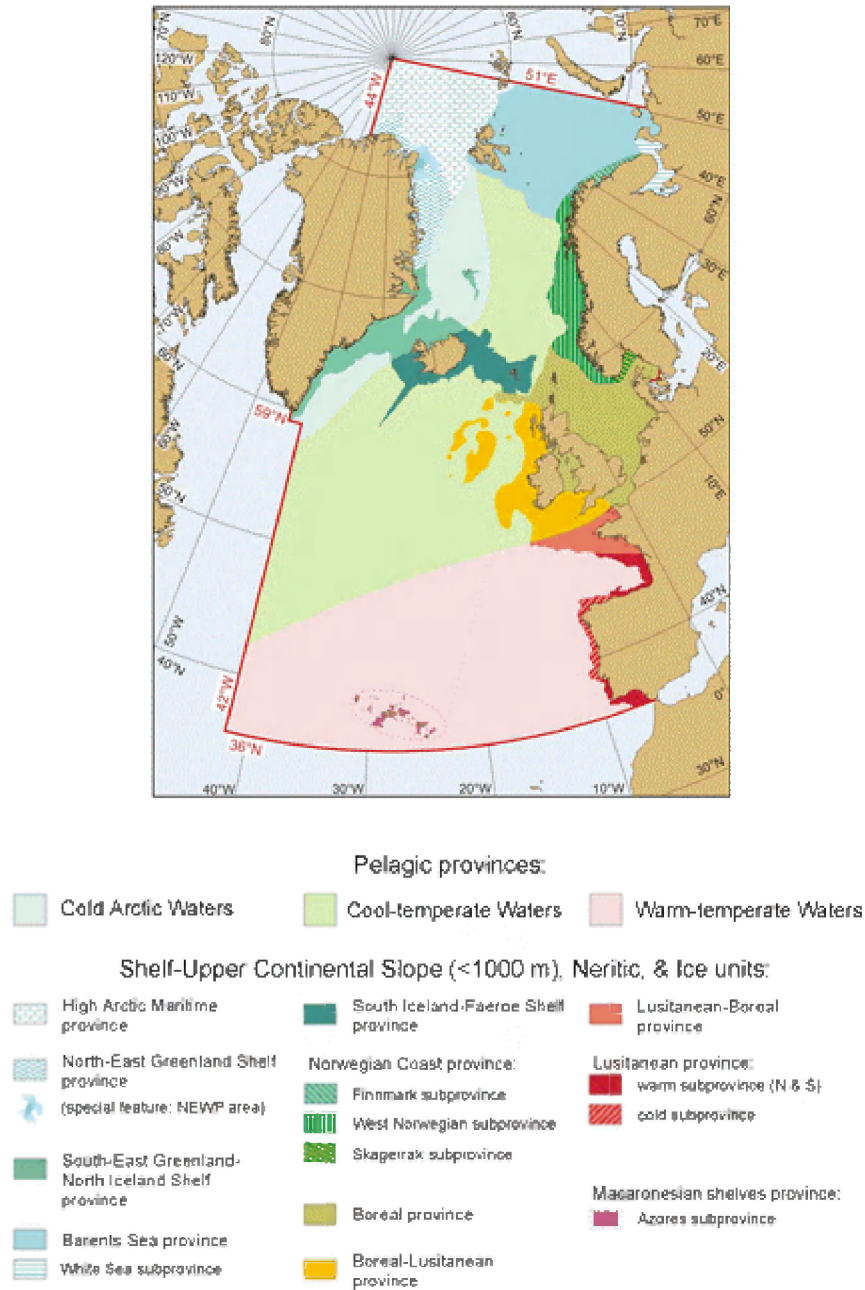


Figure 3 Proposed biogeographical regions of the OSPAR area (Dinter, 2000).

Table 1 Principle ‘nested’ elements of an implementation framework for the protection, conservation and management of nationally important marine wildlife in the UK

The figures for ‘likely scale’ are illustrative and should not be taken as a definitive guide.

Principle elements	Likely scale (km ²)	Implementation may include actions directed at:
Wider sea	ca. 780,000	<ul style="list-style-type: none"> the conservation, protection & management of wide ranging marine species; the maintenance of marine ecosystem health, including sustainability indicators & links between marine wildlife & principle issues, e.g. fishing, water quality etc.; better integration, planning & management of sea uses; ‘whole seas’ or greater, resulting from Directives, Conventions, legislation and policy; and understanding of marine environmental change - cause, effect & implications.
Regional/subregional seas	Ca. 6000 – ca. 70,000	<ul style="list-style-type: none"> gathering/disseminating marine conservation information & knowledge at the regional scale; using a regional framework for assessing the marine resources, integration with other sectoral uses & implementing regionally based initiative e.g. PSSAs providing a framework to support the selection of nationally important landscapes, habitats & species, & implement OSPAR proposals in due course; providing a regional delivery framework to enable national biodiversity objectives to be expressed at a more meaningful scale.
Marine landscapes	10’s – 10,000’s	<ul style="list-style-type: none"> mapping the extent & distribution of marine landscape types in all UK waters; the identification of marine landscapes requiring conservation action & dissemination of information on the remainder; the protection, conservation & management of marine landscapes, where needed, through application of appropriate measures, including area-based ‘traditional MPAs’ & new offshore mechanisms (e.g. ‘conservation boxes’ - a form of MPA).
Habitats and species	Ca. 0.01 – 100’s	<ul style="list-style-type: none"> habitat & species classification systems, & assessments of environmental sensitivity; the protection, conservation & management of individual marine habitats and species or complexes, where appropriate, through application of measures, including area-based approaches (see ‘marine landscapes’ above) & use of species protection laws.

Table 2 Proposed examples of physiographic types which occur in the OSPAR maritime area

This draws from the work of specialists from OSPAR, ICES and the European Environment Agency at the second workshop on marine habitat classification (Southampton: 18-22 September 2000), and incorporating concepts for pelagic systems from Hyrenbach, Forney and Dayton (2000 - in press).

Saline lagoons
Straits and Sounds
Estuaries
Bays
Fjord (sea lochs)(with or without sill)
Rias
Voes
Sand waves fields
Lag gravel pavements
Carbonate mound fields
Pockmark fields (gas seeps)*
Seamounts
Canyon systems
Channel systems
Deep sea sediment fans
Submarine ridge systems (including hydrothermal vents)
Iceberg plough mark zones
Sponge fields (with massive sponges or glass sponges) *
Coral grounds (scattered *Lophelia* or gorgonian fields)
Contourites (sand features)
Shelf slope
Enclosed 'deeps' on the shelf
Sandbanks and linear tidal sand ridges
Turbidites, slumps & slides
Mud basins
Shelf islands
Oceanic islands
Polynias
Sea ice
Glacial moraines
Marginal ice zone

Static bathymetric features - shelf break
Persistent hydrographic features - currents and frontal systems
Ephemeral hydrographic features - upwellings, eddies, ephemeral fronts

* not a true 'habitat complex' within the meaning of the EUNIS classification.