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*Strategic goals and objectives
for marine nature conservation,
and associated indicators*

English Nature Research Reports



working today
for nature tomorrow

English Nature Research Reports

Number 482

Strategic goals and objectives for marine nature conservation,
and associated indicators

Prepared for the Review of Marine Nature Conservation Working Group
by English Nature, the Countryside Council for Wales,
the Joint Nature Conservation Committee and
the Department of the Environment (Northern Ireland)

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Context

In 1999 the Department for Environment, Food and Rural Affairs (Defra, formerly 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 focused on territorial waters, but this position was revised in the summer of 2000 to cover the adjacent 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 five submitted by English Nature to the Working Group. The 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.

LAFFOLEY, D. d'A., CONNOR, D.W., TASKER, M.L. & BINES, T. 2000. Nationally important seascapes, habitats and species. A recommended approach to their identification, conservation and protection. Prepared for the DTR Working Group on the Review of Marine Nature Conservation by English Nature and the Joint Nature Conservation Committee. Peterborough: *English Nature Research Reports*, No. 392. 17 pp.

LAFFOLEY, D. d'A., BAXTER, J., BINES, T., BRADLEY, M., CONNOR, D.W., HILL, M., TASKER, M. & VINCENT, M. 2000. An implementation framework for 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. Peterborough: *English Nature Research Reports*, No. 394. 29 pp.

LAFFOLEY, D.d'A, VINCENT, M., CONNOR, D.W., HILL, M., & BREEN, J., 2002. Strategic goals and objectives for marine nature conservation, and associated indicators. Prepared for the Review of Marine Nature Conservation by English Nature and the Joint Nature Conservation Committee. Peterborough: *English Nature Research Report*, No. 482. 23 pp.

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

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Preface

English Nature, the Countryside Council for Wales, the Joint Nature Conservation Committee and the Department of the Environment (Northern Ireland) have compiled this report to support the work of the Review of Marine Nature Conservation.

The starting premise for this paper has been Defra's view that any strategic goals for marine nature conservation should fall from the Government's overall vision for the marine environment and overarching strategic goals, and take into account existing goals, objectives and targets developed under other fora. For the purposes of this paper we have assumed this to be inclusive of all relevant legislation, legal commitments and obligations.

Many of the existing goals, objectives and targets that Government has agreed to and that have been used to inform the setting of strategic goals in this paper are aspirational. Once strategic goals are agreed, a practical programme to make such aspirations deliverable will need to put in place. Given the timetables already agreed to by Government, putting such a programme in place should be viewed as a priority.

Whilst our current view is set out in this report, we raise three issues for consideration.

1. Strategic goals for marine nature conservation are being drawn from the Government's overall vision, and from existing goals, objectives and targets. The exercise of preparing strategic goals for marine nature conservation is important and should be completed. The question then arises as to whether there is a need for any *separate* goals for marine nature conservation or whether they should be a prominent feature of a comprehensive set of strategic goals for the marine environment as a whole? It is logical to presume that if strategic goals for the marine environment draw from the same sources, then it could be expected that they should be the same or similar to the strategic goals for marine nature conservation. This paper shows differences exist and could perpetuate a sectoral approach to maritime issues rather than the more integrated processes called for in *Safeguarding our Seas*;
2. More generally, greater thought needs to be given to the structuring of the vision-led approach for the marine environment. Further consideration should be given to adopting a single clearer hierarchy for our seas, involving a vision, strategic goals, strategic objectives, operational objectives, targets and indicators, as is already being implemented overseas, for example, in Australia. This paper uses this structure within current constraints. In the relevant section of the paper we accordingly refer to 'strategic objectives' for marine nature conservation to underpin strategic goals, rather than 'associated measures', but terminology may need further consideration.
3. The focus of this paper is on marine ecosystems, habitats and species. Marine geology and geomorphology are not included as we are unaware of any relevant goals, objectives and targets. This is an important gap that will require further consideration under the marine stewardship process.

Richard Leafé & Dan Laffoley
November 2002

1. Introduction

- 1.1 In the Interim Report on the Review of Marine Nature Conservation (DETR 2001), it was recommended, and subsequently agreed by Ministers, that a next step for the Review of Marine Nature Conservation Working Group (RMNC) should be to advise on a set of strategic goals for marine nature conservation, applicable as far as possible across the complete geographic spectrum from the high water mark to the limits of the UK Continental Shelf.
- 1.2 It was considered that this should include consideration of strategic marine planning, the extent of local authority jurisdiction, and the links with Integrated Coastal Zone Management. These goals could be informed by the formulation of an overall vision for marine nature conservation, which, if adopted by Government, should then either be promulgated as a policy statement and/or form the basis for any subsequent statutory duties.
- 1.3 In February 2002, the RMNC Working Group submitted recommendations for strategic goals for the marine environment to Defra for consideration within the Marine Stewardship Report then in preparation. These recommendations were set out in *Strategic goals for the marine environment* (Defra 2002a). It was recognised that these recommendations went beyond just nature conservation and would be subject to broad public consultation during 2002. It was intended that further detailed work to identify strategic goals for marine nature conservation would be undertaken in due course.
- 1.4 At the eleventh meeting of the RMNC, in June 2002, it was agreed that this work to develop specific strategic goals for marine nature conservation should commence. To follow up this decision, the RMNC Secretariat produced a paper, *Strategic goals for marine nature conservation* (Defra 2002b) to assist the further consideration of this issue by the RMNC Working Group. This paper stated that such strategic goals should:

".... fall from Government's overall vision for the marine environment and from [its] overall strategic goals. It should also take into account existing goals, objectives and targets developed under other instruments such as the Convention on Biological Diversity and the EU's 6th Environment Action Programme....."
- 1.5 This paper is a further contribution to the process of developing strategic goals for marine nature conservation. Its focus is on these strategic goals, the associated strategic objectives to underpin them, and the indicators needed to assess progress against them. It does not address the more detailed information and actions needed to translate strategic goals into operational and practical programmes. The paper is set within the context of the current state of maritime nature conservation (Covey & Laffoley, 2002), and of decisions by Government on relevant maritime issues at national, European and global levels.

2. A Government vision for the marine environment

- 2.1 Following on from the RMNC Secretariat's paper on *Strategic goals for marine nature conservation* (Defra, 2002b), it is important to ensure that any strategic goals for marine nature conservation, and supporting measures, integrate with the developing Government initiatives on the marine environment.
- 2.2 In consequence, the overall context for the paper is provided by the Government's vision for the marine environment. This is set out in the Marine Stewardship Report, *Safeguarding Our Seas* (Defra, 2002c) as:

“To provide for clean, healthy, safe, productive and biologically diverse oceans and seas.”

3. Possible strategic goals for the marine environment

- 3.1 This vision set out in paragraph 2.2 above is very broad ranging, going much wider than just nature conservation. It was in this context that the RMNC Working Group recommended *Strategic goals for the marine environment* (Defra 2002a).
- 3.2 The strategic goals for the marine environment recommended were:
- i. to conserve and enhance the overall quality of our seas, its natural processes and its biodiversity;
 - ii. to use marine resources in a sustainable and ecologically sensitive manner in order to achieve maximum environmental, social and economic benefit from the marine environment;
 - iii. to develop proposals for an integrated and ecosystem-based approach to marine management;
 - iv. to sustain economic benefits and growth in the marine environment by enabling and encouraging environmentally sustainable employment;
 - v. to increase our understanding of the marine environment, its natural processes and our cultural marine heritage; and
 - vi. to promote public awareness, understanding and appreciation of the marine environment and seek active public participation in the development of new policies.
- 3.3 It is within the context of these proposed goals that more specific goals for marine nature conservation should be developed. The goals set out above have yet to be agreed by Government and will be consulted on shortly as part of the ongoing programme of marine stewardship. Whilst strategic goals for marine nature conservation, and measures to achieve them, will affect all the goals set out in paragraph 3.2 above to some extent, they should particularly contribute to the first of them, namely ‘to conserve and enhance the overall quality of our seas, its natural processes and its biodiversity’.

4. Associated measures for strategic goals for the marine environment

- 4.1 To ensure that strategic goals for marine nature conservation, once adopted, can be achieved, the RMNC also recommended that they should be supported by a clear statement of the associated measures that need to be adopted by Government (Defra, 2002a). The RMNC Working Group considered that in working to achieve these goals the Government should:
- i. co-ordinate its activities with those of its agencies and with the devolved administrations to enable streamlined and effective mechanisms of regulation;
 - ii. make every effort to reconcile and accommodate competing needs and uses of the marine environment;
 - iii. make systems of regulation more transparent and reduce failures in their implementation;
 - iv. involve stakeholders in the development of new proposals through shared and participative policy-making processes;
 - v. ensure a fair and effective balance between regulation and voluntary initiative;
 - vi. base decisions on a clear understanding of natural processes;
 - vii. improve our expertise and capabilities in ocean-related biological and management science, technology and engineering; and
 - viii. have regard to the international importance of the marine environment and related legal obligations whilst ensuring we are still able to exercise our rights and jurisdiction over inshore and offshore areas and their resources.

5. Relationship to an ecosystem-based approach and strategic goals for marine nature conservation

- 5.1 In considering the proposed goals set out in paragraph 3.2 above, there is a need to ensure that they mesh with the principles of an ecosystem-based approach, set out in summary form in *Safeguarding our Seas* and in more detail by the Convention on Biological Diversity (Annex 1)¹. The principles of sustainable use also need to be addressed (Annex 2).
- 5.2 If, after further consultation, these goals are accepted as the broad framework for the marine environment, the RMNC Working Group had previously considered that they would form the basis from which the Working Group could then develop proposals for an integrated set of strategic goals for marine nature conservation.

¹ While the CBD uses the term 'ecosystem approach' as opposed to the term 'ecosystem-based approach' used in *Safeguarding Our Seas*, for the purposes of this paper the two wordings are taken to mean the same thing.

5.3 In this paper, in order to develop strategic goals for marine nature conservation, and given that the two processes are now running in parallel, the assumption has had to be made in this paper that goals for the marine environment the same as, or similar to, those in paragraph 3.2 above will be adopted by Government in due course. We do, however, raise questions in the preface to this report what the precise relationship between the two sets of strategic goals should eventually be.

6. Guiding principles for the development of strategic goals for marine nature conservation

6.1 In order to set the strategic goals for marine nature conservation, recommended in this paper, in the appropriate context, they have been developed to accord with a number of guiding principles.

6.2 These principles, many of which have been considered at a more general level by Government in *Safeguarding our Seas*, are that any strategic goals and supporting measures for marine nature conservation, will need to:

- i. focus on current ecosystem health and the principle human activities that impact on the state of our marine biodiversity and their ecosystems and processes;
- ii. aim to achieve measurable results for marine biodiversity, accepting that some tools and indicators may need to be developed to achieve this and that ecosystems are full of surprises and uncertainty;
- iii. integrate with existing and relevant government legislation, legal obligations, policy, goals, statements and agreements on maritime issues;
- iv. integrate with European and global legislation, principles, and decisions by Government relevant to marine nature conservation;
- v. be visionary, long-term and challenging, so as to be ‘strategic’; and
- vi. relate primarily to actions and activities, rather than administrative processes.

6.3 The context of each principle, and its consequence for strategic goals for marine nature conservation, is outlined below:

6.3.1 Focus on current ecosystem health and principle human activities that impact on the state of marine biodiversity and their ecosystems and processes

The government’s first stewardship report, *Safeguarding our Seas*, includes the adoption of an ecosystem-based approach. Strategic goals for marine nature conservation and supporting measures accordingly need to take an ecosystem perspective rather than only focusing on rare, threatened, or declining habitats and species. They also need to focus on the current health (state) of ecosystems and on the principle human activities that cause an impact. It is

evident that there is a difficult balancing act to be achieved in drafting any such goals. On the one hand, it is tempting simply to relate any strategic goals to required states for wildlife, whilst, on the other, there is a need to be precise and practical about actions that can be taken to achieve the end result. It seems that a hybrid approach is needed, neither approach, on its own, produces satisfactory solutions.

6.3.2 Aim to achieve measurable results for marine biodiversity, accepting that some tools and indicators may have to be developed to achieve this and that ecosystems are full of surprises and uncertainty

In setting any goals and objectives, it is important to draft them so that it will be evident when they have been met. When is enough, enough? This consideration covers both the phrasing of any goals and objectives and also the technical content. On the latter, it is important to consider, from the outset, what elements of ecosystems and wildlife would need to be monitored in order to track the progress of management actions towards providing a desired ecosystem state. Indicators for marine biodiversity have yet to be developed to underpin the UK Sustainable Development Strategy or the England Biodiversity Strategy. Indicators also require considerable scientific development to ensure that they function in a predictable fashion. There is, therefore, no agreed framework to work from to assist current deliberations. Tracking the cumulative effects of human activities on marine ecosystems is another important issue that has yet to be tackled, since current monitoring is not designed to report on overall health and status, but relates to statutory obligations. Informed judgments will, however, always need to play a role in assessment. This paper, therefore, briefly considers such indicators, although work on indicators is already being undertaken by Defra, separately, but alongside, the work of the RMNC. The section on indicators is, therefore, presented in order to help in the development of strategic goals and objectives, rather than in the context of indicator development *per se*.

6.3.3 Integrated with existing and relevant government legislation, legal obligations, policy, goals, statements and agreements on maritime issues

A fundamental principle is that of integration. Any recommendations need to mesh with existing and relevant government policy, goals, statements and agreements, so that they are at least as demanding, long-term and as strategic as any current position. Amongst these, Government has already agreed to:

- i. an ecosystem-based approach and the principles of integration of management and streamlining of decision-making processes, documented in *Safeguarding our Seas*;
- ii. a key environmental aim for Defra is to protect wild and endangered species of animals, birds, plants and marine life to enhance biodiversity, and the recognition that such benefits also extend to the economy, through tourism, and to society through the enjoyment and educational opportunities that biodiversity and wildlife offer (Defra, 2002d);
- iii. the role that non-extractive use areas (referred to in fisheries management as ‘no-take reserves’, or more recently ‘fish replenishment areas’) should be playing in marine resource management to aid recovery, through the recent Bergen Declaration from North Sea Environment Ministers, and papers of the reform of the Common Fisheries Policy; and

- iv. the agreement of the need to manage risks to genetic diversity and the gene pool, from the introduction of non-native and novel ‘genetically-modified’ organisms, in a comprehensive and integrated manner.

6.3.4 Integrate with European and global principles and decisions by Government that relate to marine nature conservation

At European and global levels there are a further range of goals, decisions and agreements that help form the basis from which to derive strategic goals and supporting measures for marine nature conservation. There are many aspects to these (see Defra 2002c for a summary) but the principle ones are:

- i. the objective of the OSPAR Convention’s Biodiversity Strategy ‘to protect and conserve the ecosystems and the biological diversity of the maritime area which are, or could be, affected as a result of human activities, and to restore, where practicable, marine areas which have been adversely affected’;
- ii. the decision by Heads of European Government at the European Summit in Gothenburg in June 2001 to the target to halt the decline of biodiversity across the European Union by 2010, subsequently and now adopted by the thirteen candidate countries under the Spanish presidency in July 2002 (The El Teide Declaration). The Habitats Directive is viewed as an important instrument amongst others to deliver this target;
- iii. the stated aim of the European Union’s 6th Environmental Action Programme (EC, 2001) ‘to protect and restore the functioning of natural ecosystems and halt the loss of marine biodiversity in the European Union and globally....’. Article 2 of the Programme identifies a key objective in achieving this aim as the ‘protection of biological diversity, in line with the Community’s biodiversity strategy’;
- iv. the European Community’s biodiversity strategy (EC, 1998), which states under the theme of ‘conservation and sustainable use of biological diversity’, that the Community should ‘seek the conservation and, where relevant, restoration of ecosystems and populations of species in their natural surroundings’;
- v. the European Commission’s strategy to protect and conserve the marine environment (EC, 2002), as a contribution to the Community Strategy for Sustainable Development, which has as its overarching objectives, ‘sustainable and healthy European seas and their ecosystems’, and ‘sustainable exploitation of renewable marine resources of the seas’. It also embraces the 2010 target to halt the decline in biodiversity as well as embracing a longer-term objective ‘to ensure a sustainable biodiversity through the protection and conservation of natural habitats and of wild fauna and flora’. In the first instance, it would be applied in European seas *inter alia*, by restoring marine ecosystems and re-establishing certain trophic levels that have been affected by human activities and by preventing the human-induced introduction of new non-indigenous species, genetically modified organisms and disease organisms;

- vi. relevant agreements made at the World Summit on Sustainable Development, held in Johannesburg in 2002. These are: to establish a regular United Nations system for marine monitoring by 2004; produce integrated water resources management and efficiency plans by 2005; encourage the ecosystem approach in marine management by 2010; establish representative marine protection networks by 2012; and to restore depleted fish stocks to maximum sustainable yields by 2015 ‘where possible’;
- vii. agreement under the Convention on Biological Diversity (CBD) to the principles of an ecosystem approach, as well as a common interpretation of Article 2 on sustainable use. The ecosystem approach puts the emphasis on management that maintains the core physical, chemical and biological processes that actually support the ecosystem in question. The adoption of an ecosystem approach to management ensures that the health of the ecosystem is maintained and that social values (such as fishing or recreation) can be enjoyed in a sustainable manner. The text that the Conference of Parties agreed to in 2000, and supporting principles of an ecosystem approach, is included as Annex 1. Sustainable use has been defined under Article 2 of the Convention on Biological Diversity as ‘the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations’. Details are provided at Annex 2;
- viii. The recent declaration by Environment Ministers from the North Sea Conference (The Bergen Declaration) making a commitment for marine protected areas in the North Sea by 2010.
- ix. agreements under OSPAR to reduce or eliminate the entry of various classes of contaminants into the marine environment.

In addition, there is a range of European Union legislation that *inter alia* is directed at sustaining marine biodiversity. Primary amongst this legislation is:

- i. the EC Habitats Directive (1992) which, in Article 2, requires measures to be taken so as to maintain or restore natural habitats and species of wild fauna and flora to a favourable conservation status, a goal which also has an analogy in relation to wild birds in the EC Birds Directive (1979);
- ii. the EC Water Framework Directive (2000) which requires measures to be taken *inter alia* to prevent further deterioration to, protect and enhance the status of aquatic ecosystems, including estuarine and coastal waters.

6.3.5 Visionary, long-term and challenging so as to be strategic

This concerns the need to establish strategic goals that present long-term and challenging targets that can be worked towards, rather than developing less demanding goals that lack the ambition to bring about real, and lasting change, and that could be seen simply as a re-labelling of current actions.

6.3.6 Related to actions and activities rather than administrative processes or considerations

The focus needs to be on actions and activities that deliver real changes on the ground, rather than creating administrative actions or bureaucratic processes that have little real impact for marine ecosystems and their wildlife.

7. Proposed strategic goals for marine nature conservation

7.1 The purpose of the strategic goals for marine nature conservation, having due regard to the principles of sustainable development, can be broadly summarised in the following way:

To ensure through the management of human activities that the marine environment of the UK is restored to, and maintained in, a state where it can sustain the variety and abundance of biodiversity naturally characteristic of it, while making a full contribution to the UK's social well being and economic prosperity.

7.2 Taking account of all the issues and principles outlined in the foregoing section, the following strategic goals for marine nature conservation have been developed. Dates relate to targets already agreed to by Government, whilst a clarification over principle aspects of the recommended goals, is provided in the text that follows.

7.3 Strategic Goals for Marine Nature Conservation

1. by 2010, to have halted the current deterioration¹ in the state² of the UK's marine biodiversity³, and, by 2015 to have ensured its recovery to the desired state⁴;
2. by 2015, to have ensured that the water quality⁵ of the UK's seas is capable of supporting the range of biodiversity naturally characteristic of them;
3. by 2010, to have ensured that the natural marine structures⁶ are protected from further damage, and that the seas' biological, physical and chemical processes⁷ are maintained in a state that can sustain the variety and abundance of biodiversity naturally characteristic of them;
4. by 2015, to have achieved the recovery of populations of the UK's fish species to a level where they can make a substantial and sustained contribution to the UK's food supply and provide a livelihood for the UK's fishing communities in the long-term, as well as making a full contribution to the natural food chain of which fish populations form an integral part;
5. by 2015, to have recovered areas of the sea and seabed that have sustained damage as a result of human activity so that they can support biodiversity;

6. after 2010 and 2015, respectively, to avoid subsequent deterioration in the state of biodiversity, or to water quality, processes or fish populations;
7. ensure that human activities which utilise renewable products and services⁸ provided by the marine environment can be sustained in the long-term without significant detriment to the environment, and that non-renewable products and services are utilised in a wise and environmentally-sensitive manner;
8. report on the state of the UK's marine biodiversity, and the water quality and processes that support it, on an adequate and regular basis, using the results to improve the effectiveness of management⁹ ;
9. use fully protected areas¹⁰, integrated where possible and in part with marine industry installations, as 'controls' to help provide a baseline against which to report on the impact of human activities and the effectiveness of management measures;
10. to have taken on the appropriate timescale measures necessary to achieve the Strategic Goals.

Where:

'Nature conservation' is taken to mean the same as section 131 of the Environment Protection Act 1990: 'the conservation of flora, fauna, geological or physiographical features'

- 1 **'deterioration'** means reduction in species richness, or reduction or decline in the range, viability and strength of species populations, reductions in trophic complexity of food chains, or reduction in the extent of relatively intact natural habitats and biological communities;
- 2 **'state'** of UK's marine biodiversity encompasses species richness, the range, viability and strength of species populations, the structure of food chains, and the extent of relatively intact natural habitats and biological communities;
- 3 **'desired state'** means a state whereby the objective given in paragraph 7.1 is essentially achieved; it includes the concept of favourable conservation status as set out in the EC Habitats Directive;
- 4 **'marine biodiversity'** is 'marine wildlife' and consisting of genetic material, populations, species, communities and other aggregated terms (eg seascapes, biotope complexes etc);
- 5 **'water quality'** means the physical character and chemical composition of the water, including clarity, temperature and nutrient and other chemical content;
- 6 **'natural marine structures'** means natural physical structures in the marine environment, including natural substrates, intertidal and undersea topography

and physiographic features, and structures of biological origin eg biogenic reefs;

- 7 **'biological processes'** means the range of biological processes needed to sustain biodiversity, including food-webs and the decomposition cycle, and the inter-relationships between species; **'physical processes'** include waves, tides, currents, the processes of erosion, sediment transport and deposition, thermocline development and breakdown; **chemical processes** includes natural chemical processes such as the nutrient and cycles and calcification;
- 8 **'products and services'** means any real or perceived benefit of whatever kind derived from the marine environment including benefit having a monetary, non-monetary or other value;
- 9 **'management'** includes relevant governance processes, and appropriate legislative, policy or guidance processes, including consideration of specific issues like strategic marine planning, the extent of local authority jurisdiction, and the links with Integrated Coastal Zone Management.
- 10 **'fully protected areas'** means areas where all extractive uses cease and other significant disturbance is minimized.

8. Relationship and integration between the strategic goals for marine nature conservation and existing goals, agreements and principles

- 8.1 The foregoing Strategic Goals have been informed by the range of obligations and commitments, which the UK has entered into over the past decade. For example:
 - i. The reference to 'restore and maintain' with regard to the state of the UK's marine biodiversity, reflects Article 2 of the EC Habitats Directive which requires measures to be taken to maintain or restore natural habitats and species to a favourable conservation status. The 2010 date reflects the Heads of Government target for EU Member States to halt the decline in biodiversity by that date. Essentially, similar commitments derive from OSPAR, the 6th Environmental Action Programme, the EU Biodiversity Strategy and the EU's emerging thematic Strategy for the marine environment;
 - ii. the reference to 'water quality' reflects the obligations arising *inter alia* from the Water Framework Directive and the date of 2015 reflects the obligation to achieve environmental objectives under that Directive, it conforms to the adoption of the ecosystem-based approach by Government in the first Stewardship report;
 - iii. the reference to 'physical, chemical and biological processes' again reflects the ecosystem-based approach adopted in the first Marine Stewardship Report, its

being a fundamental principle of the Convention on Biological Diversity and the recent agreement at the World Summit on Sustainable Development to encourage the adoption of the ecosystem approach by 2010;

- iv. the reference to 'recovery of fish' populations by 2015 is based on the recent agreement at the World Summit on Sustainable Development.

8.2 The strategic goals for marine nature conservation are founded on the principles of ecologically sustainable development. Maintaining a healthy, functioning natural system is key to the delivery of sustainable access to high quality resources and amenities, and to accommodating the community's full range of economic, social and ecological aspirations.

8.3 To achieve this goal requires a significant and lasting shift in perceptions away from viewing marine nature conservation as an unwelcome constraint to it being seen as an essential tool to help deliver positive economic and environmental benefits. If ecosystem functioning were impaired these essential environmental services would be extremely costly to restore, or replace, if indeed this was possible.

9. Strategic objectives for marine nature conservation

9.1 In a similar way that the RMNC felt it necessary to recommend supporting measures, eight supporting strategic objectives (see preface with regard to terminology issues) are identified below to help achieve the strategic goals for marine nature conservation and to ensure that such issues are placed at the heart of the marine stewardship process. Further development of these strategic objectives is likely to be needed:

- i. **adopt an ecosystem-based approach** to management that incorporates, to the extent appropriate, the principles summarised in Annex 1. This will necessitate full use of the **precautionary principle** and **adaptive management**;
- ii. **ensure sustainable uses** - ensure that human uses are compatible with the principles of sustainable use, the ecosystem-based approach and the maintenance of ecological integrity and biological diversity;
- iii. **implement effective protection** - introduce effective management regimes for the protection and conservation of marine natural structures, processes and biodiversity, to ensure human uses are sustainable. This will require increasing the existing protection afforded to marine biodiversity across the marine environment as a whole, principally by ensuring that all relevant marine policies, plans and programmes and projects provide effective protection for marine biodiversity. This will also need to include enhanced use of site-based mechanisms, such as establishing fully representative networks of marine protected areas to conserve sensitive biological communities, and the use of highly protected areas to support the replenishment of fish stocks and assist in the recovery of marine biodiversity;
- iv. **halt deterioration and achieve recovery** - halting deterioration and achieving the recovery in the state of marine ecosystems and the associated biological

diversity, to a state where the ecological integrity of the system is fully restored; this will include the taking of general measures to avoid harm to the marine environment. It will also require priority action for those parts of ecosystems, habitats and/or species already under decline, threatened, vulnerable or at risk. This should not, however, be at the cost of actions directed at halting decline across the marine environment as a whole;

- v. **maintaining the gene pool** - maintaining the genetic quality and diversity of the marine gene pool through increased awareness and coherent risk management at national and European levels;
- vi. **providing effective management of risk** – extending the use of strategic and environmental impact assessment to integrated area assessments, better use of the precautionary principles and widening of management options to embrace a greater range of management approaches including the setting aside of areas from extractive human uses. Risk management should be taken to encompass the full range of risk, both from direct impacts, indirect impacts (eg pollution) or from impacts that have a temporal lag (eg introduced species);
- vii. **increase our understanding of the marine environment and natural processes** – principally to feed-back into more effective management of human activities;
- viii. promoting and increasing public awareness, understanding and appreciation of the marine wildlife and the environment and its resources – this is an important issue given that so many goods and services stem from having a healthy and productive marine environment.

10. Assessing progress towards meeting strategic goals for marine nature conservation

- 10.1 In developing strategic goals for marine nature conservation an important consideration concerns thinking early enough about how progress towards any such goals would be assessed. This is so that any issues that arise can be integrated with any similar activities that may be going on or planned.
- 10.2 Therefore, within the development of strategic goals for marine nature conservation, it is important to note that Government is currently embarked on plans to prepare, for 2004, a *State of the Seas Report* as part of the marine stewardship process. Work is already underway to examine how this may be best achieved and how monitoring and reporting activities can be best integrated to report against objectives. The purpose of this section is accordingly not to suggest duplication of such work but to raise issues for consideration by other Defra activities working alongside the RMNC.
- 10.3 Current monitoring actions are directed towards the preparation of Government goals for marine environmental monitoring to support an overall UK Strategy for Marine Monitoring. The current view on how the four sectors for UK marine monitoring activity can be brought together is shown in Figure 1. The idea is to use the results from the four sectors to make a ‘holistic’ comprehensive assessment of the state of the

UK marine environment, and thereby contribute to a more ‘ecosystem-based’ approach to marine environmental management. Further consideration will need to be given to links with current monitoring for key contaminants in the marine environment and in biota, and to the need for the development of additional monitoring, as well as indicators, to demonstrate the effectiveness of pollution control measures.

- 10.4 When considering such plans against the need to track progress against the strategic goals for marine nature conservation, or indeed the state of the marine environment, a problem becomes evident. This is becoming more widely acknowledged, and is perhaps better demonstrated in Figure 2, which attempts, in a simple way, to conceptualise the principle families of indicators that would be required to report against any goals that relate to any ‘state’ of marine biodiversity and ecosystems.
- 10.5 Much attention of late has been directed towards the development of political indicators and, for example, through the Ecological Quality Objectives work in the North Sea and ICES, the development of indicators related to manageable activities. Whilst it is undoubtedly the case that both types of indicators are required and are of considerable value, taken together they will not be sufficient to allow reporting on ‘state’ due to the synergistic effects human activities have on the marine environment – a fact well documented in the scientific literature on how human interactions have changed the UK marine environment over time.
- 10.6 To report against the recommended strategic goal for marine nature conservation a third family of indicators should be recognised, which focus on appropriate components of ecosystem state. Some provisional ideas on the range of possible indicator areas available, orientated to marine ecosystem and components of marine biodiversity, are suggested in table 1 in order to stimulate debate. This has been devised with due regard to data currently being gathered, and methods published and reported on in peer reviewed journals, and the nature of marine ecosystems and biodiversity components. It is important to realize that ‘state’ indicators resulting from synergistic effects would need to operate on a different basis to indicators identified, for example, by ICES. They differ in that they do not relate to a single manageable activity and this would need to be taken into account in their selection and use. Issues concerning who would be responsible for their identification and measurement are of particular importance at this time.
- 10.7 A debate needs to occur on this issue in order to decide how best to take such issues forward alongside current work considering marine monitoring. The challenge to the marine stewardship process is to bring together the complete family of indicators for the marine environment in such a way that is streamlined, represents value for money and provides a quantified perspective on progress and how marine biodiversity, ecosystems, functions and processes responds to changes in management regimes.

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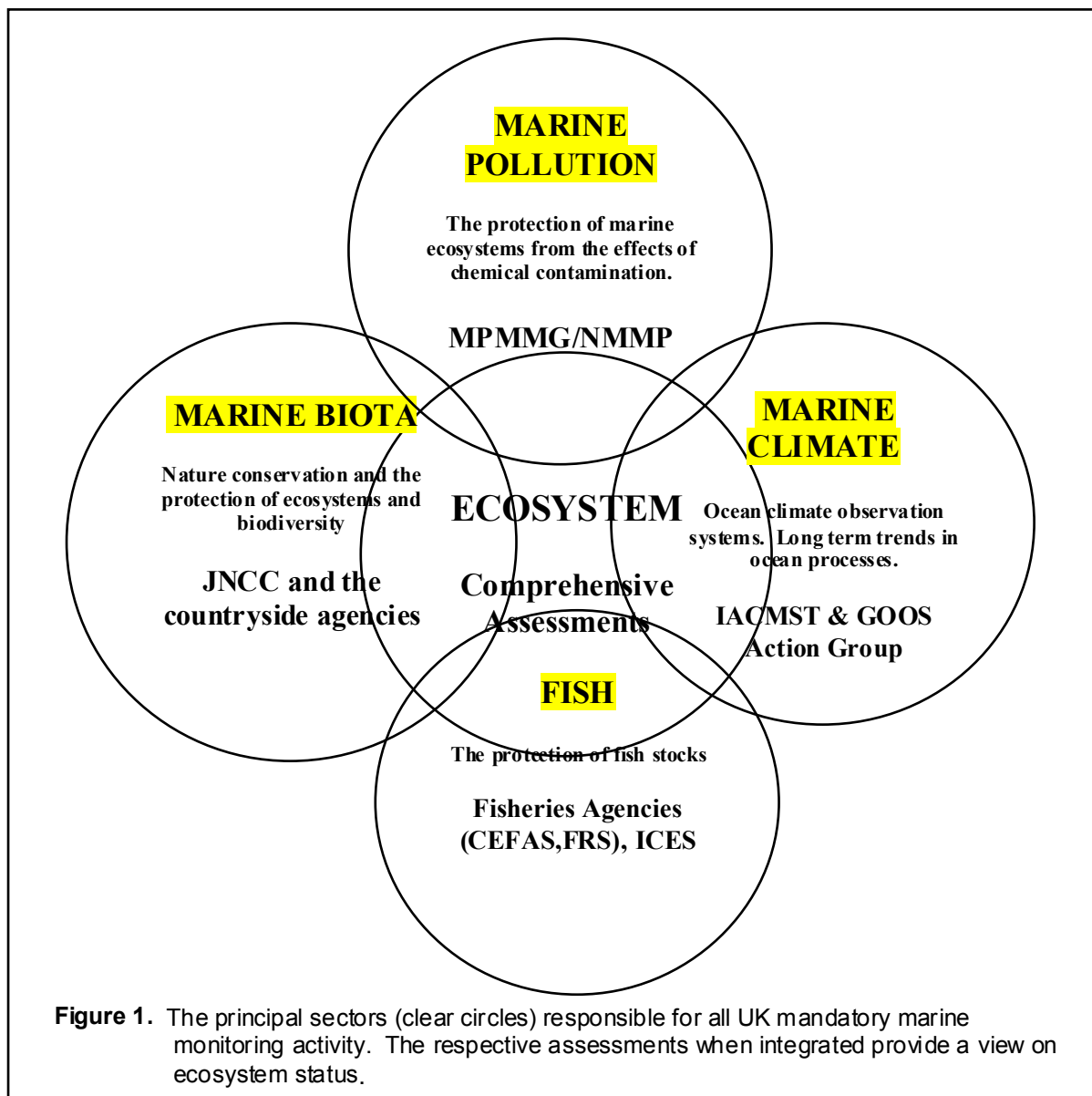


Figure 1 The principal sectors (clear circles) responsible for all UK mandatory marine monitoring activity. The respective assessments when integrated provide a view on ecosystem status

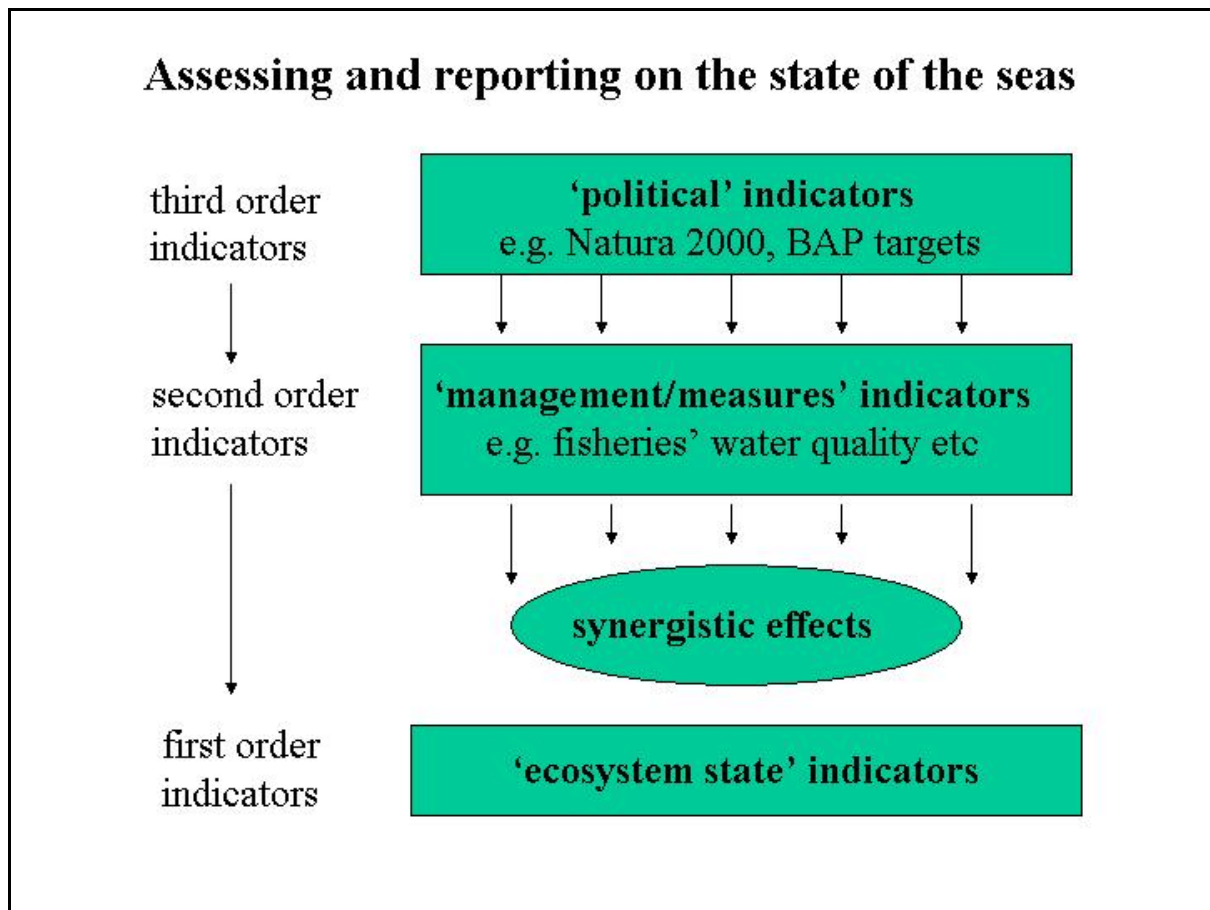


Figure 2. Conceptual diagram of the families of indicators required to report on the state of marine ecosystems. Table 1 Summary of some possible indicators of the status of marine ecosystems and associated components of marine biodiversity

Table 1 Summary of some possible indicators of the status of marine ecosystems and associated components of marine biodiversity

Ecosystem focus	Indicator/indicator area	Progress tracking against goal
Food webs - Productivity - Trophic structure	Plankton/chlorophyll Average trophic level	SAHFOS to advise A halt in the decline in trophic structure of marine ecosystems and subsequent recovery of structure
Species assemblages	Fish assemblages Sediment assemblages Reef assemblages	Recovery of assemblage Recovery of assemblage Recovery of assemblage
Habitats	Quality and extent Diversity	Maintenance of quality and extent of irreplaceable habitats Maintenance in quality and extent of fragile and/or sensitive habitats, and increase area and recover quality where impacted Reduction in levels of contaminants in water, sediment and biota Maintain current diversity of habitats and recover where impacted
Species	Range Size Cohorts Abundance	Expand range of slow growing, long-lived and/or low fecundity species Halt downward trends in populations and increase average size Expand age classes present in populations Increase abundance of slow growing and/or low fecundity species
Maintaining the gene pool	Extinctions Range reduction Vitellogenin precursor? Niche disruption including cross-breeding	Prevent extinctions at local, regional, national and global levels Prevent anthropogenically determined range reductions Prevention of levels of endocrine disruption that interfere with reproductive behaviour Prevention of introduced and/or genetically modified organisms displacing or interbreeding with native flora and fauna

Annex 1: The Conference of Parties on the Convention on Biological Diversity (COP5 in 2000 & COP6 in 2002) agreed the following:

The 12 principles recommended by the Conference of Parties of the Convention on Biological Diversity to guide signatory countries in the practical application of the ecosystem-based approach

The objectives of management of land, water and living resources are a matter of societal choice

Management should be decentralised to the lowest appropriate level

The ecosystem approach should be undertaken at the appropriate spatial and temporal scales

Recognising the varying temporal scales and lag-effects that characterise ecosystem process, objectives for ecosystem management should be set for the long-term

Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems

Recognising potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: reduce those market distortions that adversely affect biological diversity; align incentives to promote biodiversity conservation and sustainable use; and internalise costs and benefits in the given ecosystem to the extent feasible

Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach

Ecosystems must be managed within the limits of their functioning

Management must recognise that change is inevitable

The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity

The ecosystem approach should consider all forms of relevant information including scientific and indigenous and local knowledge, innovations and practices

The ecosystem approach should involve all relevant sectors of society and scientific disciplines

Annex 2: Sustainable use and the Convention on Biological Diversity

Sustainable use is defined in Article 2 of the Convention as:

“Sustainable use means the use of **components 1** of biological diversity in a way and at a rate that does not lead to the **long-term 2 decline 3** of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations”.

The workshop in Hanoi defined the three key phrases in the definition of the Convention text:

Key phrase 1

Five components of biodiversity are recognized:

- a. Genetic material
- b. Populations
- c. Species
- d. Communities
- e. Other aggregate terms (eg “vegetation”)

Key phrase 2

Long-term means five human generations or 100 years. This time frame is intended to be used as a moving window and refers primarily to the future use potential of a resource by people. This time span approximates the present generation, parents and grandparents, children and grandchildren as a realistic human timescale for resource use. The management of biological resources requires a shorter time period linked to the life history of the species concerned. Whenever one or more indicators show that a form of use is not likely to be sustainable, remedial action should be taken.

Key phrase 3

Decline is defined in the context of each of the five recognized components of biological diversity:

- a. *Genetic material*

“A measurable reduction in any appropriate measure of genetic diversity in a population”.

- b. *Populations*

“A measurable reduction in the distribution and numbers of individuals of a population or increase in fragmentation or decrease in size of population range”.

- c. *Species*

“A measurable reduction of the total number of individuals, populations or geographical races of a species or increase in fragmentation or decrease in size of a species’ range below the limits necessary for the maintenance of viable populations”.

d. *Communities*

“A measurable reduction of the number, variety and composition of species within a defined management area”.

e. *Other aggregate terms (eg “vegetation”)*

“A measurable reduction in the extent or amount of the biotic component within the management area; a measurable decrease in the provision of ecosystem services and goods”.

In other words, the definition of Article 2 can now be operationalised for each component of biological diversity:

a. **Genetic material**

*“Sustainable use means the use of **genetic material** in a way and at a rate that does not lead to a measurable reduction in any appropriate measure of genetic diversity in a population within five human generations or 100 years, whichever is shorter, thereby maintaining its potential to meet the needs and aspirations of present and future generations.”*

b. **Population**

“Sustainable use means the use of a population in a way and at a rate that does not lead to the measurable reduction in the distribution and numbers of individuals of a population or increase in fragmentation or decrease in size of population range within five human generations or 100 years, whichever is shorter, thereby maintaining its potential to meet the needs and aspirations of present and future generations.”

c. **Species**

*“Sustainable use means the use of **a species** in a way and at a rate that does not lead to a measurable reduction of the total number of individuals, populations or geographical races of a species or increase in fragmentation or decrease in size of a species’ range below the limits necessary for the maintenance of viable populations within five human generations or 100 years, whichever is shorter, thereby maintaining its potential to meet the needs and aspirations of present and future generations”.*

d. **Communities**

*“Sustainable use means the use of **a community** in a way and at a rate that does not lead to a measurable reduction of the number, variety and composition of species within a defined management area within five human generations or 100 years, whichever is shorter, thereby maintaining its potential to meet the needs and aspirations of present and future generations”.*

e. **Other aggregate terms (eg “vegetation”)**

*“Sustainable use means the use of **vegetation [phytomass]** in a way and at a rate that does not lead to a measurable reduction in the extent or amount of the [vegetation cover] within the management area; a measurable decrease in the provision of ecosystem services and goods within five human generations or 100 years, whichever is shorter,*

thereby maintaining its potential to meet the needs and aspirations of present and future generations”.

The measurement of aspects of decline, as contained in the definitions developed in Hanoi, was discussed by the Salinas workshop also in the context of adaptive management.



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Top left: Using a home-made moth trap.

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Middle left: English Nature bat warden with a whiskered bat near Holme, Devon.

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Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.

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Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.

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