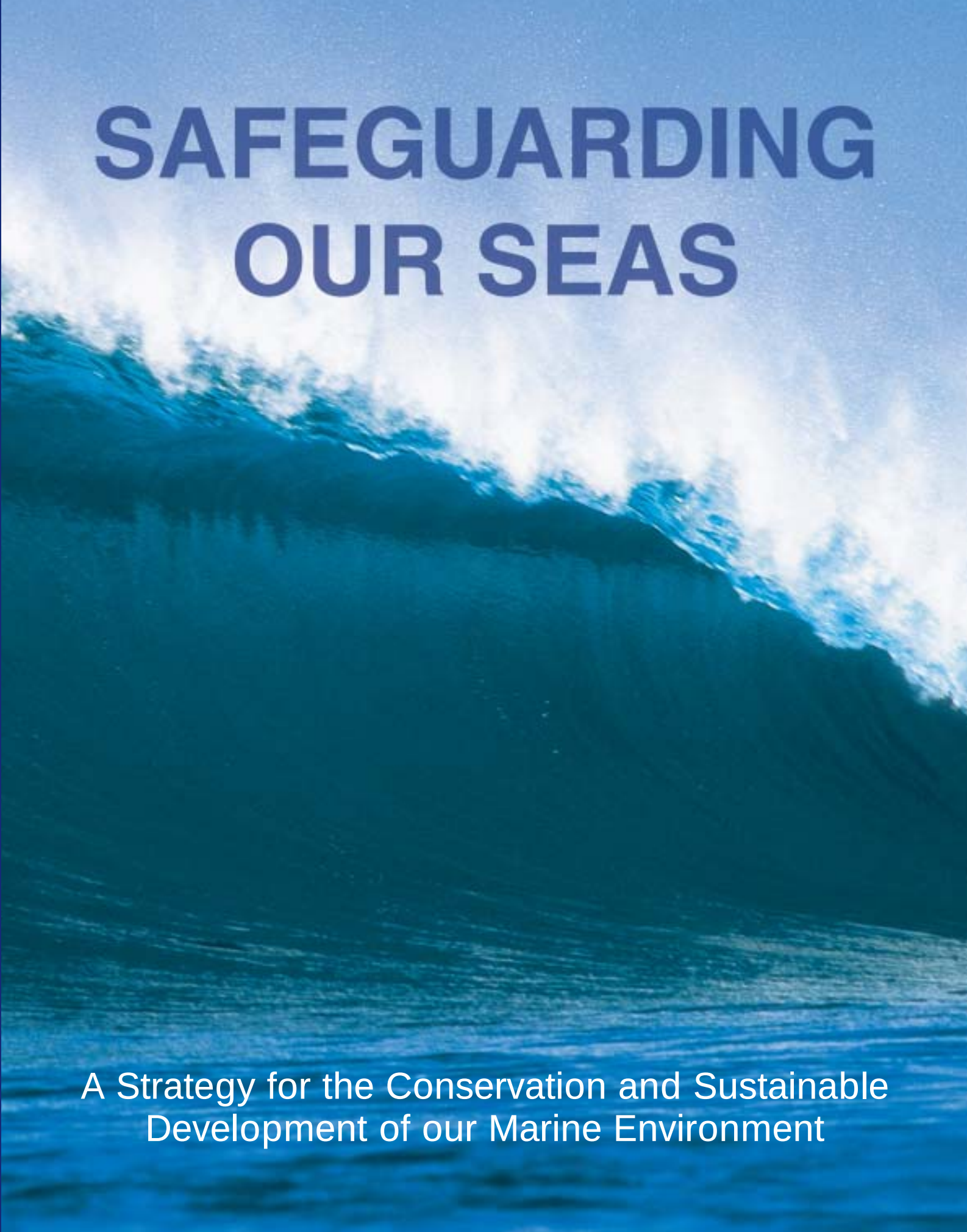

SAFEGUARDING OUR SEAS

A Strategy for the Conservation and Sustainable Development of our Marine Environment

DEFRA
Department for
Environment,
Food & **Rural Affairs**

DEFRA
Department for
Environment,
Food & Rural Affairs

SCOTTISH EXECUTIVE

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

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Foreword

By the Rt Hon Margaret Beckett MP
Secretary of State for Environment, Food and Rural Affairs

In the UK, we have made good progress in tackling the problems facing our oceans and seas. But we must do more nationally and internationally to tackle the threats that remain if we are to safeguard our seas for future generations.

These threats are very real. Many commercial fish stocks are overexploited. Industrial waste continues to find its way into the world's oceans. Ecosystems can be destroyed by invasive non-indigenous species. And the effects of climate change on marine habitats and species are potentially enormous.

There is an urgent need for a coherent and integrated approach to face up to these threats and conserve marine biodiversity. *Safeguarding Our Seas* provides this. It sets out our vision for our marine environment and details past achievements. But more importantly it contains new ideas and initiatives to show how we will work to turn our vision into reality.

It describes how our initiatives will enhance marine nature conservation and conserve biodiversity. They will also improve management of our marine resources and develop scientific research to help us make more informed policy decisions. Our initiatives will also streamline regulation for those who make their living from the sea whilst better protecting the marine environment. And they will involve stakeholders in making the decisions that affect them.

I am grateful to the devolved administrations and other stakeholders who helped to prepare this report. In particular, the Scottish Executive contributed fully to the drafting of the report and hosted one of our stakeholder workshops in Edinburgh.

But this report is only the first step. Much remains to be done if we are to turn our vision into reality. We must not underestimate the challenge that lies ahead. Oceans and seas make up over 70 per cent of the surface of our 'blue planet'. That gives some indication of the size of the task we face in safeguarding our seas. Delivering our vision requires commitment and perseverance from us all. We owe it to future generations to succeed.

Margaret Beckett

Rt Hon Margaret Beckett MP

Executive summary

Our vision for the marine environment is clean, healthy, safe, productive and biologically diverse oceans and seas.
Within one generation we want to have made a real difference.

We need to use the resources and opportunities offered by our oceans and seas while protecting ecological processes and ecosystems. This is the foundation for sustainable development.

We can achieve our vision by adopting an ecosystem-based management approach. We formally endorsed this at the *5th North Sea Conference* in March 2002.

For the UK, and our Overseas Territories and Crown Dependencies, the principles that underpin our policy for the marine environment are:

- sustainable development – the needs of future generations should not be compromised by the needs of people today;
- integrated management – looking at the wider picture so that all those who manage or influence the marine environment work together at all levels with a common understanding;
- conservation of biological diversity – conserving and enhancing biological diversity within the UK and contributing to the conservation of global biodiversity;
- robust science – understanding the processes and influences that impact on the marine environment and using research to inform policy-making and marine management;
- the precautionary principle – sensibly erring on the side of caution where the scientific evidence is not conclusive; and
- stakeholder involvement – involving all stakeholders so that they are an integral part of the decision-making process.

Chapter 1 of this report sets out our vision. Subsequent chapters set out what has already been achieved and current policy for the full range of activities that take place in UK waters and the coastal zone such as fishing, aquaculture, shipping, ports, offshore oil and gas extraction and offshore renewable energy. The final chapter draws out the role of marine science in policy-making which is inherent in the preceding chapters.

Most importantly this report sets out how we will work to achieve our vision by developing new ideas and initiatives, particularly at the cross-cutting level. New initiatives include:

- protecting important habitats – we will announce the first sites to receive Special Area of Conservation and Special Protection Area status under the *Habitats and Birds Directives* beyond 12 nautical miles later this year;
- improving marine conservation in the UK – we will follow up the *Interim Report of the Review of Marine Nature Conservation* by testing some of the ideas developed during the review in a regional seas pilot scheme in the Irish Sea. The pilot scheme will start in May 2002;
- pressing for sustainability – we will work with the European Commission to implement its fisheries biodiversity plan and to ensure that the review of the Common Fisheries Policy gives full weight to sustainability and biodiversity matters;
- becoming more integrated – we will explore the role of spatial planning for the marine environment and provide a focal point to build on existing seabed mapping for coastal waters around the UK;

- working more effectively – we will review the regulatory framework affecting development in the coastal area with a view to simplifying the regulatory system and protecting the marine environment;

- improving co-ordination in Government – we will examine how to improve co-ordination of the granting of consents between Government departments for activities that affect the seabed and how the granting of individual consents might be made more efficient;

- assessing progress – we will work with other countries at the regional level to develop indicators – Ecological Quality Objectives – for the sustainable management of our marine environment;

- involving stakeholders – the English, Welsh and Scottish Coastal fora and Northern Ireland stakeholders will explore how the European Commission Recommendation on Integrated Coastal Zone Management should be implemented;

- delivering development goals – we will use the 2002 World Summit on Sustainable Development to emphasise the contribution that sustainable marine management can make to food security, poverty eradication and wider development;

- affording more protection to marine species and habitats on the high seas – we will explore with other countries, and through appropriate international bodies, the case for, and the feasibility of, marine protected areas on the high seas;

- better international co-operation – we will push for greater co-operation and co-ordination between countries at the international and regional level and within the United Nations, its agencies, regional fisheries organisations and regional fisheries conventions, and for a truly global membership of the key international maritime agreements and bodies;

- improved marine scientific research – we will review the arrangements for marine research to ensure that we have the science base to under-pin our policy goals; and

- effective monitoring – we will develop our environmental monitoring framework and produce an integrated assessment of our seas in 2004.

Much work remains to be done on a number of fronts to take these initiatives forward. Stakeholder involvement will be crucial. As a first step we will hold a workshop this autumn to consider how best to achieve our vision. We will also consult by the end of this year on the scope and content of subsequent marine stewardship reports, which will show how we are implementing our vision and note progress made.

Some policy matters covered in this report are the responsibility of the devolved administrations. The Scottish Executive and National Assembly for Wales were integral to the preparation of this report. The Northern Ireland Executive has monitored progress of the report and will wish to consider the implications for Northern Ireland.

Our vision and its delivery

- **We depend on the oceans and seas to help meet our economic and social needs. At the same time, they contain unique habitats and diverse forms of life.**
- **Our vision is one of clean, healthy, safe, productive and biologically diverse oceans and seas. Within one generation we want to have made a real difference by building on the progress already made.**
- **We are putting an ecosystem-based approach at the heart of our strategy to reconcile conservation objectives and individual needs.**
- **We will deliver our vision by pursuing policies that promote sustainable development, integrated management, stakeholder involvement, robust science and the precautionary principle.**

Porpoise – one of over 44,000 marine species

THE IMPORTANCE OF OUR OCEANS

1.1 Oceans and seas cover over 70 per cent of the Earth's surface. They are a major and distinct source of the world's biodiversity and natural resources. Without them, there would be no life on our planet.

1.2 The waters around the UK are incredibly diverse and productive. They are influenced by colder arctic waters in the north, temperate waters more usual at this latitude and warmer influences such as the Gulf Stream.

1.3 Our understanding of marine ecosystems is still far from complete, but up to half of the UK's biodiversity – over 44,000 species – may be found in our seas. New species and habitats, such as the Darwin Mounds cold water coral reefs off the North West of Scotland, are still being discovered.

1.4 Our oceans and seas offer us food, both from fishing and aquaculture, and opportunities to exploit renewable energy sources such as wind power. And on or under the seabed there are minerals and energy supplies.

1.5 More than half of the world's population lives within 60 km of the coast. Some 950 million people, mainly in the developing world, rely on the marine environment for their primary source of protein. Their health, and indeed the general health of our planet, depends in no small part on the condition of our oceans and seas.

1.6 In addition, 98 per cent of world trade by volume – about 5.5 billion tonnes – is transported by sea. The full range of marine-related activities in the UK – including fishing, tourism and offshore oil and gas extraction – has been estimated to contribute some 3 to 4 per cent of GDP and directly employ around 423,000 people.[1]

OUR VISION

1.7 As an island nation, the seas and the life they contain are an integral part of the UK's national identity and are an important part of the common heritage of mankind.

1.8 Within the framework of the *United Nations Convention on the Law of the Sea* (UNCLOS[2]) and international law, our vision for the marine

[1]UK Marine Industries World Export Market Potential – a report for the Foresight Marine Panel: Douglas-Westwood Associates, October 2000.
[2]UNCLOS came into force in 1994. It contains a legal framework covering navigation, maritime boundaries, fisheries, the marine environment and marine scientific research. To date, 138 states are members, including the UK. We strongly support it and encourage all states to join.

environment can be summarised as working for clean, healthy, safe, productive and biologically diverse oceans and seas. Within one generation we want to have made a real difference to tackling the threats that marine ecosystems face. This vision covers all oceans and seas and their adjacent coastal areas. It is a long term vision, but one that requires short to medium term outputs, targets and aspirations.

1.9 In recent years we have made real progress in protecting the seas around our own coasts and we have played a full part in European and international efforts to protect the oceans regionally and globally. But much more still needs to be done if our oceans and seas are to be used wisely.

Our vision for the marine environment:

"clean, healthy, safe, productive and biologically diverse oceans and seas"

We want to see this both nationally and globally. Within one generation we want to have made a real difference.

Delivering our vision will require:

- **Sustainable development – so that the needs of future generations are not compromised by the actions of people today**
- **Integrated management – looking at the wider picture and developing a common understanding**
- **Conservation of biological diversity – conserving and enhancing biological diversity within the UK and contributing to the conservation of global biodiversity**
- **Robust science – understanding our marine environment better and integrating scientific knowledge into policy-making**
- **The precautionary principle – sensibly erring on the side of caution where the scientific evidence is not conclusive**
- **Stakeholder involvement – involving stakeholders as an integral part of policy-making**

SUSTAINABLE DEVELOPMENT

1.10 Following the *Earth Summit* in 1992 in Rio de Janeiro, nearly 180 countries agreed a plan of action, Agenda 21[3], for delivering sustainable development. This recommended that all countries should produce national sustainable development strategies. The UK's strategy *A better quality of life*[4] was published in May 1999. It built on the previous government's 1994 strategy, but recognised that a broader approach was needed to emphasise the social dimension of sustainable development alongside economic issues, the environment and resource use.

1.11 Sustainable development means working towards a better quality of life for all by ensuring that the needs of future generations are not compromised by the actions of people today. Long term threats, such as climate change, as well as short term threats, need to be addressed.

1.12 The natural resources that our seas offer such as fish, minerals and oil have to be used prudently. We need to make sure that we use the resources that our seas offer efficiently and that there are alternatives available for non-renewable resources. Marine life and habitats have to be protected. We need to reflect the economic and social needs of communities and individuals.

ADOPTING AN ECOSYSTEM-BASED APPROACH

1.13 An ecosystem-based approach is needed to deliver our vision. The UK formally endorsed this approach at the *5th North Sea Conference* in March 2002.

1.14 The International Council for the Exploration of the Sea's (ICES) current working definition of an ecosystem approach is the integrated management of human activities based on knowledge of ecosystem dynamics to achieve sustainable use of ecosystem goods and services, and maintenance of ecosystem integrity.

1.15 In other words, we need better to integrate marine protection objectives with sustainable social goals and economic growth and address conservation objectives alongside the full range of

[3] *Agenda 21* – Action plan for the next century, endorsed at United Nations Conference on Environment and Development (the Earth Summit) 1992.
[4] A better quality of life – A strategy for sustainable development for the UK, Cm4345, May 1999.

Adopting an ecosystem-based approach means:

- **Providing and working within a set of clear environmental objectives**
- **Greater use of environmental and socio-economic assessments**
- **More strategic management of our activities in the marine environment**
- **Taking policy decisions and management actions that take account of biological diversity and ensure sustainable development**
- **Making better use of scientific knowledge in the policy-making process**
- **Developing more focused research and monitoring**
- **Full stakeholder involvement**

human activities and demands that we place on the marine environment.

1.16 Past management of our oceans and seas has often been fragmented, sectorally-based and driven by short-term economic gain through policies such as yield maximisation. Action was taken only when scientific evidence proved beyond reasonable doubt that there was a problem – with the effect that it was often too late to devise and implement a solution. And stakeholders were not always properly involved in policy-making and implementation.

1.17 An ecosystem-based approach to management represents a new and more strategic way of thinking. It puts the emphasis on a management regime that maintains the health of ecosystems alongside appropriate human use of the marine environment, for the benefit of current and future generations. This requires setting clear environmental objectives both at the general and specific level, basing management of the marine environment on the principles of sustainable development, integrated management, conservation of biodiversity, robust science, the precautionary principle and stakeholder involvement.

1.18 An ecosystem-based approach also means taking steps to ensure that sectoral actions do not compromise marine ecosystems and their constituent parts. Nature conservation objectives need to be an integral part of our thinking about marine development proposals. This emphasises the importance of integrated assessments based on the environment, marine resources and socio-economics; and planning our use of our marine resources accordingly.

1.19 Central to responsible stewardship is a sound understanding of the way the marine environment functions and how our oceans and seas respond to human activities. Our strategy emphasises the importance of and need for robust scientific research together with effective monitoring and reporting procedures. It is crucial that marine scientific research and knowledge is fully integrated into policy-making.

1.20 Where scientific evidence is not conclusive, we need sensibly to apply the precautionary principle. This means, for example, taking preventive measures where there are reasonable grounds for concern that direct or indirect inputs to the marine environment may harm human health, living resources and marine ecosystems or other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects.

1.21 Delivering our vision also requires commitment to the principle that the costs of pollution prevention, control and reduction measures are borne by the polluter and the user. Furthermore we fully support the identification of best available techniques (BAT) and best environmental practice (BEP).

HOW WE WILL DELIVER

Integrated stewardship

1.22 We see stewardship as entrusting people with a responsibility to care for the community they belong to. It means involving people in protecting the oceans and seas and using the resources they offer wisely. The benefits of stewardship include better decision-making, reduced reliance on regulation, generating a positive role for people and organisations and greater inclusiveness.

To become better integrated we will:

- **Review the legislation affecting development in the coastal area with a view to simplifying the regulatory system and protecting the marine environment**
- **Explore how co-ordination between Departments might be improved in the issuing of individual consents for activities that impact on the seabed**
- **Work through OSPAR to explore spatial planning for the marine environment at the regional level**
- **Provide a focal point to build on existing seabed mapping**
- **Implement the EC Recommendation on Integrated Coastal Zone Management *(ICZM)***
- **Use the *Review of Marine Nature Conservation* regional seas pilot scheme to examine how we can integrate nature conservation into key sectors**

1.23 We need to take account of the fact that many activities take place simultaneously in our marine environment. Better integration and more effective management of conflicting pressures and demands placed on the marine environment is a prerequisite for conservation. This is why we need to strengthen co-operation in spatial planning processes for the marine environment.

1.24 Many different Government Departments and the devolved administrations have responsibility for regulating different activities and protecting the marine environment. In particular, the waters around Scotland, Wales and Northern Ireland out to 12 nautical miles are territorial seas[5] and are the responsibility of the respective devolved administrations.

1.25 The creation of the Marine Consents and Environment Unit (MCEU) in April 2001 provides a streamlined facility for administering certain applications for marine works consents in England and Wales. But more can be done to improve the current regulatory system, protect our oceans and seas and simultaneously manage the different human activities that take place in the marine environment.

1.26 We also need to bring together all work that maps habitats and human effects on the marine environment in the waters around the UK. We need to identify gaps where further mapping is needed. We must ensure that we deliver a joined-up approach to seabed mapping that provides for better co-ordination and co-operation as part of an ecosystem-based management approach. As a first step, we will hold a workshop to explore how best to take our seabed mapping initiative forward.

1.27 We will continue to press for greater co-operation and co-ordination between countries at the international and regional level and within the United Nations, its agencies, regional fisheries organisations and conventions, and marine science organisations. We will use the forthcoming *World Summit on Sustainable Development (WSSD)*, to be held in Johannesburg, South Africa, to emphasise the contribution that sustainable marine management can make to food security, poverty eradication and wider development objectives.

Emphasising sustainability

1.28 Delivering our vision in a way that maintains ecosystems in a self-sustaining state requires a regulatory framework that ensures that they can accommodate appropriate human demands and activities. It is therefore crucial for sustainable development that human demands on the marine environment are properly assessed and understood.

1.29 *Environmental Impact Assessment* (EIA) procedures ensure that the environmental consequences of specific projects are taken into account when the project is authorised. We require EIAs for many activities that impact on the seabed. *Strategic Environmental Assessment* (SEA) provides analysis and evaluation of the environmental effects of a proposed policy, plan or programme. An EC Directive providing for SEA of certain plans and programmes was agreed in 2001 and will be transposed by mid 2004. This will help to ensure that environmental concerns are properly integrated into other sectors and will provide for more informed decision-making. Both SEA and EIA provide opportunities for

[5]Under international law, the territorial seas around the UK are the waters in the 0-12 nautical mile zone from the coast. The zone beyond territorial waters where the UK has sovereign rights extends from 12 to up to 200 nautical miles.

The aims and benefits of SEA are:

- **To help achieve sustainable development by promoting:**
  - **integrated environmental and development decision-making**
  - **environmentally sustainable policies and plans**
  - **consideration of best available techniques and alternatives**

- **To strengthen and streamline project EIAs by:**
  - **early identification of potential impacts and cumulative effects**
  - **addressing strategic issues related to justification of the plan and location of projects**
  - **reducing the time and effort needed to assess individual projects**

stakeholders to express their concerns and for those concerns to be addressed when decisions are taken.

1.30 The UK has ratified the OSPAR *Convention for the Protection of the Marine Environment of the North East Atlantic* and is a contracting party to it. The Convention requires Contracting Parties to take all possible steps to prevent and eliminate pollution and take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected. It requires the applications of the precautionary principle, the polluter pays principle, BAT and BEP. OSPAR has developed and put in place five strategies to direct its work in the medium to long term. The UK is also an active participant in the North Sea Conference.

To emphasise our commitment to sustainability we will:

- **Where appropriate, require SEA and EIA for policies and projects respectively and see how arrangements for co-operation and information sharing can be improved**
- **Implement OSPAR's strategies for hazardous substances, eutrophication, radioactive substances, offshore industries and biological diversity**
- **Use WSSD to emphasise the importance of the marine environment to food security and poverty eradication**
- **Work with the European Commission to ensure that the current review of the CFP gives full weight to sustainability and biodiversity issues**

1.31 The UK is playing a leading role in the review of the *Common Fisheries Policy* which is due to be completed by the end of 2002. The creation of the Department for Environment, Food and Rural Affairs (DEFRA) has brought a sharpening of focus on the relevance of environmental considerations to fisheries management. The creation of the Scottish Executive Environment and Rural Affairs Department (SEERAD) has yielded similar benefits in Scotland. We are working for a policy that is both economically and environmentally sustainable. We also want to involve stakeholders, such as fishermen, scientists and managers, much more closely in decisions that affect them.

Improving marine conservation

1.32 A key element of our ecosystem-based approach is the conservation and, where possible, enhancement of marine ecosystems in a way that conserves biological diversity and ensures sustainable development of our marine resources. We want to meet the EU *6th Environmental Action Programme* objective of halting the loss of biodiversity by 2010.

1.33 At the *5th North Sea Conference* we agreed to identify and designate by 2010 relevant areas of the UK's seas as areas of marine protection belonging to a network of well-managed sites. Decisions will be based on a clear understanding of natural processes and the ecological requirements of marine species, habitats and ecosystems. This will help to safeguard threatened and declining species, habitats and ecosystem functions, as well as areas which best represent the range of ecological character in our seas.

Grey seal – part of the marine ecosystem
Photographer Rohan Holt

1.34 Within Europe, we will be among the first countries to apply fully the *Habitats and Birds Directives* to the limit of jurisdiction of UK waters. The UK is also in the lead in drawing up criteria for selecting sites which are important for habitats and species beyond our immediate territorial waters. We aim to consult on regulations to enable the designation of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) beyond territorial waters later this year. These measures will improve the protection available to habitats and species in UK waters.

1.35 Our *Review of Marine Nature Conservation* is assessing the success of previous measures to protect the marine environment. We will be piloting a regional seas framework for marine conservation in the Irish Sea, starting in May this year. The results of the pilot should be available in early 2004. Stakeholder involvement will be an important element in taking forward the pilot.

To improve marine conservation we will:

- **Apply the *Habitats and Birds Directives* out to the limit of jurisdiction of UK waters and designate SACs and SPAs**
- **Pilot a framework for nature conservation in the Irish Sea as the next step of our *Review of Marine Nature Conservation***
- **Implement the UK's *Biodiversity Action Plan* which sets targets for conservation, restoration and enhancement of important species and habitats**
- **Work internationally to protect marine biodiversity and explore how marine protection on the high seas might be improved**

Supporting policy through robust science and monitoring

1.36 An ecosystem-based approach to marine management depends on developing focused research on processes and influences on the marine environment and making effective use of existing scientific knowledge and advice in policy-making. We want to maximise the value of Government-funded science as a basis for delivering our vision.

1.37 To improve our understanding of the marine environment, UK Government Departments, the devolved administrations and Government agencies carry out regular monitoring of the quality, structure and functioning of the marine environment. We also work with the research councils to support high quality scientific research to further support and inform the development of policy. Whilst current arrangements work well, they will nevertheless be reviewed to ensure the link between marine scientific research and policy-making.

To reflect the importance of marine science we will:

- **Consider how marine scientific research and policy-making might be better integrated**
- **Develop our environmental monitoring framework and produce an integrated assessment of our seas in 2004**
- **Develop a pilot programme in operational oceanography to support coastal management, emergency response and marine management**
- **Work through OSPAR to develop Ecological Quality Objectives to assess our success in delivering an ecosystem-based approach**
- **Work with stakeholders to develop co-ordinated monitoring and open access to marine environment data**

To promote stakeholder involvement in the marine stewardship process we will:

- **Hold a workshop in the autumn to decide how best to take forward the initiatives in this report**
- **Hold a joint conference of the English, Scottish and Welsh Coastal fora, together with Northern Ireland stakeholders, to discuss plans to implement the EC's ICZM Recommendation**
- **Consult on whether a new stakeholder body is needed for the wider marine environment and what its remit might be**
- **Consult on the scope and content of future Marine Stewardship Reports**

1.38 Through OSPAR we are developing Ecological Quality Objectives, initially for the North Sea, which will contribute to our framework of indicators. Ecological Quality Objectives are tools that can support the development and application of an ecosystem-based management approach. By describing the quality of the environment at which policies and management actions are aimed, they provide a benchmark against which performance can be judged and success measured.

Stakeholder involvement

1.39 We recognise the need for full stakeholder participation. As part of the preparation of this report, we held three workshops with key stakeholders – two in London and one in Edinburgh. Stakeholders included Government agencies, environmental non-governmental organisations and representatives of the business community. The views of stakeholders showed that there was a real appetite for stakeholder participation and stakeholder views have helped to shape the scope of this report and our overall strategy.

1.40 Preparing this report is only the first step. We want to involve stakeholders in taking forward the measures summarised in this report and monitoring progress made in meeting our goals. Stakeholder involvement is already working well in many areas, such as the *Review of Marine Nature Conservation*. We will hold a workshop this autumn with key stakeholders to consider how best to take forward the full range of proposals contained in this report. We will also consult on whether current arrangements for stakeholder involvement are adequate and on the scope and content of future Marine Stewardship Reports. We will issue our consultation paper by the end of 2002.

TAKING THINGS FORWARD

1.41 This chapter has summarised our vision and the key initiatives that will help us to deliver clean, healthy, safe, productive and biologically diverse oceans and seas. It outlines how an ecosystem-based approach can deliver this goal based on the principles of sustainable development, integrated management, conservation of biodiversity, robust science, the precautionary principle and stakeholder involvement. The remainder of the report sets out in more detail what we have already achieved and how we will deliver our vision based on the initiatives summarised in this chapter.

Protecting marine biodiversity

- **The marine environment contains a unique and distinct collection of species and habitats. Up to half of the UK's biodiversity may be found in our seas.**
- **We will conserve and, where possible, enhance and restore this biodiversity. Adopting an ecosystem-based approach requires us to manage all human activities in a way that maintains ecosystem integrity.**
- **We will continue to play a leading role in international fora both at the global and regional level to help conserve marine biodiversity.**
- **The UK's *Review of Marine Nature Conservation* is examining how we can improve the protection afforded to the UK's marine biodiversity and ecosystems. Our Irish Sea pilot scheme will show the way forward.**

A VITAL RESOURCE FOR LIFE

2.1 Marine biodiversity is the variety of species and habitats found in our oceans, seas and coasts. It includes everything from the largest animal in the world – the blue whale – to the smallest bacterium and seaweed. Marine biodiversity plays a fundamental role in the balance of life on our planet.

2.2 Human activities and climate change can damage marine ecosystems. By moving towards an approach based on ecosystems we will be better able to address threats to marine biodiversity and ensure that this approach plays a key part in all our policies that affect the marine environment. This chapter shows how we are taking forward our commitment to improve marine biodiversity at the international, regional, national and local levels.

Seafan – marine biodiversity plays a fundamental role in the balance of life on our planet
Photographer Rohan Holt

INTERNATIONAL ACTION

2.3 We are committed to working with other countries to promote the conservation of marine wildlife and habitats worldwide through the implementation of relevant conventions and agreements. This section outlines some of the UK's main international obligations.

The Convention on Biological Diversity

2.4 The *1992 Convention on Biological Diversity* (CBD) was adopted at the Rio *Earth Summit*. Its objective, which provides the main framework for much of our work, is the conservation of biological diversity, the sustainable use of its components and the fair and adequate sharing of benefits from the use of genetic resources.

2.5 The Convention's 1995 *Jakarta Mandate* represents a global consensus and has established a focus for international action on marine and coastal biodiversity. It is founded on a number of basic principles, including the ecosystem approach (which is elaborated under the Convention as the *Malawi Principles*) and the precautionary principle. The work programme focuses on priority areas for action with focus on national and regional actions.

2.6 The UK's *Darwin Initiative* plays an important role in our contribution to implementing the CBD internationally, including in relation to marine biodiversity. It seeks to help safeguard the world's biodiversity by drawing on the UK's strengths in this area to assist those countries that are rich in biodiversity but poor financially.

Main international conventions applying to the conservation of marine biodiversity

- ***The 1992 Convention on Biological Diversity*** **(CBD)**
- ***The 1979 Convention on the Conservation of Migratory Species of Wild Animals*** **(Bonn Convention)**
- ***The 1979 Convention on the Conservation of European Wildlife and Natural Habitats*** **(Bern Convention)**
- ***The 1975 Convention on International Trade in Endangered Species*** **(CITES)**
- ***The 1971 Ramsar Convention on Wetlands of International Importance*** **(Ramsar)**
- ***The 1946 International Convention for the Regulation of Whaling***

The Jakarta Mandate work programme has five main elements:

- **Integrated marine and coastal area management**
- **Marine and coastal living resources**
- **Marine and coastal protected areas**
- **Mariculture**
- **Alien species and genotypes**

Coral reefs

2.7 The UK is working internationally to protect coral reefs under the Jakarta Mandate. We are a founding member of the International Coral Reef Initiative (ICRI), a partnership between states and non-governmental bodies. The UK has committed substantial funding to support the development of improved understanding and better management of coral reef ecosystems, recognising the importance of their resources to the livelihoods of many vulnerable coastal communities in developing countries.

2.8 In September 2001, the World Conservation Monitoring Centre, based in Cambridge, launched *The World Atlas on Coral Reefs*, the first comprehensive assessment of the state of the world's coral reefs. The *6th Conference of the Parties of the Biodiversity Convention* in 2002 will decide upon a work plan on coral bleaching as

Coral reefs

Coral reefs contain more than one third of the world's marine species. They are a major provider of food and jobs for local economies, a major focus for tourism, and a source for medical research. But pollution, sewage, unsustainable fishing, coastal development and rising sea temperatures mean that 10 per cent of coral reefs are now severely depleted and over 50 per cent are threatened.

part of its overall work programme on marine and coastal biodiversity.

Wetlands: the Ramsar Convention

2.9 The work of the Ramsar and Biodiversity Conventions are closely related. Ramsar aims to secure the wise use of wetlands as a key means of achieving sustainable development. The UK has listed 168 Ramsar sites, which are wetlands of international importance, of which 13 are in Overseas Territories. We are currently carrying out a review of Ramsar sites in the UK. This follows a recommendation from Ramsar for an increase in the area of wetland designated as being of international importance, in particular under-represented wetland types. We will continue to address issues relating to full and effective implementation of the Convention through our National Ramsar Committee.

Endangered species: CITES

2.10 The UK plays an active role in the Convention on International Trade in Endangered Species (CITES), which protects endangered species of animals and plants by restricting and monitoring international trade in them. A number of important marine species are listed on Appendix I of the Convention, which means that all international commercial trade in these species, their parts and derivatives is prohibited. Other species, which may become endangered if they are subject to over-exploitation from trade, are listed on Appendix II.

2.11 In April 2000, the UK proposed the listing of the Basking shark on Appendix II. An Appendix II listing means that international trade is only permitted where it would not be detrimental to the species. The Appendix II proposal failed narrowly and the UK has since listed the Basking shark on Appendix III. This means that no CITES party may allow the import of Basking sharks (or their parts or derivatives) from the UK unless a valid export permit is presented and, as Basking sharks are protected in UK waters, such certificates would not normally be issued. Imports from other countries must be accompanied by a document certifying that they did not originate in the UK.

Marine species listed on CITES Appendix I:

- **Great whales**
- **Marine turtles**
- **Sea otters**
- **Guadeloupe fur seals**
- **Monk seals**
- **Dugongs and manatees**

2.12 The UK will resubmit the Appendix II listing proposal to the next CITES conference in Chile, in November 2002. To support this, the UK has commissioned research into the life history and migratory patterns of Basking sharks.

Whaling: the International Whaling Commission

2.13 The UK ceased whaling in 1963. We are opposed to all forms of whaling, except for some limited indigenous whaling, and strongly support the International Whaling Commission's (IWC) 1982 moratorium on commercial whaling. The UK would like to see all other forms of whaling ended. We believe that whaling does not serve any genuine need and involves unacceptable cruelty. The UK has been successful in maintaining the IWC moratorium (despite increased pressure from pro-whaling nations) and in establishing whale sanctuaries in the Indian and Antarctic Oceans.

2.14 The UK has taken the lead in the IWC in promoting whale-watching as an alternative way of making use of whale resources. Whale-watching continues to grow in popularity and has the potential to become more economically viable than the whaling industry. We believe that the IWC has an important role to play and will continue to encourage the IWC to develop guidelines in this area and oversee discussion.

2.15 In April 1998 the Government established a Consultative Forum on Whaling. This forum consists of representatives of organisations interested in the conservation of whales and meets regularly to discuss whale conservation issues and to advise the Government on its policies in the IWC. The next meetings of the IWC will be in Shimonoseki, Japan in May 2002 and Berlin, Germany in June 2003.

Migratory species: The Bonn Convention

2.16 The Bonn Convention provides an effective umbrella for international action to protect migratory species. Action is sometimes approached, or initiated, at the regional level as the following examples illustrate.

Small cetaceans: ASCOBANS

2.17 Small cetaceans, which comprise dolphins, porpoises and some whales, are caught in the nets of commercial fishing vessels – known as by-catch. Addressing this problem has been a priority for the UK, and we have promoted a regional approach through the Bonn Convention's *Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas* (ASCOBANS). At the meeting of the Parties in Bristol in July 2000, the UK was instrumental in securing agreement to reduce by-catch levels of small cetaceans to no more than 1.7 per cent of the best available abundance estimates. This is discussed later in this chapter.

Albatrosses and petrels in the Southern Hemisphere: ACAP

2.18 The UK hosts important breeding sites on account of its Overseas Territories in the Southern hemisphere. Consequently we played a major role in negotiating the *Agreement on Albatrosses and Petrels*. We are a range state under the agreement and are working with others to bring it into force this year. It will protect 21 species of albatross and seven of petrel. Measures proposed include an Action Plan and conservation measures such as reducing by-catch and prohibiting egg taking. An Advisory Committee will be charged with developing conservation guidelines to assist Contracting Parties in the implementation of the Action Plan.

Marine turtles: the Bern Convention

2.19 The UK is making an active contribution to the work of the Bern Convention, including work on marine turtles. The detrimental impact of various forms of fishery by-catch and of tourist resort development on nesting beaches, in the Mediterranean and North Atlantic are major themes of the Convention's recent work. The UK is raising marine turtle awareness among tourists and tourism operators. In March 2002 we signed a Memorandum of Understanding under the Bonn Convention on the Conservation and Management of Marine Turtles and their Habitats in the Indian Ocean and South East Asia.

Marine protection on the high seas

2.20 The high seas are beyond the jurisdiction of any state, and are, in the words of the *United Nations Convention on the Law of the Sea*, the common heritage of mankind. Yet the high seas are home to a number of unique habitats such as deep sea hydrothermal vents on mid-ocean ridges and sea mounts. We will explore with other countries and through appropriate international fora the case for, and the feasibility of, marine protected areas on the high seas. We will also work within the International Seabed Authority to ensure that any use, including prospecting, of the seabed under the high seas, takes place on an environmentally sound basis.

Working through the European Union

The Habitats and Birds Directives

2.21 These two European Directives have a significant influence on the conservation and

The UK Marine SACs Project

This ran from 1996 to 2001 to establish management schemes on selected marine SACs. It focuses on 12 marine SACs around the UK, aiming to develop specific areas of knowledge needed for the management and monitoring of European marine sites. The project was run as a partnership between all the UK conservation agencies. Management groups were established, made up from national and local Government, NGOs, commercial interests and leisure organisations. These groups aim to use expertise and experience to promote strategic, co-ordinated management to protect the environmental resource at SAC sites.

The Habitats and Birds Directives

The EC Habitats Directive: **requires Member States to protect areas that support certain natural habitats or species of plants or animals of Community interest listed in the Directive. It provides for a range of measures including conservation of important wildlife features, the protection of agreed species from damage, destruction or exploitation, and the surveillance of natural habitats and species. The most demanding obligations relate to the selection, designation and protection of sites as Special Areas of Conservation (SACs).**

The EC Birds Directive: **protects all wild birds naturally occurring within Member States. It covers the protection, management and control of these species and lays down rules for exploitation. It applies to all wild birds, nests and habitats. Under the Directive, Member States are required to take special measures to conserve the habitats of certain rare species of birds and regularly occurring migratory birds. In particular each Member State is required to designate the most suitable areas of such habitats as Special Protection Areas (SPAs).**

Together the SACs and SPAs will create a network of protected areas across the European Union known as Natura 2000. This European-wide network of sites is designed to promote the conservation of habitats, wild animals and plants, both on land and at sea and is a major contribution by the EC to implementing the Convention on Biological Diversity. In the UK the Directives have been transposed into legislation by the *Wildlife and Countryside Act 1981* and the *Conservation (Natural Habitats, &c.) Regulations 1994*, as amended.

The Moray Firth
The Moray Firth was designated as a marine Special Area of Conservation because it is home to the world's most northerly bottlenose dolphin population.

protection of marine species and habitats in the UK and the rest of Europe. We have already taken considerable action within the UK's territorial waters and there are currently 71 marine SPAs and 62 candidate SACs.

Beyond the 12 mile limit

2.22 Work is under way to develop legislation to apply the *Habitats and Birds Directives* beyond territorial waters. We expect to consult on regulations later in the year. We have commissioned the Joint Nature Conservation Committee (JNCC) to identify potential SACs and SPAs beyond territorial waters.

2.23 At the *5th North Sea Conference* we agreed to identify and designate by 2010 relevant areas of the UK's seas as areas of marine protection belonging to a network of well-managed sites. Decisions will be based on a clear understanding of natural processes and the ecological requirements of marine species, habitats and ecosystems. The JNCC's work in identifying potential SAC and SPA sites will help us to take forward this commitment.

2.24 The Darwin Mounds, a large cold water reef system, found 185km off the north-west coast of Scotland, are prime candidates for investigation for SAC status. They are expected to be the first site to be confirmed once the necessary regulations are in place.

2.25 Further information on the distribution of vulnerable marine habitats and species in UK waters has been produced through the Marine Life Information Network (MarLIN) and can be found at: www.marlin.ac.uk

The EU's Biodiversity Strategy and Action Plans

2.26 The UK has argued successfully that national and, where appropriate, regional strategies and action plans under the main

Darwin Mounds -– corals, associated invertebrates (echiuran worms, spider crab, starfish) and fish

Conventions, such as the Convention on Biological Diversity, are key to integrating environmental considerations into the policies of important economic sectors. The European Commission, as part of the requirements of its overall Biodiversity Strategy, has adopted a suite of *Biodiversity Action Plans* (BAPs). We have contributed to the development of these and fully support them. Two are relevant to marine biodiversity – one on the conservation of natural resources and one on fisheries.

2.27 The natural resources action plan makes particular reference to the full implementation of the *Habitats and Birds Directives* and sets out policy priorities for helping preserve biodiversity across the Community, as well as promoting integrated coastal zone management. The fisheries BAP focuses on conservation and sustainable use of fish stocks, the reduction of the impact of fishing activities on marine and coastal habitats and non-target species, such as sharks and rays, and preventing aquaculture having a harmful impact on different ecosystems.

OSPAR's 1998 Biodiversity Strategy is working to:

- **Assess and prioritise those species and habitats in need of protection**
- **Assess and prioritise the effects of human activities**
- **Promote the establishment of a network of marine protected areas**
- **Develop Ecological Quality Objectives**

Working through OSPAR

2.28 At the regional level of the North East Atlantic, valuable work is being undertaken through the OSPAR Convention and its Biodiversity Strategy. At the 1998 meeting in Sintra, Portugal, Ministers agreed a new Annex V to the Convention, which contains provisions on the protection of ecosystems and biodiversity.

2.29 Annex V requires the UK and other Contracting Parties to take the necessary measures to protect and conserve marine ecosystems and biodiversity of the North East Atlantic, and to restore, where practicable, adversely affected areas. It also provides for the adoption of programmes and measures to assist management of human activities that can have an adverse impact on the marine environment. Annex V came into force on 30 August 2000.

2.30 At the *5th North Sea Conference*, the UK agreed to work through OSPAR to pilot the most advanced Ecological Quality Objectives (EcoQOs) in the North Sea and work to develop the remaining EcoQOs by 2004. It was also agreed that where ecological quality target levels were not being met, policies that are contributing to this failure would be reviewed and that coherent monitoring arrangements, which are discussed later in this report, will be established so that progress made in meeting EcoQOs can be assessed.

THE NATIONAL DIMENSION

Evaluation, new initiatives and stakeholder involvement: developing an ecosystem-based approach

2.31 We have been developing a number of new approaches to evaluate the success of existing measures to protect the marine environment. These demonstrate a commitment to adopting an ecosystem-based approach, founded on stakeholder involvement, and are detailed below.

The Review of Marine Nature Conservation

2.32 In its 1998 consultation document, *Sites of Special Scientific Interest: Better Protection and Management,* the Government recognised that the creation of a network of Marine Nature Reserves (MNRs) under the *Wildlife And Countryside Act 1981* had not been as successful as originally hoped. As a result it established the *Review of Marine Nature Conservation* (RMNC) to evaluate the success of previous statutory and voluntary marine nature conservation measures and identify examples of current best practice and existing barriers to successful marine conservation. The main aim of the Review is to put forward practical and proportionate proposals for improving marine nature conservation.

2.33 A Working Group was set up to take the Review forward. This group includes Government Departments and agencies, regulatory bodies, the devolved administrations, conservation NGOs,

The domestic legislative framework:

The Wildlife and Countryside Act 1981 **implements the EC Birds Directive and protects all species of wild bird from intentional killing, injuring or taking of birds or their eggs. Protection is also afforded to any nest of a wild bird while it is in use or being built. Certain birds listed on Schedule 1 of the 1981 Act are also protected from disturbance while building or in a nest or near a nest containing young.**

The 1981 Act also protects certain species of animals in Great Britain including all species of whales, dolphins, porpoises and Basking sharks from intentional killing, taking or injuring, and for certain species protects against disturbance. It also affords protection to a number of marine plants by making it an offence intentionally to pick, uproot or destroy any protected plant.

The Act also enables the establishment of Marine Nature Reserves (MNRs) and Sites of Special Scientific Interest (SSSIs). For example, the waters around Lundy Island off the north coast of Devon have been designated as a MNR. SSSIs are used to protect coastal habitats of ecological significance.

Key recommendations from the interim report of the RMNC include:

- **There is a need to set strategic goals for marine nature conservation**
- **There is a need to draw together identification of those habitats and species which are nationally important and justify conservation action**
- **The regional seas approach to nature conservation should be tested through a pilot scheme**
- **There should be a further drive to rationalise regulation, especially in coastal waters**
- **An exercise should be undertaken to identify best practice in marine enforcement, both at home and abroad**

commercial and leisure interests. The Review's interim recommendations were produced in March 2001.

2.34 A key outcome of the interim report was the proposal for a regional seas pilot scheme to test ways of integrating nature conservation into key sectors in order to make an effective contribution to sustainable development on a regional basis. It will also seek to determine the potential of existing regulatory and other systems for delivering effective marine nature conservation and aim to identify any gaps in existing systems and make recommendations on how to fill them.

2.35 The pilot scheme will take place in the Irish Sea. It will involve all key stakeholders – local, regional, national and international – in as inclusive a manner as possible at every stage in the development and implementation of the pilot. It is hoped that the findings of the pilot will be available in early 2004. The results are expected to make a significant contribution to our consideration of how we apply an ecosystem-based approach.

The Review of Non-native Species Policy

2.36 The Government is undertaking a review of its policies on non native species, including in relation to the marine environment. Their introduction can have major effects in transforming ecosystems, altering natural habitats and threatening native species. Co-ordinated action is needed to address these issues involving Government, industry and conservation bodies.

2.37 The aim of the review is to evaluate the effectiveness of current statutory and non-statutory procedures for dealing with the introduction and establishment of non-native species and to identify examples of current best practice within the UK and abroad. It will also identify the main vectors for introduction and spread and put forward proposals for improving measures to limit the impact of non–native species. These could include proposals in areas of research and monitoring, trade, and control of non–native species.

2.38 At the *5th North Sea Conference*, it was agreed that OSPAR should investigate how best to prevent, control or eradicate, as appropriate, the introduction of harmful invasive species in the OSPAR region. This will take account of the

The UK Biodiversity Action Plan (UK BAP):

- **The UK BAP was prepared in response to requirements under the *Biodiversity Convention* agreed in 1992**
- **The UK BAP establishes the framework for the conservation of species and habitats as well as the integration of biodiversity into all areas of policy**
- **The UK BAP has some 40 individual action plans for important marine and coastal habitats and species, including mammals, reptiles, fish, molluscs, sea anemones, corals, and algae**
- **The action plans set objectives and targets for conservation, restoration and enhancement**
- **Working in partnership is an essential element of the UK BAP**

The individual action plans and a report on progress on the first five years of the UKBAP can be found at: www.ukbap.org.uk

results of ongoing work in organisations such as the International Maritime Organisation (IMO) and the *Convention on Biological Diversity*. Ballast water from ships as a vector for spreading non-native species is specifically addressed in Chapter 5.

The UK Small Cetacean By-Catch Response Strategy

2.39 In July 2001 the Government set up a Working Group to develop a *UK Small Cetacean By-Catch Response Strategy*. The aim of the Strategy will be to identify what measures can be taken and the constraints on those measures, to work towards meeting the 1.7 per cent by-catch target set by ASCOBANS in 2000. The strategy will consider the effects of every type of commercial fishery carried out by UK fisheries, cover all waters within the UK's Exclusive Fisheries Zone and take account of measures used to reduce by-catch in other countries.

2.40 The strategy will be produced later this year and will help us to deliver on the commitment made at the *5th North Sea Conference* to aim to reduce the by-catch of harbour porpoises below 1.7 per cent of the best population estimate, and a precautionary objective to reduce by-catches of marine mammals to less than 1 per cent of the best available population estimate. We will work with ASCOBANS and other relevant bodies to develop and adopt a recovery plan for the harbour porpoise in the North Sea.

2.41 The Government is pleased that the *Marine Wildlife Conservation Bill*, a private member's Bill introduced by John Randall MP, has completed its House of Commons stages and will now be considered by the House of Lords. The Bill, if enacted, will permit the notification of marine sites in England and Wales which are of special interest by virtue of their fauna, flora or geological or physigraphical features. Such sites will be of national importance.

The SCANS project

The 1994 Small Cetacean Abundance in the North Sea (SCANS) project aimed to estimate abundance and identify the main summer concentrations of small cetaceans in the North Sea. The UK Continental Shelf population of harbour porpoise is estimated to be in the order of 150,000. These estimates of abundance have been used extensively by a number of international organisations including ASCOBANS.

TAKING THINGS FORWARD

2.42 We will work with the EC and Member States towards the *EU 6th Environmental Action Programme* objective of halting biodiversity decline by 2010. In contributing to this objective we will promote the sustainable use of the seas and the conservation of marine ecosystems. A better understanding of marine ecosystems and our impacts on them through the work that is in train, especially the identification of indicators, will help us to identify whether we are on track to achieve this ambitious goal.

2.43 Working with stakeholders we are making good progress. We will continue to work to identify species and habitats which justify conservation action through various forums including the *Review of Marine Nature Conservation* and OSPAR. We will try to identify where action needs to be taken quickly to protect them. We will continue to work internationally and at the regional level to implement Conventions to conserve marine biodiversity and protect endangered species and habitats.

2.44 We will build on marine protection afforded in Territorial Waters under the *Habitats and Birds Directives* by applying these Directives out to the limit of jurisdiction of UK waters. We will identify and designate relevant areas of the UK's seas as areas of marine protection belonging to a network of well-managed sites by 2010. We will also explore how marine protection on the high seas might be improved. We are also working to assess the threats posed by non-native invasive species so that appropriate action can be taken to tackle the threat.

2.45 We will strive to improve our scientific understanding of our seas in order to base our decisions on the best available knowledge. The

Review of Marine Nature Conservation, perhaps the most fundamental review of its kind, should help us achieve this aim, as should our commitment to build on seabed mapping initiatives to improve our understanding of marine habitats. We hope that the Irish Sea Pilot Scheme under the Review will produce constructive ideas on how we can improve our management of the marine environment.

Integrated coastal management

- **We want to develop a new, shared vision for the future of our coastal areas. This is essential for the stewardship of our seas and the success of an ecosystem-based approach.**

- **The coastline of the United Kingdom is one of the most diverse in Europe. We must balance the conservation of this vital resource with the economic and social activities that take place there.**

- **We are encouraging local partnerships to deliver local solutions and develop opportunities within the Government's framework of national policies. Integrated coastal management is central to achieving this.**

OUR UNIQUE COASTLINE

3.1 Our coastal areas are the link between the land and the sea. Each stretch of coast is different. The extent and variety of the UK's coastline makes it rich in species and habitats of national and international significance. Over a third of its length is designated for its scenic or natural beauty.

3.2 Coastal areas are subject to constant natural processes such as storms, flooding and erosion, which are likely to increase with global warming. By the 2080s, climate change and natural land movement may lead to a rise in sea levels of up to 86cm in south east England and up to 58cm in the west of Scotland, which could threaten property and livelihoods[6].

3.3 One in three people in the UK live within 10 km of the coastline. It provides important commercial, residential and leisure opportunities. Many communities have social and economic issues that are specific to their coastal location such as seasonal unemployment and lack of affordable housing.

3.4 The Government's strategic aim seeks to balance these competing pressures. We promote the sustainable management of coastal areas based on both conservation value and the different human activities that take place there. But different circumstances require different responses. What is best for one stretch of the coast may not be right for another.

3.5 Our approach, therefore, is to set the regulatory framework for managing specific coastal issues, such as development planning and the control of ports and harbours, whilst encouraging a more flexible, discretionary approach to the overall management of coastal areas.

3.6 This builds on existing administrative structures so that local authorities, harbour authorities, environmental agencies and other bodies each retain their statutory responsibilities, but work together at the most appropriate level.

Durdle Door, near Lulworth – part of over 20,000 km of UK coastline

[6]UK Climate Impacts Programme 2002

Rather than impose decisions, we seek to encourage local solutions and the development of opportunities within a clear framework of national policies. Stakeholder involvement is crucial.

INTEGRATED COASTAL MANAGEMENT

3.7 The concept of integrated coastal management is central to an ecosystem-based approach. It brings together everyone involved in the management and use of the coast within a framework that works to achieve common goals. The objective is to establish sustainable levels of economic and social activity in our coastal areas while protecting the coastal environment.

3.8 Integrated coastal management typically involves a partnership of local authorities, statutory agencies, local conservation bodies, businesses and recreational groups who, together, produce a joint action plan for a particular stretch of coast. These widely-used non-statutory plans are a useful tool for encouraging participation, dialogue and consensus. Their content must be tailored to local circumstances, but they will normally look at a whole host of issues including coastal development, conservation, recreation, historical heritage, flood defence and tourism.

3.9 In September 2000, the European Commission published a proposal for a Recommendation on Implementing Integrated Coastal Zone Management (ICZM) across Europe[7]. This asks all European Union governments to conduct an overall stocktaking to analyse which laws, institutions and stakeholders influence the planning and management of their coastal zone.

3.10 Then, based on these results, each government should prepare a national coastal strategy. These should identify the roles of the different stakeholders in the coastal zone; the appropriate mix of instruments for implementing the principles of ICZM; measures to promote more public participation; and suitable sources of long-term financing for local initiatives.

3.11 The principles in this proposal are already part of the UK's approach to coastal policy and the Government welcomes the Recommendation as providing fresh impetus to delivering effective coastal management in Europe. We have been a key player in negotiations on the text and hope it will be adopted later in 2002. Our plan is then to carry out a wide-ranging review of all the institutions, laws and stakeholders that influence our coastline, prior to starting a consultation process on draft coastal strategies for each of the national administrations.

MANAGING OUR COASTLINE

3.12 Over the last decade, the Government and the devolved administrations have published a range of advice for coastal decision-makers including guidance on planning policy, best practice and discussion papers.

3.13 Coastal fora in England, Scotland and Wales, with membership representing national groups from a range of sectors, have brought stakeholders together. For example, the Scottish Coastal Forum, established by Government in 1996, has regular meetings and a detailed work programme which aims to encourage national

Principles of Integrated Coastal Management:

- **taking a long term view**
- **a broad holistic approach**
- **adaptive management**
- **working with natural processes**
- **support and involvement of all relevant administrative bodies**
- **use of a combination of instruments**
- **participatory planning**
- **reflecting local characteristics**

Coastal planning

The statutory planning system plays an important role in coastal management. A range of national planning policy guidance has been published to direct local planning authorities in the control of coastal development above the low-water mark, including PPG20 in England, NPPG13 in Scotland and PPW in Wales.

[7]COM (2000) 545 final

debate on coastal issues. Early effort concentrated on reviewing the existing management arrangements but the Forum has now started work on developing its own coastal strategy and has commissioned a range of research reports. These are available on the Forum's web site: www.scotland.gov.uk/environment/coastalforum. The latest information on good practice and forthcoming events is distributed to coastal managers through its electronic newsletter.

3.14 A number of well-regarded local and regional partnerships have evolved across the UK to establish practical management arrangements for protecting estuaries and the coastal environment. For example:

- The Severn Estuary Partnership is actively helping collaboration between the parallel agencies at work on either side of the Welsh/English border.

- The management committee of Strangford Lough – Northern Ireland's leading marine site in terms of conservation – has been resolving local problems since its formation in 1992 and acts as an advisory body to the Northern Ireland Government.

- The Dorset Coastal Forum is raising awareness in communities along the South West coast through improved visitor facilities, education programmes, newsletters, information boards and a website.

- The Moray Firth Partnership in the north east of Scotland has developed a community grants scheme so local groups can undertake a range of projects to deliver integrated coastal management in their area.

3.15 We will hold a joint conference with the national coastal fora, plus key stakeholders from Northern Ireland, to take place after the EU proposals on ICZM have been adopted. Representatives from local and regional partnerships will also be invited to participate to discuss the Government's plans for implementing the Recommendation.

3.16 In addition, we will be inviting views on whether a new overarching stakeholder consultation group covering all marine issues, including coasts, is needed to deliver our ecosystem-based approach to marine management.

Coastal bye-laws

In 1998, the Government published a review of coastal bye-law powers in England and Wales. This made recommendations aimed at improving the management of coastal leisure and recreational activities. We will produce a guide for local authorities explaining the range of powers open to them and intend to look at new legislation when Parliamentary time permits.

3.17 The principles of integrated coastal zone management are also reflected in work the UK is undertaking to develop the EC *Biodiversity Action Plans* (BAPs) as part of its lead in promoting the integration of environmental considerations into the main economic sectors. BAPS were discussed in more detail in Chapter 2.

3.18 The coastal zone is also important for tourism and recreation, and includes a significant cultural heritage, as revealed through underwater archaeology. There are, for example, many thousands of historic shipwrecks around the coast of the UK. To date, 52 of these have been selected for protection under the *Protection of Wrecks Act 1973*.

3.19 Our initiative to review the regulations affecting development of the coastal area will need to consider the full range of activities that take place in the coastal zone. The aim of the review will be to help identify ways in which the regulatory system can be simplified and

Designated wrecks

The archaeological survey and exploration of designated sites is carried out under licence from the relevant Secretary of State or Minister. Much of the work is carried out by amateur divers, assisted by professional archaeologists, including the Archaeological Diving Unit of St Andrew's University in Scotland.

rationalised without reducing the level of protection currently afforded to the marine environment. It is considered preferable to give this review a relatively narrow focus – development in coastal areas – in order to produce meaningful results. Similarly the work that OSPAR will undertake to explore the role of spatial planning will help to improve co-operation and management of the range of different activities that take place in coastal waters.

FLOOD AND COASTAL DEFENCE

3.20 Protecting the coast from erosion and flooding is a particular concern in England and Wales and requires a co-ordinated approach to managing the coastal zone. For example, in 1993, a new flood and coastal defence strategy was published that encouraged the development of Shoreline Management Plans (SMPs) based on coastal sediment cells. It recognised that there should be a presumption that natural coastal processes should not be disrupted except where life or important natural or man-made assets were at risk. This might mean no active intervention, only limited intervention or the deployment of soft engineering techniques, for example at Porlock Bay in north Somerset where the pebble ridge was allowed to be breached by the sea and natural processes have resumed.

3.21 The first SMPs covering the whole coastline of England and Wales were completed in 1999. They provide the basis for a holistic, sustainable approach to coastal defence planning over the next 50 years.

3.22 The next round of SMPs begins this year with the aim of further improving the consideration of long-term natural processes, including climate change and integration with the planning system. This will be supported by the findings of a £1 million research project on the likely future evolution of the coastline. The results, due shortly, will be a GIS-based system for modelling the probable coastline changes over the next 50 to 100 years.

3.23 The new SMPs should also contribute to the targets set out in the UK BAP for the conservation, restoration and, where appropriate, enhancement of those species and habitats considered to be of conservation importance.

Coastal Habitat Management Plans (CHaMPS)

CHaMPS is an initiative being developed through the EU Life funded *Living with the Sea* project, which is being undertaken jointly by English Nature, NERC, the Environment Agency and DEFRA. The project, which runs from December 1999 to December 2003, will involve the preparation of seven CHaMPS, best practice guidance on habitat creation, and a framework for managing European habitats on changing coastlines. Each CHaMP will identify likely losses and gains in wildlife habitats over the next 30-100 years, the flood and coastal defence works that need to be undertaken to maintain protected habitats, and the new habitats that will need to be created to offset losses. CHaMPS will also include strategic habitat-monitoring programmes to map future changes. The actions will be delivered through Shoreline Management Plans and flood and coastal defence strategies and schemes.

IMPROVING WATER QUALITY

3.24 Achievements under a number of EC Directives have played, and will continue to play, a key part in improving the quality of water and protecting aquatic life around our coasts.

3.25 *The Bathing Water Directive*[8] sets mandatory water quality standards as well as more stringent guideline levels that Member States must endeavour to meet. In 2001, 546 identified coastal bathing waters were sampled in the UK. 95 per cent passed the mandatory standards and 57 per cent met the guideline values (up from 77 per

Improving bathing water:

- **£2 billion has been invested since the early 1990s**
- **A further £600 million is being invested between 2000 and 2005**

[8]Directive 76/160/EEC

cent and 30 per cent respectively in 1990) which are required to qualify for a Blue Flag award.

3.26 The UK is working closely with the EC to develop a revised bathing water policy that takes account of developments in science, technology and research. We are looking to develop a Directive that protects public health and is rooted in sound scientific evidence and takes into account cost benefit analysis.

3.27 In addition, the *Shellfish Waters Directive*[9] aims to protect and improve the quality of waters in which shellfish grow. There are currently 161 designated waters in the UK, up from 40 in 1998. A further 75 were designated in Scotland in March. The Directive sets mandatory water quality standards that must be met for designated shellfish waters, together with more stringent guidelines that Member States must endeavour to meet. All shellfish waters have comprehensive pollution reduction programmes in place, which include intensive water quality monitoring.

3.28 The *Water Framework Directive*[10] sets out a framework for protecting waters, including coastal waters, with the aim of achieving demanding water quality targets by 2015. This will be carried out through comprehensive river basin management and should contribute to the protection of specific marine sites. This will include, *inter alia*, setting water quality standards and emission controls for priority substances. We want the UK to be amongst the leaders in Europe in ensuring successful implementation and will pool our expertise and work with the EC and Member States to deliver the targets.

3.29 The *Urban Waste Water Treatment Directive*[11] (UWWTD) sets standards and deadlines for the treatment of sewage according to the population served by sewage treatment works, and the sensitivity of the receiving waters to adverse effects from their discharges. The Directive also covers waste water collecting systems and limiting pollution from storm water overflows. By the end of 2002, 98 per cent of discharges from sewage treatment works serving populations over 15,000 people will receive primary and secondary treatment before entering receiving waters.

3.30 Furthermore, by the end of 2005 in England and Wales, primary and secondary treatment will be the minimum standard for all freshwater, estuarine and coastal discharges from sewage treatment works serving populations of 2000 or more. This minimum standard for coastal discharges goes beyond the requirements of the Directive.

3.31 The *Blue Flag* award for beaches provides a comparison with coastal resorts across Europe. As well as meeting the guideline values for bathing water quality, the beach must be clean, well-managed and promote sound environmental management. National sustainable tourism indicators[12], published in 2001, include the number of beaches with a *Blue Flag* or a *Seaside Award* (a similar scheme that applies for rural and resort beaches). Last year, UK beaches received 55 Blue Flags and 308 Seaside Awards (up from 41 and 260 respectively in 1999).

TAKING THINGS FORWARD

3.32 Over the last decade, we have made considerable progress in understanding the stewardship of our coastline and its waters. We are now about to move into a new phase of increased emphasis and awareness.

3.33 We welcome the EC's proposals for a Recommendation on ICZM. If adopted, they will be a driving force for progress at all levels: locally, regionally, nationally and internationally. Once we have a clear idea of the final text of the Recommendation later in 2002 we will hold a joint conference of the national coastal fora. This will be a chance to discuss the way forward and begin consultation on the Government's plans for implementation.

3.34 We will continue to invest to drive up compliance with EC Directives to improve water quality. We want to be amongst the leaders in Europe in ensuring successful implementation of these Directives.

3.35 Our initiative to provide a focal point to build on existing seabed mapping in coastal waters around the UK and consider how best to make

[9]Directive 79/923/EEC
[10]Directive 2000/60/EC
[11]Directive 91/271/EEC
[12]National Sustainable Tourism Indicators – Monitoring Progress Towards Sustainable Tourism in England, English Tourism Council, 2001

the data available to interested parties will improve our understanding of the coastal zone and provide for more informed decision-making at all levels. Our commitment to develop Ecological Quality Objectives and our environmental monitoring framework will enable us to assess our progress in delivering an ecosystem-based approach to marine management of our seas, oceans and coasts.

3.36 We will also undertake a comprehensive, factual review of all the institutions, laws and stakeholders that influence our coastal areas. Once this has been completed we will begin consulting on draft coastal strategies for each of the national administrations. In 2006 we will have developed an overarching vision for the future of the UK's coastline, underpinned by a fully integrated set of strategies for England, Wales, Scotland and Northern Ireland.

Tackling pollution from land-based sources and dumping at sea

- **Globally about 80 per cent of marine pollution comes from a variety of land-based activities. The UK is working nationally and through OSPAR, the EC and other international fora to tackle pollution from land-based sources.**

- **Continued research is providing a better understanding of the significance of the effects of hazardous substances and endocrine disrupters. The UK and its partners are working through OSPAR to reduce or eliminate inputs of radioactive substances and hazardous substances of most concern by 2020.**

- **Over the past 20 years the UK has phased out most forms of dumping of waste at sea and the remainder are strictly controlled. The UK encourages other countries to apply similar controls and to ratify the *London Convention Protocol 1996.***

LAND-BASED POLLUTION

4.1 Land-based activities such as farming, together with industry and households, have a huge potential impact on the marine environment if they are not properly regulated. It is therefore vital that the stewardship concept and an ecosystem-based approach encompass the management of pollutant releases and provide an understanding of the main pathways by which pollutants reach the seas.

4.2 Contamination of marine wildlife, habitats, seafood and seawater with chemicals, sewage or other land-based pollutants is a cause of ecosystem damage and disease in coastal communities in many parts of the world. Certain persistent organic substances such as PCBs and heavy metals such as cadmium can accumulate in shellfish and in top predators, including humans. Some substances known as endocrine disrupting chemicals (EDCs) also have the potential to impair reproductive processes in aquatic organisms.

HAZARDOUS SUBSTANCES

4.3 At the national and regional level, work is being undertaken through the EC and OSPAR to tackle the threats that hazardous substances pose to the marine environment. OSPAR Decisions and Recommendations and EC Directives have reduced discharges of heavy metals, organic substances and other hazardous chemicals into the North East Atlantic. Figure 4.1 (overleaf) shows how UK inputs of heavy metals and lindane into the marine environment have fallen since 1985. The UK has published a strategy on the Sustainable Production and Use of Chemicals to avoid harm to the environment or to human health through environmental exposure to chemicals[13].

The UK is working nationally and internationally to tackle pollution Photographer Paul Kay

[13]Sustainable Production and Use of Chemicals: A strategic approach, DETR, December 1999

Figure 4.1: UK Inputs (waterborne loads/year) of heavy metals and lindane (as reported to the 5th North Sea Conference)

Year	Mercury (t)	Cadmium (t)	Copper (t)	Lead (t)	Zinc (t)	Lindane (kg)
1985	27	79.9	1275	1660	3630	1560
1988	19.9	65.9	893	633	3168	1420
1990	11.8	63.6	850	667	3920	780
1991	10.6	63.4	711	655	3800	910
1992	8.4	45.3	729	539	3870	689
1993	8.9	39.7	704	637	3203	729
1994	7.3	36.7	720	558	3462	636
1995	6.1	30.7	645	419	2805	627
1996	4.6	26.6	469	330	2110	370
1997	4.8	19.6	497	389	2178	419
1998	6.0	22.5	660	606	2660	591
1999	4.3	22.8	664	558	2609	494

4.4 As part of OSPAR's strategy for hazardous substances, a work programme has been developed to identify those hazardous substances which are of greatest concern, prepare assessments on the main sources and pathways to the marine environment and to develop or promote appropriate measures to achieve the 2020 cessation target for these substances. Around 30 substances for priority action have been identified so far and individual Contracting Parties take forward work on specific substances. The UK is taking the lead on mercury, octylphenol and 2,4,6 tri-tert-butylphenol. Another key priority is to develop appropriate monitoring and assessment techniques to measure progress.

OSPAR's 1998 Strategy for Hazardous Substances

Objective

- **to prevent pollution of the maritime area by continuously reducing discharges, emissions and losses of hazardous substances, with the ultimate aim of achieving concentrations in the marine environment near background values for naturally occurring substances and close to zero for man-made synthetic substances.**

Timeframe

***By 2000*: the Commission will, for the whole OSPAR maritime area, work towards the reduction of discharges, emissions and losses of hazardous substances which could reach the marine environment, to levels that are not harmful to man or nature with the aim of their elimination**

***By 2020*: the Commission will implement the strategy progressively by making every endeavour to move towards the target of the cessation of discharges, emissions and losses of hazardous substances**

4.5 The *Integrated Pollution Prevention Control Directive* (IPPC)[14] requires that all major industries apply BAT to limit discharges and emissions of hazardous substances into the environment. National regulations have been adopted to implement the provisions of the Directive and to improve transparency. The Environment Agency has set up an on-line facility which enables the public to see the levels of key substances which are being emitted from particular installations in specific areas: www.environment-agency.gov.uk.

4.6 Effort is now switching to prioritising additional hazardous substances, using agreed hazardous properties as selection criteria, and identifying substances of equivalent concern such as endocrine disrupters; together with the development of biological monitoring techniques which can reveal the cumulative effects of

[14]Directive 96/61/EE

mixtures of chemicals. Another priority is the further development and implementation of a Europe-wide framework for ensuring that risks from chemicals are minimised and that harmful chemicals are not used or put on the market.

4.7 As noted in Chapter 3, the *Water Framework Directive* establishes a strategic framework for protecting waters, including coastal and transitional waters, with the aim of achieving demanding water quality targets by 2015. Certain priority substances will be subject to cessation or phasing out of discharges, emissions and losses within 20 years of the adoption of measures for this purpose.

International efforts

4.8 Internationally we are in the process of ratifying the *1998 Protocol on Heavy Metals* to the *1979 UNECE Convention on Long Range Transboundary Air Pollution*. The Protocol aims to reduce the total annual emissions of cadmium, lead and mercury to below 1990 levels. It requires the application of BAT to certain combustion and industrial sources together with the application of emission limit values for particulates, lead and mercury to certain new stationary sources and certain existing sources.

4.9 The UK has begun preparations to ratify the *Stockholm Convention on Persistent Organic Pollutants* (POPs). POPs are chemicals that are toxic, persistent, bioaccumulate in fatty tissues and biomagnify through the food chain. The Convention was signed by 127 countries in May 2001 in response to the need for urgent global action to protect human health and the environment from POPs. It seeks the elimination or restriction of production and use of 10 intentionally produced POPs, including PCBs and DDT. These chemicals have already been banned by many signatories to the Convention, including the UK.

4.10 The UK has also taken a leading role in supporting the implementation and development of the *Washington Global Programme of Action* (GPA) and associated *Washington Declaration*, which was adopted by 108 governments in 1995 in Washington, USA. This reflects the importance that the GPA has for making a major contribution to our environmental and development objectives.

The GPA can help to deliver environmental and development objectives by:

- **improving the health, food security and economic well-being of coastal communities, as well as protecting coastal habitats and species**
- **fostering better co-operation and resource allocation among the UN agency and donor community through its multi-sectoral and integrated approach, as well as facilitating the mobilisation of resources from the private sector**

4.11 The GPA is designed as a framework for integrated, multi–sectoral action to be drawn upon by national governments to assist them in protecting the marine environment from the consequences of land-based activities. National and regional programmes of action are identified as the key modes for action in taking forward the GPA. It was reviewed by governments in Montreal in November 2001. The resulting *Montreal Declaration* underlined the commitment of the international community to GPA implementation.

4.12 Particular emphasis was placed on the role to be played by the regional seas conventions, including OSPAR, and how they can play a key part in improving oceans governance, including bringing together all stakeholders around the common focus of the GPA. This will include working within OSPAR to explore a twinning arrangement with the West African Regional Seas Convention.

EUTROPHICATION

4.13 Eutrophication is the undesirable effect of nutrient enrichment of our seas as a result of human activities. It tends to occur in coastal areas of the eastern part of the North Sea or the Wadden Sea, or in susceptible estuaries. The effects of eutrophication can include changes in species composition and increased oxygen consumption in water and sediments. This can have detrimental effects on benthic fauna and the water column.

4.14 The UK is working with its partners in the EC and OSPAR to combat the threats that eutrophication poses. An initial assessment of the OSPAR maritime area, which includes UK marine waters, is currently under way within the remit of OSPAR in order to assess their eutrophication status. This will complement assessments of freshwater estuaries and nearshore waters which are being undertaken under relevant EC Directives. The results of the current UK assessment under OSPAR will be available in 2003.

4.15 Under the *Nitrates Directive*[15], action plans to control the agricultural sources of nitrates are required in catchment areas draining to marine areas found to be eutrophic. Under the Urban Waste Water Treatment Directive (UWWTD), investment programmes provide more stringent treatment to reduce nutrients (nitrogen and/or phosphorus) at qualifying sewage works identified as sensitive areas. Marine waters also gain an indirect benefit in terms of reduced nutrient inputs due to action under the Directives in respect of any designations of inland waters.

4.16 Nitrate Vulnerable Zones under the *Nitrates Directive* will expand significantly during 2002 following consultation. Separate consultations are being carried out in England, Scotland and Wales. A review of sensitive areas was carried out in 2001, as required by the UWWTD, and further designations are expected in 2002.

4.17 The OSPAR *Strategy to Combat Eutrophication* requires the application of reduction measures in respect of those sources of nutrients which contribute directly or indirectly to problem areas in the OSPAR maritime area. Where an area is designated as a potential problem area, the OSPAR Strategy calls for preventive action.

4.18 More generally, the UK has developed codes of good agricultural practice which are aimed at reducing the emissions and losses of nutrients from agriculture for the general benefit of the land, air and waters in and around the UK.

4.19 The UK has also signed up to the *Gothenberg Protocol*, which aims to abate acid rain, eutrophication and ground level ozone.

OSPAR's 1998 Strategy to combat eutrophication

Objective

- **To combat eutrophication in the OSPAR maritime area, in order to achieve and maintain a healthy marine environment where eutrophication does not occur. The target date for achieving this objective is 2010.**

Assessment of eutrophication status

In order to determine what action is required under the OSPAR Strategy, there is a need to classify marine areas as problem areas, potential problem areas or non-problem areas. This is to be done by application of the OSPAR *Common Procedure*.

Action required

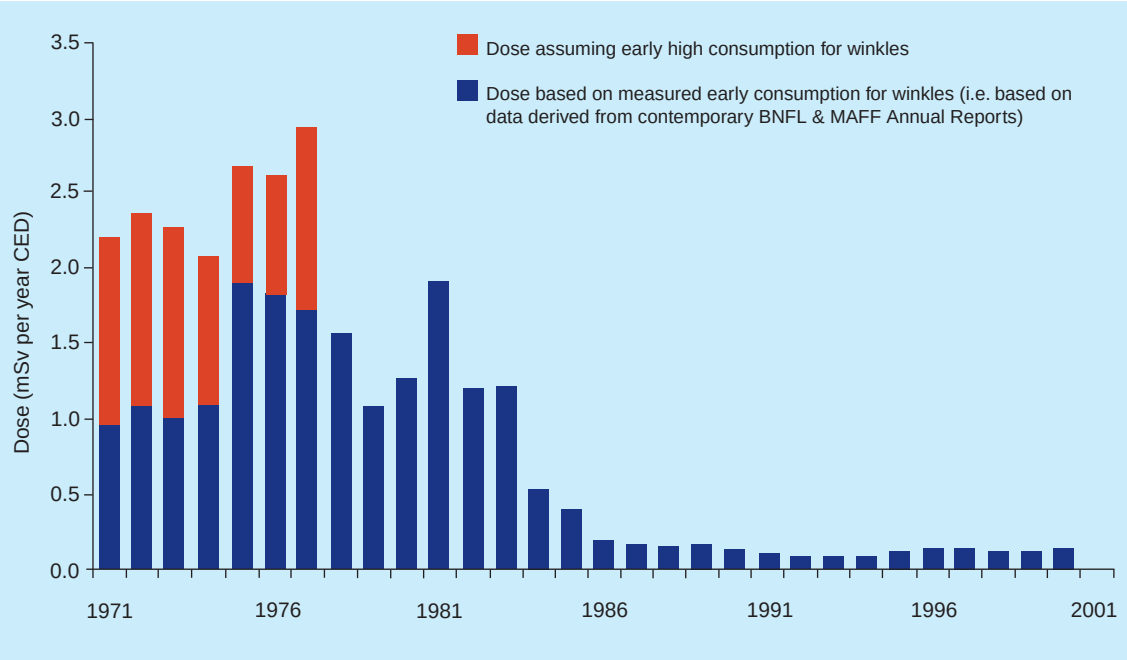
Action within catchment areas, *eg* to reduce the discharges, emissions and losses of nutrients, will be required depending upon the eutrophication status of the receiving marine waters. The main sources are the effluents from sewage treatment works and losses from agriculture. The principal nutrient of concern is nitrogen.

Parties to this Protocol have to meet individual ceilings by 2010 for four transboundary pollutants: sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia. The protocol sets emission limit values for certain processes and emission reduction strategies. There is also an obligation to provide public information on the problems of acidification, eutrophication and ground level ozone, as well as offer best practice guidance on feedback and reductions.

4.20 Emission levels for the four transboundary pollutants covered by the Protocol have reduced over the past decade, substantially in most cases. For example, in 1998 emissions of nitrogen oxides (1753 kilo tonnes) were less than two thirds of the level in 1990 (2788 kilo tonnes); while emissions of ammonia have reduced by about 5 per cent over the same period (from 366 to 350 kilo tonnes). This is the result of greater efficiency, better technology, cleaner fuels and

[15]Directive 91/676/EEC

Figure 4.2: Estimated dose to the Sellafield critical group of fish and seafood consumers 1971–2000



more stringent regulation; all of which have reduced nitrogen deposition in the marine environment. The ceilings agreed for emissions under the *UNECE Protocol* for 2010 will continue this downward trend (*eg* 1181 kilo tonnes for nitrogen oxides; 297 kilo tonnes for ammonia). The UK is to prepare a strategy setting out how the *Gothenburg Protocol* will be delivered.

4.21 The forthcoming EU *National Emission Ceilings Directive* will also set emission ceilings for the same four pollutants for the EC. The Directive was proposed to show the ECs commitment to reducing acidification, eutrophication and ground level ozone. Under the Directive the UK has been set lower ceilings for both sulphur dioxide and nitrogen oxides.

RADIOACTIVE SUBSTANCES

4.22 Radioactive substances are closely regulated to protect the natural environment from harmful levels of radioactivity and to safeguard quality of life. In particular, regulatory arrangements are designed to ensure that radioactive wastes are not created unnecessarily, and that those wastes that are created are managed and disposed of in ways that protect the public, the workforce and the environment. Much has been done in the UK through the application of Best Practicable Means to achieve substantial reductions in discharges over the last 25 years.

4.23 In the wider context of environmental protection and sustainable development, we are committed to managing radioactive wastes, whether they are in solid form or as liquid or aerial authorised discharges, in ways that will not place greater burdens on future generations. Protecting our seas is a major part of this commitment. As can be seen from figure 4.2, we have dramatically reduced the most harmful radioactive discharges into the marine environment, as indicated by the estimated doses to the Sellafield critical group of fish and seafood consumers.

4.24 These discharge reductions have caused the impact of radioactive substances in the marine environment to decline to the extent that the OSPAR *Quality Status Report 2000* does not

OSPAR's 1998 Strategy for Radioactive Substances

Objective

- **Prevent pollution of the maritime area from ionising radiation through progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim of concentrations in the environment near background values for naturally occurring radioactive substances, and close to zero for artificial radioactive substances.**

In achieving this objective, the following issues should, *inter alia*, be taken into account:

- **legitimate uses of the sea**
- **technical feasibility**
- **radiological impacts to man and biota**

Time frame

***By 2000:* the Commission will, for the whole maritime area, work towards achieving further substantial reductions or elimination of discharges, emissions and losses of radioactive substances;**

***By 2020:* the Commission will ensure that discharges, emissions and losses of radioactive substances are reduced to levels where the additional concentrations in the marine environment above historic levels, resulting from such discharges, emissions and losses, are close to zero.**

list this as an issue of major importance. In the past, the driving force for reducing radioactive discharges has been the protection of human health. The new challenge is to ensure that non-human biota are also adequately protected. This is being addressed internationally, in part through the OSPAR Convention.

4.25 In June 2000 the Government issued for consultation a draft UK *Strategy for Radioactive Discharges 2001-2020* to show how the UK is working towards achieving the OSPAR target for 2020. The final version of the UK strategy, which will be updated every four years, will be published this year. It will include estimated discharge profiles, from the various nuclear sectors, from 2001 to 2020 and show how we will implement the OSPAR targets rigorously and transparently and in a way that is proportionate to the risks, costs and benefits involved.

4.26 In implementing the OSPAR Strategy, the OSPAR Commission has undertaken to develop environmental quality criteria for the protection of the marine environment from adverse effects of radioactive substances and to report on progress by 2003.

4.27 In addition, the EC's *Marina II* study is looking at concentrations of radioactive substances in different compartments of the marine environment and is expected to provide the data against which OSPAR can determine historic levels. A key element of the project is further development of the scientific tools for assessing radiation exposure and risk, especially to marine organisms. This project will provide an update on the original Marina study on the radiological exposure of the European Community from radioactivity in north European waters, using data on discharges and environmental concentrations up to January 2000. The UK fully supports such evidence-based policy-making.

What do we mean by "close to zero" and "historic levels"?

The terms "close to zero" and "historic levels" are not defined in the OSPAR Strategy and no agreement on their interpretation has been reached within the OSPAR Commission. The UK has funded research projects to identify key environmental indicators for radioactive substances, to develop modelling approaches for predicting future environmental concentrations on the basis of these indicators, and to investigate statistical approaches to the definition of "close to zero".

Transporting radioactive materials by sea

British Nuclear Fuel Limited (BNFL) and its shipping arm, Pacific Nuclear Transport Ltd (PNTL) began transporting nuclear materials by sea in 1966.

Its ships have carried over 4,000 flasks and covered over 4.5 million miles without a single incident involving the release of radioactivity. PNTL ships are purpose-built to meet the highest standards of safety.

4.28 As well as taking action to reduce radioactive discharges, the UK ensures that all shipments of radioactive materials are strictly undertaken within the terms of all relevant international recommendations and requirements covering nuclear safety, security and nuclear non-proliferation. For more than 30 years, shipments of nuclear materials and radioactive wastes have been safely carried out between Europe and Japan without a single incident resulting in the release of radioactivity. The ships used to carry the transport flasks are purpose built to meet the highest safety requirements of the International Martime Organisation's *International Maritime Dangerous Goods (IMDG) Code* as it relates to the transport of nuclear materials. This incorporates the requirements covering the transport of nuclear materials established by the International Atomic Energy Agency (IAEA).

ENDING DUMPING AT SEA

4.29 The UK has considerably reduced its use of the sea for disposal purposes, with consequent benefits for the marine environment. In the past, sea disposal was seen as a convenient outlet for waste material from coastal communities. Now only dredged material is disposed of in significant quantities. Applicants for licences to dispose of dredged material are first required to seek beneficial uses for it.

The London and OSPAR Conventions

4.30 In 1972 the *Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter*, also called the *London Convention* was adopted. This was the first major global initiative

UK sea dumping of:

- **Radioactive waste ceased in 1982**
- **Industrial waste ended in 1992**
- **Sewage sludge was phased out in 1998 Incineration of waste at sea has not been permitted since 1990**

designed to protect the marine environment from unregulated dumping or incineration of waste from vessels, aircraft or platforms. Currently, 78 countries are contracting parties to the *London Convention*. A Protocol to the Convention was agreed in 1996. This strengthens existing global controls by greatly reducing the range of materials which may be considered for sea disposal. The UK was one of the first countries to ratify the Protocol and has been active in promoting increased membership, particularly among developing countries. At present the Protocol has been ratified by 15 countries – 11 short of the number required to bring it into force.

4.31 The *OSPAR Convention* was drawn up in 1992 as a successor to the *1972 Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft* and the *1974 Paris Convention for the Prevention of Marine Pollution from Land-Based Sources*. It therefore covers not only disposal from vessels but also pipeline discharges. As far as sea disposal from vessels, platforms or aircraft is concerned, Annex II of the Convention bans all material from being dumped at sea except for dredged material, inert material of natural origin and fish waste from industrial processing operations.

Marine litter

Although the dumping of waste is prohibited under the OSPAR Convention and the dumping of garbage and litter from ships in the North Sea is prohibited under MARPOL Annex V, marine litter remains a problem for many coastal communities and the marine environment. At the 5th North Sea Conference, Ministers agreed to give priority to projects that effectively address the problem of marine litter.

4.32 At the Ministerial Meeting of the OSPAR Convention, held in Sintra, Portugal, in 1998, the dumping, and leaving wholly or partly in place, of disused offshore installations within the maritime area was prohibited. This was a significant step forward from the previous position of considering each on a case-by-case basis.

4.33 The Ministers agreed that derogations would be possible if there are significant reasons why an alternative to re-use, recycle or disposal on land is preferable in the case of the footings of steel installations weighing more than 10,000 tonnes or of concrete installations (there are only 11 concrete platforms in the UK waters to which the derogation might apply). Ministers agreed to strive to avoid using derogations. The topsides of every installation and any steel installation placed in the sea after 9 February 1999 must be completely removed at the end of its useful life.

UK legislation

4.34 The UK implements international obligations and imposes national regulation on deposits in the sea by means of the *Food and Environment Protection Act 1985* (FEPA). The disposal, including the beneficial use of dredged material in the sea, requires a licence issued under FEPA. This is only granted after chemical analysis of the material to be dumped and detailed scientific assessment of the potential environmental impact. Disposal at sea is not permitted where an alternative option is available and increasingly alternative uses are being found for material dredged from the sea, either in soft sea defences or to mitigate habitat loss caused by rising sea levels or land reclamation.

TAKING THINGS FORWARD

4.35 Much has been achieved in recent years to tackle many of the problems of marine pollution from land-based activities and dumping at sea. Inputs of some hazardous substances have decreased considerably due to control measures that have been adopted. We will continue to work through the EC and OSPAR to prioritise additional hazardous substances for further action and develop and implement a Europe-wide framework to ensure that risks from chemicals are minimised. We will work towards the OSPAR target of cessation of discharges, emissions and losses of hazardous substances by 2020.

4.36 In tackling nutrients and eutrophication, we will complete the assessment of the eutrophication status of all UK marine waters, under OSPAR, by the end of this year. This will provide the basis for identifying those catchment areas from which nutrient inputs are either creating problems or have the potential to do so. This, in turn, will allow any significant sources of nutrients to be identified and priorities to be established for remedial or preventive action.

4.37 For radioactive substances, we will publish this year the final version of the UK Strategy for Radioactive Discharges 2001–2020. This will show how the UK is working towards achieving further substantial reductions in radioactive discharges, as required by the OSPAR Strategy. We will update this strategy every four years.

4.38 The UK has already taken substantial steps to reduce the impact of sea disposal. We will continue to encourage countries, particularly developing countries, to ratify the 1996 Protocol to the London Dumping Convention

4.39 To support the development of an ecosystem-based approach to managing our marine environment we will optimise the UK's marine environment monitoring system and develop a framework of indicators, which will include the Ecological Quality Objective developments within OSPAR. We will develop a first integrated assessment of the UK marine environment in 2004, which will help to demonstrate our progress towards an ecosystem-based approach.

The importance of shipping and ports

- **Shipping and ports serve our nation's economic needs, supporting the competitiveness of both national and regional economies. Both need to operate in a way that is sustainable.**

- **The Government is committed to reducing the risk of marine pollution occurring from accidental or deliberate shipping discharges by taking pre-emptive action through international and domestic fora.**

- **The Government has a well-rehearsed *National Contingency Plan* in place to counter actual or threatened pollution from a shipping incident, and stands ready, with the ports industry, to deal with incidents so as to minimise damage to our coastline.**

THE CONTRIBUTION OF SHIPS AND PORTS

5.1 Over 90 per cent of the UK's overseas trade is carried by sea with 7 per cent of our internal freight also moved by sea. Over 388 million tonnes of international freight passed through UK ports in 1999. This represents 95 per cent of the UK's international freight tonnage movements and 75 per cent by value. Another 177 million tonnes of domestic freight moved through UK ports. Over 70 million passenger journeys per year are taken to, or from, our ports.

5.2 It is in the national interest that the shipping industry remains effective and efficient, and that our ports remain able to handle current UK trade and its potential development efficiently and sustainably. The demonstrable impact of shipping activity and port development and operations, especially on coastal wetlands and wildlife in territorial waters, highlights the importance of adopting the stewardship concept and an ecosystem-based approach to the management of these activities. Responsible stewardship is necessary to ensure the management of shipping and ports is compatible with national and international environmental objectives.

Milford Haven port – over 90% of UK overseas trade is carried by sea
Photographer Paul Kay

5.3 The UK is adjacent to one of the world's busiest sea-lanes – the English Channel – and most of the ships passing our shores do not call at our ports. Shipping is by its nature an international industry which requires international controls to regulate it. These are put in place in the UK by working through the International Maritime Organization (IMO). Safe seas for those that use them are an important element of our vision.

5.4 In addition we work within the European Union to ensure common application of the IMO requirements across the Community. As a coastal state, our ability to restrict or control shipping movements in or near our waters is necessarily limited by established freedoms of navigation, principally through UNCLOS.

5.5 We involve stakeholders through the Marine Pollution Advisory Group (MPAG), a group which has proved most successful in assisting policy development on live issues as well as acting as a useful forum for exchange of views. Chaired by Government, MPAG comprises representatives of a number of UK Government Departments and devolved administrations, local government associations, non-departmental public bodies, industry associations and non-government organisations. The broad range of interests represented on MPAG, and its ability to focus on specific issues and pursue them to a conclusion, has enabled the Group to make a particularly valuable contribution to policy development in the field of marine pollution during recent years. We are looking at how we might further develop the work of MPAG.

5.6 Pollution arising from shipping movements contributes a relatively small fraction of the overall level of marine pollution. But the effects of accidental or deliberate discharges can damage a local area environmentally and economically. Addressing the threat posed by pollution by shipping, both accidental and operational, is instrumental in delivering our ecosystem-based approach. Our policies are aimed at reducing the risk of such pollution though international and domestic action and at ensuring that when incidents do occur our national response minimises the damage caused.

Sea Empress – oil spills can damage a local area's environment and economy

THE UK'S APPROACH

5.7 Since Lord Donaldson's 1994 report *Safer Ships, Cleaner Seas* following the sinking of the oil tanker *Braer* off Shetland in 1993, the UK has radically altered its approach to the environmental risks arising from shipping. The UK carried out further reviews following the grounding of the *Sea Empress* on rocks in the entrance to Milford Haven in 1996. Actions were taken domestically and through both the IMO and the European Union.

5.8 To reduce the risk of accidental discharges we are also seeking to enhance the standard of the world's shipping fleet and to eliminate sub-standard operators. This is done, primarily, through port state control inspections of foreign flagged vessels using our ports to ensure they comply with international standards set by the IMO. We also seek to ensure that our own vessels operate to the highest standards and that all flag states are reminded of their responsibilities under maritime law.

5.9 Our aim is to reduce operational discharges from ships by detecting and deterring, through prosecution, those who continue to discharge illegally. This is backed up by the provision of adequate port waste reception facilities to ensure that there is no excuse for discharging ship waste during sea passages.

5.10 We have also radically altered our response arrangements to maritime casualties. We have taken steps to ensure that environmental considerations are fully taken into account during

Port marine safety code

- **The code applies the well-established principles of risk management and safety management systems to port marine operations**
- **It applies to all harbour authorities with powers to direct shipping and to regulate navigation. It also applies to local lighthouse authorities. Harbour authorities must be openly accountable for their legal duties and powers**
- **The code holds them accountable for the outcome of their policies, their procedures, their allocation of resources to safety management and their management of personnel.**

salvage and clean-up operations. We are further working to ensure that adequate compensation is made available, with the minimum delay, to those who suffer economically following a pollution incident caused by a ship.

5.11 A further consequence of the *Sea Empress* incident was that the Government developed a *Port Marine Safety Code* with all sides of the industry. Published in March 2000, the Code is a national standard and a guide to best practice. It also offers a framework for harbour authorities preparing policies and plans in consultation with local users and other interests. With the support of the ports industry, the Government is also developing national standards for all port marine personnel, including pilot training and examination.

Routeing measures

Routeing measures, introduced through agreement at the IMO, are designed to make shipping around the UK safer by protecting the marine and coastal environment. They include a deep water route to the west of the Outer Hebrides (which laden tankers over 10,000 gross tonnes are normally requested to use rather than passing the Little Minch or North Minch), the Traffic Separation Scheme in the English Channel, and a number of Areas To Be Avoided (including those located around the Orkney Islands and the Shetland Islands). Compulsory reporting measures are also in place in the Channel.

5.12 In his 1994 report Lord Donaldson expressed concern about the lack of knowledge of shipping movements around our coasts. Since then the UK has put in hand comprehensive shipping surveys, together with compulsory IMO reporting requirements in the English Channel. At other locations there are voluntary reporting systems and the UK has actively supported the mandatory carriage by IMO regulation of transponders which will allow our Coastguard to identify and monitor all shipping movements around our coasts.

INTERNATIONAL MEASURES

Protection for Special Areas

5.13 The UK has worked with neighbouring states to convince the international maritime community through the IMO of the need to introduce tighter rules and standards to regulate discharges from ships in their waters under the *International Convention for the Prevention of Pollution from Ships* (MARPOL). The UK played a lead role in persuading the IMO to agree to the designation of North West European waters – including the North Sea, the English Channel, the Irish Sea and other UK waters – as a Special Area under Annex I of MARPOL (covering prevention of pollution by oil) and for the North Sea to be designated a Special Area under Annex V of MARPOL (covering prevention of pollution by garbage from ships). Under these provisions, the disposal into the sea of both oil and garbage is governed by much more stringent limits than in other marine areas under international law, recognising that our waters deserve greater protection from pollution deriving from ships.

Anti-fouling paints

5.14 Anti-fouling paints are used on the hulls of ships to prevent marine organisms from attaching themselves, thereby slowing down the speed of the vessel and increasing fuel consumption. Some of the most effective active ingredients in anti-fouling paints are organotins, particularly tributyltin (TBT). However, these compounds can

have serious detrimental effects on the environment. The UK has banned the sale and use of TBT paint for vessels under 25 metres since 1987.

5.15 The IMO's Marine Environment Protection Committee recognised that TBT is a worldwide problem and has developed an international instrument. The *International Convention on the Control of Harmful Anti-Fouling Systems* on ships, adopted in October 2001, bans the application of organotin from 1 January 2003 and its use as an anti-foulant on ships from 1 January 2008. It sets out a system of survey, certification and enforcement to implement the ban and includes a mechanism to regulate other systems if they pose an environmental risk. The UK is working towards early ratification of the Convention, taking into account developments in Europe. The European Commission is proposing to amend a Directive to ban the marketing and use of organotin acting as biocides on all ships, and is developing a regulation which would apply some elements of the Convention to EU flagged ships and ships calling at EU ports if the Convention is not in force by 1 January 2003.

Ballast water management

5.16 Ships use ballast water for safe and cost-effective operations, for example to adjust their stability, particularly when they are unloaded or partially unloaded. But there is a risk that non-native marine species can be introduced inadvertently when ships discharge ballast water and ballast tank sediment, usually in port. If these species become established they can upset local ecosystems.

5.17 OSPAR and the North Sea Conference support the need for concerted action through the IMO to establish mitigation and control measures for the management of ships' ballast water and sediments. The IMO's Marine Environment Protection Committee produced guidelines in 1997. Since then, it has been working on drafting an *International Convention for the Control and Management of Ships' Ballast Water and Sediments*. The UK chairs the Working Group that is developing the Convention. A Diplomatic Conference to adopt the Convention is scheduled for 2003. The Convention will require all ships which use ballast water to meet minimum requirements, such as a ballast water management plan, and allow for stricter controls to be applied in designated ballast water management areas.

International Safety Management (ISM) Code

5.18 The ISM Code, which will apply to most internationally trading vessels from July 2002, provides an international standard for the safe management and operation of ships and for pollution prevention. As part of it, shipping companies must establish an environmental protection policy, which must be periodically audited both internally and externally. The UK regards the ISM Code as an important means of encouraging environmentally responsible shipping, and a major factor in the elimination of sub-standard ships and problems associated with these. Similar measures are being introduced on small domestic passenger vessels, and consideration is being given to an extension of the ISM Code to all UK registered vessels.

International oil pollution compensation regime

5.19 At the IMO in October 2000, the UK played a leading role in achieving agreement to a substantial increase in the maximum amount available under the international oil pollution compensation regime. From November 2003 the amount of compensation available for any single oil spill from a tanker will rise by 50 per cent to approximately £180 million.

Hazardous and Noxious Substances Convention

5.20 The UK took a high profile in the work up to and during the 1996 IMO Diplomatic Conference which successfully adopted the *International Convention on Liability and Compensation for Damage in Connection with the Carriage by Sea of Hazardous and Noxious Substances 1996* (the HNS Convention). The convention will introduce a compensation fund similar to that applying for oil tanker pollution which will avoid the need for

court actions, making it much easier for claimants to recover their losses. It will require compulsory insurance and provide a right of direct action against the insurer.

5.21 The UK is actively working to achieve the entry into force of the Convention and is co-ordinating a working group of IMO Member States, interested industry parties and other stakeholders to assist potential State Parties in resolving any practical difficulties in setting up the regime. The UK is also pressing hard in Europe for the early implementation of the Convention amongst EU Member States as part of a strategy for maritime liability, preparedness and response.

Bunkers Convention

5.22 Ships' fuel oil (bunkers) was the one significant source of marine pollution from ships which was not covered by an international agreement to establish specific liability and compensation arrangements. The *International Convention on Civil Liability for Pollution Damage Caused by Bunker Oil 2001* (the *Bunkers Convention*) was successfully adopted in March 2001, and the UK played a key role in pressing for this convention and on the work leading to its development. Like other maritime conventions on liability and compensation, the *Bunkers Convention* will apply the principles of strict liability and compulsory insurance, with a right of direct action against the insurer.

5.23 The UK is now actively working to bring the *Bunkers Convention* into force. The Convention forms part of the strategy of maritime liability, preparedness and response that the UK has initiated within Europe to encourage the implementation of a raft of important IMO conventions amongst EU Member States.

DOMESTIC MEASURES

Prosecutions and Port State Control Detentions

5.24 We are working with other European countries to deal with the problem of illegal discharges from ships. Prior to 1998, prosecutions for marine pollution offences were not co–ordinated by a single agency and were neither frequent nor very successful. However, since the establishment of the Maritime and Coastguard Agency's (MCA) centralised Enforcement Unit, there has been a much larger number of prosecutions and the success rate has been close to 100 per cent. Aerial surveillance plays a significant role in identifying and deterring marine pollution by ships. We also share satellite information with other states which are Contracting Parties to the *Bonn Agreement*.[16]

Prosecuting offenders – a new network

A key outcome of the *5th North Sea Conference* was a commitment by North Sea states to work through the *Bonn Agreement* to create a network of investigators and prosecutors to enforce more effectively the internationally agreed rules and standards for the prevention, control and reduction of pollution from ships.

This network will help to increase the rate of detection of illegal discharges and improve the investigation and successful prosecution of offenders. The process of developing the increased co-operation and co-ordination needed to make the network effective will start later this year with a conference hosted in Sweden.

5.25 The MCA publishes the names of those it successfully prosecutes for pollution or other offences. A list of foreign ships detained in our ports following port state control inspections is published monthly.

Emergency Towing Vessels

5.26 Recognising the value of tugs in preventing groundings and other incidents, the UK introduced Government-funded Emergency Towing Vessels (ETVs) on a trial basis in 1994. Initially ETVs were stationed at Dover and Stornoway for the winter months only. After further review, the number of ETVs was increased to four – stationed at Dover (with the collaboration

[16]The Bonn Agreement is an international agreement by North Sea coastal states, together with the EC, to offer mutual assistance and co-operation in combatting pollution and using surveillance as an aid to detect breaches of anti-pollution regulations.

of the French Government), Stornoway, the Fair Isle Channel, and in the South West approaches. The last three were originally on station in winter only, but since October 2001 all four ETVs have been on station all year round.

Double hull tankers

5.27 An accelerated timetable for introducing double hull tankers is now in place as a result of the IMO reacting quickly and positively to an EU proposal following the sinking of the oil tanker *ERIKA* off the coast of France in December 1999. This means that by 2015 (rather than by 2025) tankers with partial hull protection will not be allowed into the ports of EU Member States, UK Overseas Territories, Russia and the Baltic States unless they are double hulled. Unprotected single hull tankers will not be allowed to operate anywhere in the world after 2007.

Marine Environmental High Risk Areas

5.28 For some time, the UK has been engaged in the complex process of identifying marine and coastal areas which are at particular risk from pollution from shipping due to the combination of high environmental sensitivities and high levels of shipping risk. These are known as Marine Environmental High Risk Areas (MEHRAs). The establishment of MEHRAs is intended to provide extra protection over and above the high level of protection which the UK already provides to its coastal and marine areas. MEHRAs are a national initiative which will complement existing protection mechanisms, emphasising the UK's commitment to protecting its coastal and marine environment.

5.29 Stakeholder involvement has been, and will continue to be, an important element in the development of MEHRAs. We have developed and applied a rigorous and robust methodology for this purpose, and we are taking steps to identify MEHRAs and evaluate the protective measures already in place, the adequacy of protection offered by these measures and the additional measures required.

5.30 After identification of MEHRAs, the UK will monitor the effectiveness of the measures protecting the areas and assess whether further protective measures may need to be introduced at a later stage, in which case the UK would seek agreement through the IMO as necessary. A separate report will be issued on MEHRAs and the other measures taken to protect our waters from pollution from ships.

National Contingency Plan

5.31 Following a wide-ranging review, in February 2000 the UK published a revised *National Contingency Plan for Marine Pollution from Shipping and Offshore Installations* setting out how the relevant agencies and authorities in the UK will respond to such incidents. The UK is also a party to the *International Convention on Oil Pollution Preparedness, Response and Co-operation 1990* (OPRC). The UK applies this through regulations which provide a framework for oil pollution planning and response at local and regional levels, which is compatible with the *National Contingency Plan*. We are also in the process of acceding to the 2000 OPRC (HNS) Protocol. A special post created in 1999, the Secretary of State's Representative for Maritime Salvage and Intervention (SOSREP), provides overall command and control of operations during marine emergencies.

SOSREP

Maritime emergencies must allow for the possibility of simultaneous operations at sea, in the air and on shore. On behalf of the Secretary of State, SOSREP has the power to oversee, control and – if necessary – intervene in salvage operations within UK waters involving vessels or fixed platforms where there is a significant risk of pollution. The powers of direction invested in SOSREP are extensive, and are called into play when he believes that the public interest is not being adequately protected. As well as being an international first for the UK, the SOSREP role has proved very successful in a number of incidents.

SUSTAINABLE DEVELOPMENT OF PORTS

5.32 Port operators under expansion pressures must rise to the challenge of sustainable development, as set out in the Government's publication *Modern Ports – A UK Policy*[17]. Where policy responsibility no longer remains with the UK Government, the Scottish Executive, National Assembly for Wales and the Northern Ireland Assembly have the opportunity to develop policies for sustainable development which reflect their own local circumstances. Since many ports are located on estuaries and close to designated wildlife sites a balance must be struck between nature conservation and the need for new port development.

5.33 Sustainable development policies aim to manage new development, not rule it out. Sensitive sites, such as those which are internationally or nationally recognised or protected, are subject to restrictive controls, reflecting the sensitivity of our coastline. Appropriate safeguards for such sites are essential to an ecosystem-based approach and are therefore built into regulations which include procedures for approving new development.

5.34 *A Port Marine Safety Code* was published in March 2000. *A Guide to Good Practice on Marine Operations* will support the Code. This is a long-term commitment which the Government will undertake jointly with the ports industry and other stakeholders. National standards for all port marine personnel will also be developed. We will also, as a priority, develop guidance for port operators on development control procedures.

Port waste reception facilities

5.35 Port waste reception facilities can enhance the protection of the marine environment by removing any incentive – practical or financial – for ships to dump their waste at sea. The UK strongly supports the MARPOL requirement for the provision of adequate waste reception facilities which do not cause undue delay to ships using them.

5.36 The UK introduced domestic legislation with effect from January 1998 covering all places that provide ships with berths (including fishing and pleasure vessels). Port authorities are required to plan the provision of waste reception facilities in consultation with users, and ensure that any charging arrangements do not discourage the use of reception facilities provided at port. By the end of 2001, the UK's MCA had approved 641 port waste management plans. The UK played an active part in negotiating an EC Directive to establish a port waste reception regime across the EC, which was adopted in September 2000 and will come into force in December 2002.

TAKING THINGS FORWARD

5.37 Over the last decade, the UK has taken considerable action at home and through international fora to make shipping safer and to reduce the risk of marine pollution from accidental or deliberate discharges. Ships are now subject to tighter controls, in port and when at sea. Tighter restrictions such as the global ban on unprotected single hull tankers in 2007 will be introduced in coming years to further protect the marine environment.

5.38 The majority of offenders that do not comply with internationally agreed rules for the prevention, control and reduction of pollution from ships are successfully prosecuted. We will work with Contracting Parties to the *Bonn Agreement* to create a new network of investigators and prosecutors between North Sea States that will help further to secure more prosecutions and deter non-compliance with shipping pollution regulations. We will also take an active role at the North Sea Ministerial Meeting on the environmental impacts of shipping. It was agreed at the *5th North Sea Conference* that this will take place by 2006 in Sweden and will also address the environmental consequences of fishing.

5.39 We will identify Marine Environmental High Risk Areas during 2002 to afford added protection to particularly sensitive marine and coastal areas which could be at higher risk from a shipping pollution incident than other areas.

[17]Modern Ports – A UK Policy published by DETR, November 2000 ISBN 1-851124-44-6 priced £12

5.40 We will review the regulatory framework affecting coastal and marine development, including ports, with a view to simplifying the regulatory system and protecting the marine environment. Stakeholder involvement will be an integral part of this review. The ultimate aim will be to deliver sustainable development through a modern, transparent, efficient and effective coastal and marine development system.

The contribution of offshore activities and renewable energy

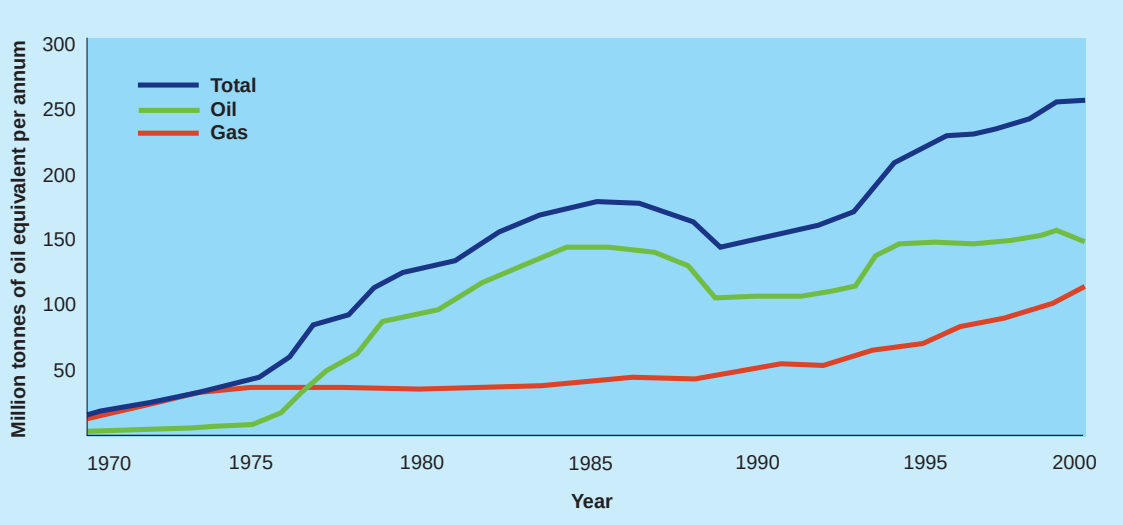
- **Our offshore oil and gas industry plays a vital role in meeting the economic and social needs of the UK. We are continuing to take steps to ensure that this is not at the expense of the marine environment.**
- **We are carrying out over the next 5 years a *Strategic Environmental Assessment* (SEA) of the entire United Kingdom Continental Shelf (UKCS) to ensure that future oil and gas licensing is carried out on a sound and informed basis.**
- **Renewable energy, including wind, wave and tidal power, has an important part to play in the Government's energy policy and in tackling climate change. We have set a firm target for renewable energy to make up 10 per cent of electricity sales from licensed suppliers by 2010.**
- **Marine dredging of sand and gravel makes a significant contribution to the supply of aggregate to the construction industry. A precautionary approach is followed and *Environmental Impact Assessments (EIA)* are required before any licence for aggregate dredging is granted.**

OIL AND GAS: A VITAL CONTRIBUTION

6.1 Oil and gas production from our offshore installations makes an essential contribution to meeting the UK's energy needs, accounting for around 85 per cent of the nation's primary energy production. It accounts for some 15 per cent of industrial investment, employs some 26,000 people and has contributed over £170 billion to the Exchequer since its inception. We are working closely with the industry and stakeholders to maximise the economic benefit to the UK whilst

Offshore oil extraction contributes to the UK's economic needs
Photographer Rohan Holt

Figure 6.1: Production of Oil and Gas
Source: Development of UK Oil and Gas Resources 2001, DTI (Brown Book 2001)



seeking to minimise the impact of oil and gas activities on the marine environment.

6.2 In the context of marine stewardship, considerable progress has been made in developing a comprehensive and effective environmental regime for the management of the UK's offshore oil and gas activities which, during 2001, produced 118 million tonnes of oil and 113 billion cubic metres of gas. A major public consultation exercise on the future of the environmental regime in 1999 found general support for an integrated approach, formed around an environmental permit system and incorporating robust Environmental Management Systems.

6.3 The offshore sector was one of the first to meet the Government's call in its *Sustainable Development Strategy* for individual sectors to set out their strategies for sustainable development. Through the UK Offshore Operators Association (UKOOA), the industry developed and published a sectoral sustainability strategy in April 2001[18]. This welcome initiative looked at environmental and social effects as well as business performance. It set out the industry's vision and strategic objectives and was based on extensive consultation with stakeholders.

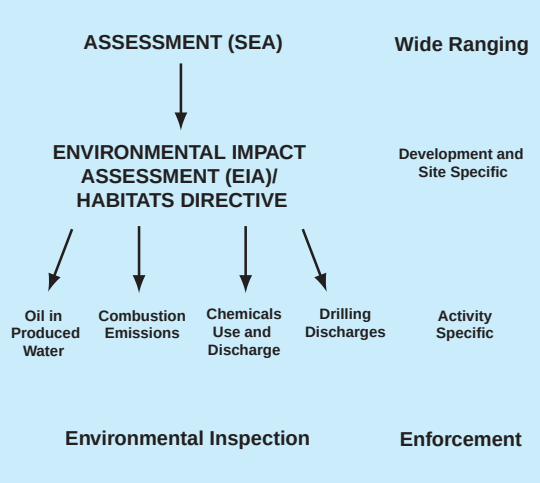
6.4 Over the last few years we have developed an interlocking set of regulations and agreements to protect the environment. These form a hierarchical structure covering, at the highest level, generic and wide ranging considerations through the *Strategic Environmental Assessment* process. At the next step down the more site- and activity-specific aspects are covered by the *Environmental Impact Assessment* legislation and the *Habitats Directive*, both of which are more focused in their application. This is further underpinned by legislation aimed at regulating specific activities with regard to their impact via atmospheric emission and discharges to the sea. This structure will form the basis of delivering an ecosystem-based approach to the management of offshore oil and gas activity.

6.5 In this way a very effective regulatory framework has been created which ensures that environmental implications of all developments and activities are properly assessed in order to minimise any impacts. Key component parts of the framework include:

- Applying the *Habitats Directive* out to the limit of jurisdiction of UK waters to provide for consideration of prospective SACs and SPAs to be built into any proposals for offshore activity;
- Environmental Impact Assessment;
- a ban on the discharge of oil and synthetic based muds;
- consents for seismic surveys and exploration activities;

[18]Striking a Balance – UKOOA, 2001

Figure 6.2: The hierarchical structure of assessment in decision-making



- consents for atmospheric emissions from offshore combustion units; and
- new statutory controls on the use and discharge of chemicals.

6.6 Through its team of Environmental Inspectors, the DTI, as the offshore oil and gas regulator, ensures that legislative requirements are being met and that best environmental practice (BEP) is encouraged. We shall continue to take a precautionary approach and, where appropriate, we will avoid licensing for exploration in areas that might become protected sites.

Protecting the marine environment from pipelines and cables

Mobile drilling rigs, permanent platforms, subsea structures, pipelines and power cables require consent from DTLR under Section 34 of the Coast Protection Act 1949. Applicants need to provide details about their proposal to enable the Department to ascertain whether obstruction or danger to navigation is caused or is likely to result. To do this DTLR consult other Government Departments and Agencies, including DTI. In Scotland, the Scottish Executive administers all Section 34 consents except those connected with the oil and gas industry.

6.7 Stakeholder involvement is important in making progress in identifying the issues that need to be addressed. In 1999 a forum was set up between the Government and the offshore industry to provide a focus for high level and authoritative consideration of environmental issues at the strategic level. In the same year, a separate offshore forum was also established to bring together Government, industry and environmental groups and aims to build a greater shared understanding of offshore environmental issues and to provide for face-to-face dialogue on key issues.

6.8 The removal of offshore installations from the marine environment inevitably has environmental impacts and involves safety, technical and economic considerations. Removal is a large-scale engineering undertaking involving management choices of the options available in the particular circumstances so as to arrive at the optimal solution. The DTI and industry have established workgroups to improve the options available through collaboration on capabilities and scheduling and the development of technologies for lifting, cutting, transporting, etc.

Working at the regional level

6.9 Through our partners in the *OSPAR Convention*, we are playing a full and positive part in developing and implementing the OSPAR strategy relating to the offshore oil and gas sector. The strategy emphasises the importance of a goal-setting approach to environmental regulation and promotes the use by industry of internationally recognised environment management systems. The UK industry has already committed itself to having all UKCS production being covered by such systems by the end of 2002. In addition, the OSPAR *Strategies on Biological Diversity and Hazardous Substances* are relevant to the offshore oil and gas industry.

6.10 There are challenges ahead. OSPAR's *Quality Status Report 2000* (QSR) records that inputs of oil from offshore oil and gas activities to the OSPAR area were reduced by over 60 per cent in the period 1985 to 1997, as shown in Figure 6.3 overleaf. It notes however that oil inputs from produced water (that is, water used in the

extraction process that becomes contaminated with oil) continue to increase as fields mature and the number of installations has increased. In OSPAR's consideration of how to address this, the UK took the initiative in developing a goal-setting approach. The outcome was agreement by OSPAR in June 2001 to a challenging target of a 15 per cent reduction on current inputs by 2006. The industry has taken a positive attitude to this challenge and the Government will work closely with them in its pursuit.

6.11 The QSR also identifies leaching from old drill cuttings as a possible source of oil although it points out that the quantities released will be small if the cuttings are not disturbed. The UK industry has taken up the issue of how these old cuttings should be addressed and has undertaken a major joint industry project over the last two years to determine BEP and BAT by studying and comparing the different management options available and consulting stakeholders. The final report was presented in February 2002 for consideration within OSPAR.

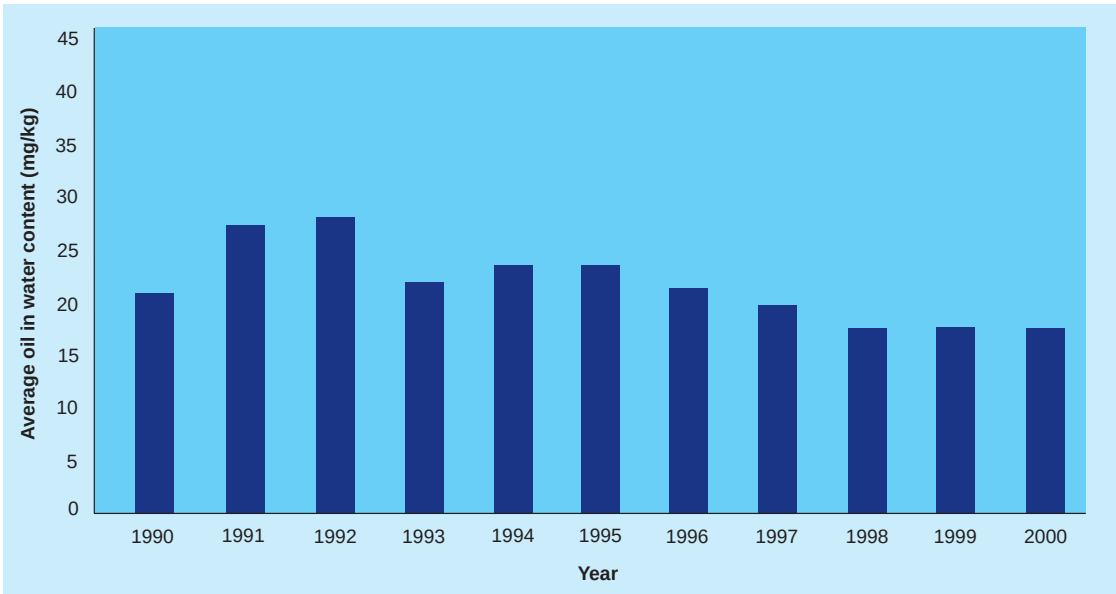
Offshore oil and gas: taking things forward

6.12 Good progress has been made to date in tackling the environmental challenges that the oil and gas industries face in helping to meet our economic and social needs. The two specific challenges which now face us in our environmental management of the offshore sector are how to manage existing mature fields as they reach the end of their productive life and how to minimise impacts from future developments, particularly as we move into previously unexplored areas.

6.13 We will continue to minimise the impact on the environment as we promote further exploration and exploitation of our oil and gas resources. To this end, we shall continue to develop by 2003 an integrated, comprehensive, environmental regulatory regime that is seamless from pre-licensing through exploration, development and eventual decommissioning; and work through OSPAR to meet the requirements of the relevant OSPAR strategies.

6.14 We are also undertaking, on a phased basis, a SEA of the entire UKCS and will not hold new licensing rounds on any area until it has been assessed. This process will be subject to wide stakeholder consultation. With over 830,000 square kilometres of sea making up the UK's continental shelf, this is a major commitment. Doing so will leave us well placed to make sensible and informed decisions on future development and

Figure 6.3: Average oil content in produced water



will give us a wealth of information on our marine environment that will be of much wider benefit than just oil and gas. We will want to build on this in taking forward our commitment to more general seabed mapping, initially in the UK's coastal zone.

6.15 We have made a good start and SEAs for the "White Zone"[19] and parts of the North Sea have already been completed. Details of these and our plans for remaining areas can be found on the internet at www.habitats-directive.org. Also at the strategic level we are committed to developing an R&D programme which is focused on making progress on the priority areas for knowledge and technology development. This will be reflected in evidence-based policy and the most effective, targeted, action being taken to protect the environment. This will be supported by a comprehensive monitoring programme that will give an indication of the impacts of current activity and the effectiveness of the present regime.

RENEWABLE ENERGY

6.16 Government policy recognises the need to ensure secure, diverse and sustainable supplies of energy at competitive prices. Renewable energy, such as wind, wave and tidal power, has an important part to play in the Government's overall energy policy. It can help to increase both the diversity and security of our energy supplies and help us to meet our environmental objectives, and help tackle the threat posed to the marine environment by climate change.

6.17 As many as 20 offshore wind farms are in the early stages of development around the coast of the UK and plans for more are beginning to take shape. We are also committed to accelerating the development of renewables in a wide range of other technologies. We are granting funding of over £260 million between 2001 and 2004 to encourage further research and development in renewable energy and support early projects, especially in offshore wind, energy crops and photovoltaics.

Offshore wind turbines – playing their part in the UK's energy policy
Photographer Paul Gilliland

6.18 We have set ourselves an ambitious target for the *Renewables Obligation* under which licensed electricity supply companies will have to provide a specified proportion of their electricity supplies from renewable energy sources, rising to 10 per cent by 2010. The Obligation in England and Wales, which is expected to last until at least 2027, is mirrored in Scotland, where the promotion of renewables is devolved. Looking further ahead to 2050, the recent Performance and Innovation Unit's *Energy Review* has recommended that the target for electricity generated by renewable energy should be increased to 20 per cent by 2020, subject to a review of the working of the Renewables Obligation in 2007.

6.19 Although the Renewables Obligation is a market-led initiative, it will include a price cap to protect consumers. Renewable energy sources will also be exempt from the Climate Change Levy. We will be developing regional strategies for renewables to assist with meeting the requirements of the planning process. We expect to see the market for renewable electricity reach somewhere between £1.5 to £2 billion a year by 2010.

Our target for renewable energy:

The Government has set a firm target for renewable energy sources to make up 10 per cent of electricity sales from licensed electricity suppliers by 2010. This could result in carbon savings of 2.5 million tonnes per annum by 2010.

[19]The White Zone is a part of the UKCS between the Shetlands and the Faroe Islands.

Figure 6.4:
Proposed wind farm development locations

Reproduced by permission of the Crown Estate.

6.20 Offshore wind farms will need to make a substantial contribution if we are to meet the target of 10 per cent renewables under the obligation. As with other offshore activities, responsible stewardship with respect to the marine environment and new developments will be essential.

6.21 The UK currently has two offshore wind turbines installed and commissioned off Blyth. These generate enough electricity to supply 3,000 homes. In April 2001, the Crown Estate completed the first round of pre-qualification for seabed leases for wind farms around England and Wales. In all, 18 wind farm developers successfully completed the pre-qualification stage. If all the proposed projects are implemented, the power generated will be between 1000MW and 1500MW, or even higher, enough to power over 1 million households. In February 2002, an additional site was made available through open competition off the north coast of Northern Ireland. The proposed scheme will generate between 150 – 250 MW for Northern Ireland. The next stage is for developers to seek consents, which will qualify them to apply for a capital grant. The first application round closes on 1 July 2002, a second round by 31 December 2002 and a third round of applications by 30 June 2003.

6.22 In addition to seabed permissions, offshore wind farms are subject to consent from Government under a range of legislation, including the *Electricity Act 1989,* the *Food and Environment Protection Act 1985* and the *Coast Protection Act 1949*[20]. The Government has established the Offshore Renewable Consents Unit to serve as a focal point for offshore wind farm consent applications and to promote a co-ordinated streamlined approach to obtaining the package of consents required. This has proved useful in sharing information between regulators, arranging meetings between all parties and co-ordinating consultations so as to avoid repeated approaches to common consultees (*eg* English Nature). However, the role of this unit does not affect the statutory roles of the various departments, agencies and authorities in determining a decision under each Act.

6.23 Applications for consents are subject to EIA, which requires developers to submit detailed environmental and other data for assessment by the licensing/consenting authorities. The EIA process will ensure that effects on the marine environment and other users of the sea are identified and minimised, and that all interests are considered. Public consultation will be carried out in each case. Where consent is granted, this will be subject to conditions, and is likely to include a requirement for monitoring the physical and biological effects of the installation, such as colonisation by marine life.

6.24 New developments will also be subject to the provisions of the *Wildlife and Countryside Act 1981* and the *Conservation (Natural Habitats &c) Regulations 1994*, as amended. Provided that wind turbines are carefully sited – *eg* to avoid migratory paths for birds – offshore wind energy should have a relatively modest and localised impact on the marine environment and any disturbance caused during the installation phase should be overcome within a fairly short period.

6.25 Other offshore energy technologies such as wave power, tidal streams and tidal barrages are at a much less developed stage. A range of wave

[20]In Scotland, these consent powers are devolved to the Scottish Executive, who are also working to streamline the consents process for offshore power developments.

energy devices are being developed either by companies or universities. The most advanced device is a small shoreline oscillating water column off Islay in Scotland. This is still at the advanced experimental stage although it is operating commercially.

6.26 In general there are two key problems to overcome in developing wave power technologies: designing a device that can withstand the rigours of the sea for long periods without breakdown or frequent maintenance; and designing a device that produces useful amounts of electricity at competitive prices. Research is also looking at how to overcome the potential navigational hazards of wave energy devices, the potential problem of noise, visual effects, how best to install devices and the conversion and transmission of energy. The Government is keeping under review the practicality of tidal stream and tidal barrage energy devices for generating electricity.

Renewable energy: taking things forward

6.27 Renewable energy is a new marine industry and needs to be developed within a coherent policy and marine resource management framework that takes account of environmental impact and monitoring data as it emerges. Consultation, information exchange and sharing expertise with other marine industries and stakeholders will be vital to ensure cumulative impacts and socio-economic issues are addressed whilst working towards meeting the target of 10 per cent under the Renewables Obligation.

6.28 We want to exploit its potential fully and safely, taking into account global and European commitments linked to the Kyoto protocol, whilst protecting marine habitats and species. We will work through OSPAR to develop a comprehensive set of criteria that can be used when deciding on applications for the development of offshore wind energy installations, and to develop advice on BAT for the location, construction, operation and removal of offshore wind energy parks in a way that both develops their potential and safeguards marine ecosystems. Following consultation, the Government will publish an Energy White Paper later this year.

MARINE DREDGING FOR MINERALS

6.29 Marine dredging of sand and gravel makes a significant contribution to the supply of aggregate to the construction industry, particularly in the south east of England and South Wales. Marine dredged material is also used for beach nourishment and flood and coastal defence schemes. In 2000, about 13.4 million tonnes were used by the construction industry in England and Wales, 7.3 million tonnes were used by the industry within mainland Europe and 2.2 million tonnes were used for coastal defence.

6.30 The contribution that marine dredged sand and gravel makes to the national supply of aggregates is an important factor in considering the likely future contributions from all sources (*eg* land won aggregates and recycled materials) and the sustainable management of these. The current policy on aggregate provision in England is set out in *Minerals Planning Guidance Note 6* (MPG6). In Scotland, national planning policy guidance is set out in *National Planning Policy*

Figure 6.5:
Crown Estate licensed dredging areas

Reproduced by permission of the Crown Estate.

Guideline 4: Land for Mineral Working (NPPG4). Policy in Wales is given in *Minerals Planning Policy Wales* (MPPW).

6.31 In the context of marine stewardship, our aim is for responsible use of this resource, recognising both the potential for environmental impact, and the economic importance of the industry. The UK has a comprehensive system in place to ensure that aggregate dredging does not have unacceptable impacts on the environment. This precautionary approach is essential to the development of an ecosystem-based approach. It is achieved through a Government View (GV) Procedure, which was introduced in 1968 (and revised in 1998). This provides Government with an opportunity to consider the environmental effects of a dredging proposal before the Crown Estate issue a licence. In future, activities will also be subject to the *Habitats Directive* regulations.

6.32 From 1989 all dredging applications were screened for the need for an EIA as part of the GV process, and since 1993 all applications have required EIA. In 1993 the Crown Estate introduced a requirement for all vessels using its production licences to install an Electronic Monitoring System (EMS) which automatically records the date, time and position of all dredging activity. This enables Government to monitor that dredging only occurs within the licensed area. The Crown Estate also audits licensees dredging records and wharf sales.

6.33 DTLR, DEFRA and the Crown Estate are funding a number of research projects to gain a better understanding of the impacts of aggregate extraction, and to provide technical guidance on undertaking EIAs. There is much international interest in the findings.

The key issues an EIA needs to address include:

- **the coast and coastal processes**
- **sediment transport pathways**
- **marine ecosystems**
- **commercial fisheries**
- **water quality**
- **navigation**
- **marine conservation areas**
- **archaeological sites**
- **other uses of the sea**

Aggregate extraction: taking things forward

6.34 We will shortly replace the non-statutory GV Procedure with a statutory process with the introduction of the *Environmental Impact Assessment* and *Habitats (Extraction of Minerals by Marine Dredging) Regulations*. This will transpose the *EIA* and *Habitats Directives* into national law in so far as they relate to marine aggregate dredging. It will enable the Government to impose legally enforceable conditions on dredging permissions. Failure to comply with the conditions will be a criminal offence. Separate regulations will be introduced in Scotland.

6.35 In parallel with preparation of the Regulations, DTLR is developing new policy guidance on marine minerals extraction in English waters. A draft policy guidance note was published for public consultation in February 2001 *(Marine Minerals Guidance Note 2 Guidance on the Extraction by Dredging of Sand, Gravel and Other Minerals from the Seabed)*. In addition,

Good practice in aggregate extraction will protect the marine environment through:

- **the careful location of new dredging areas**
- **considering new applications for Dredging Permissions in relation to the findings of a full EIA**
- **minimising the overall impact of dredging by reducing the risk of cumulative impacts from multiple dredging operations and other human activities, minimising the area being dredged at any one time, and minimising the total area permitted for dredging**
- **controlling dredging operations through the use of legally enforceable conditions attached to dredging permissions**
- **requiring operators to monitor, as appropriate, the environmental impacts of their activities during and on completion of dredging**

the Crown Estate is working closely with the dredging industry to identify opportunities to reduce significantly the area of seabed licensed for dredging. In the period 1997 to 2000 inclusive, 317 square kilometers of seabed have been surrendered. Important steps have also been taken to concentrate existing dredging activity into smaller areas through zoning.

6.36 The Scottish Executive is also undertaking research on the need to review NPPG4. The National Assembly for Wales is also currently examining responses to its draft policy framework on marine aggregate dredging.

TAKING THINGS FORWARD

6.37 This chapter has looked at a number of important human activities that take place in the marine environment and set out the next steps for sustainable development in these sectors. As with all offshore activities, our management approach is one of responsible stewardship. We recognise that many different activities take place in the marine environment and there are potential conflicts between the requirements for conservation and restoration of ecosystems and the human activities that take place there.

6.38 As agreed at the *5th North Sea Conference*, we will work through OSPAR to strengthen co-operation between Contracting Parties to prevent and resolve these potential conflicts by developing spatial planning processes related to the marine environment. Within this context, OSPAR will establish present uses of the marine environment and investigate the possibilities for further international co-operation in planning and managing marine activities through spatial planning. OSPAR will also look at the possibilities for improving environmental assessment of human activities in the marine environment, taking into account existing legal requirements such as SEA.

Sustainable fisheries

- **The UK's policy is to help establish responsible and sustainable fisheries that ensure healthy marine ecosystems, maintaining the quality, diversity and availability of marine resources and habitats.**
- **Our ecosystem-based approach entails better science, greater stakeholder involvement, adaptive and precautionary management approaches, and working to implement key fisheries agreements and strengthen regional fisheries organisations.**
- **We will promote further integration of environment and fisheries, building on initiatives such as the drift net ban, stock recovery plans, the *Cardiff Integration Strategy*, and the *Habitats Directive*.**
- **We will focus on tackling unsustainable practices, notably over-fishing and illegal fishing, which undermine fisheries, sensitive habitats and species and local communities dependent on marine resources.**

FISHERIES MANAGEMENT

7.1 Fisheries have a major part to play in the sustainable development of the marine environment at the national, European and international level.[21] At 31 December 2000, there were some 7,200 UK fishing vessels and about 15,000 regular or part time fishermen. In 2000, some 748,000 tonnes of sea fish were landed by the fleet (in the UK and abroad) with a total value of £550 million. Details of the contribution and value of the UK's aquaculture industry are given in the section on aquaculture later in the chapter.

7.2 Global production of marine capture fisheries increased from 17m tonnes in 1950 to about 80m in the mid-1980s. In its most recent report, the Food and Agriculture Organisation (FAO) concluded that 75 per cent of fisheries are either fully or over-exploited, leaving 25 per cent where there is some scope for increased yields. The FAO considers that over-fishing, including illegal fishing, is a key factor.

7.3 These pressures, and the changed perspectives following the Rio Earth Summit, have led to an emphasis on improved governance and regulation of fishing effort through UNCLOS, regional fisheries organisations and the 1995 FAO *Code of Conduct on Responsible Fisheries*. These welcome changes reflect an increasing awareness that fisheries management needs to take a longer-term and more holistic approach, characterised as moving towards an ecosystem-based management approach.

THE REGIONAL DIMENSION: THE COMMON FISHERIES POLICY

7.4 Council Regulation (EC) 3760/92 provides the basic regulatory structure for the *Common Fisheries Policy* (CFP), setting out the fundamental aim of ensuring the sustainable exploitation of fish stocks through conservation and management policies designed to protect

The 1995 FAO Code of Conduct for Responsible Fisheries

The ecosystem-based approach to fisheries management (EBFM) can be broadly seen as an extension of the conventional principles for sustainable fisheries development to cover the ecosystem as a whole. It aims to ensure that, despite variability, uncertainty and likely natural changes in the ecosystem, the capacity of the aquatic ecosystems to produce fish food, revenues and employment is maintained for the benefit of the present and future generations. As the code recognises, key principles are maintaining the characteristic structure, functioning, productivity and biodiversity of ecosystems; a wide involvement of stakeholders in knowledge-sharing, decision-making and management; improving knowledge on ecosystem impacts, and interactions, including a multi-species approach; adopting adaptive management strategies; an effective application of the precautionary approach; and effective enforcement and monitoring mechanisms.

[21]The Fisheries Departments in the United Kingdom are DEFRA, SEERAD, the National Assembly for Wales Agriculture Department, and the Department of Agriculture and Rural Development for Northern Ireland. DEFRA, the FCO and DFID all have responsibilities with regard to international fisheries issues.

The CFP: Total allowable catches

The conservation and rational exploitation of fish stocks is intended to be achieved principally through the system of total allowable catches (TACs) and national quotas, agreement on which was reached in 1983. TACs are fixed annually by the Fisheries Council on the basis of scientific advice and allocated between MS according to fixed percentages of each stock based on historical records of catches in specific areas of sea (the principle of relative stability). The UK, for example, has around 80 separate quotas. This system is accompanied by technical conservation measures which regulate the use of fishing gear and methods, principally by laying down minimum landing sizes for fish and minimum mesh sizes for nets, but also by establishing closed areas and seasons for types of fishing.

resources and reflect the needs of the fishing industry and consumers. The CFP also entails a common structural policy (aimed at balancing fleet capacity and available resources) and market policy.

7.5 In March 2001, the European Commission published a Green Paper on the review of the CFP. The UK welcomes its fundamental aim to put sustainable development at the core of Community fisheries policy and sees the review, which is due to be completed by the end of 2002, as an important opportunity to address problems with the current arrangements, and to provide a legal and regulatory framework to enable the CFP to meet the challenges of the next ten years and beyond.

7.6 The Green Paper rightly recognises that the current system is failing to provide an adequate living for many fishermen through its failure to conserve fish stocks for present and future generations. Central to these problems is the fundamental mismatch that exists in the Community between fishing capacity and the availability of fish stocks, an imbalance made worse by EU financed subsidies to promote new capital construction and modernisation.

7.7 At the same time, we support the Green Paper's recognition of the importance of maintaining certain key aspects of the current system which command wide support, notably the current access regime, which we would like to see made permanent, the principle of relative stability and the Shetland Box. Following consultation with stakeholders, the UK Government has therefore put forward to the EC the following key priorities for change to the CFP. We will work with Member States and stakeholders to promote:

- a CFP which is environmentally and economically sustainable through the establishment of responsible and sustainable fisheries that ensure healthy marine ecosystems, maintaining the quality, diversity and availability of marine resources and habitats;
- strengthened regional and stakeholder involvement, for example, increased industry involvement in decisions on fisheries management, and better dialogue between fishermen, scientists and managers;
- a targeted fleet policy which substantially reduces the capacity and effort of the EU's fishing fleet, including the withdrawal of counter-productive subsidies;
- enhanced integration of environmental concerns into fisheries management, building on the work which the UK has already taken forward;
- confirmation of the 6 and 12 mile limits on a permanent basis, retention of the Shetland Box and access restrictions to the North Sea, and the continuance of relative stability, including Hague Preference;
- greater effectiveness and consistency in control and enforcement of EU requirements, while attempting to simplify the burden of control on fishermen; and
- coherence with wider, international sustainable development objectives, including third country agreements, as well as promoting the effective operation of Regional Fisheries Organisations, and the implementation of key fishing instruments – the FAO *Code of Conduct*, the *Straddling Fish Stocks Agreement*, and FAO's *International Plans of Action*.

Examples of the UK approach to the CFP

Integration of Fisheries and the Environment – UK initiatives

7.8 Environmental integration – placing environmental considerations at the heart of other economic sectors – has been a key part of the UK's approach. The *1997 North Sea Ministerial Meeting on Integration of Fisheries and Environmental Issues* in Bergen, Norway, established a model for the integrative process by bringing together Environment and Fisheries Ministers from the North Sea States and the Fisheries and Environment Commissioners from the European Commission. Bergen showed how an integrated approach could work from general principles, such as the utilisation of the ecosystems of the North Sea in a manner consistent with sustainable development, down to specific measures and actions such as precautionary TACs and recovery plans.

7.9 The UK helped give practical realisation to these integrative approaches under the CFP during its Presidency of the European Union in 1998. Examples are the sandeel fishery closure in an extensive area off North East Britain, and the phasing out of the tuna drift net fishery, which was completed on 1 January 2002. The Cardiff Summit during our Presidency also called on all the various Councils of the European Community to establish integration strategies. The integration strategy for the Fisheries Council is now being taken forward in parallel with the Commission's work on the CFP Review, and the EU's Biodiversity Action Plan (BAP) for Fisheries, which we are taking an active role in promoting.

7.10 We are also promoting greater acceptance of scientific and precautionary advice put forward by the International Council for the Exploration of the Sea (ICES). Recently, we have promoted the use of precautionary reference points in order to set allowable catches for the main stocks, and have taken a lead in pressing for stock recovery plans, such as those for hake and cod in the North Sea, Irish Sea, and West of Scotland. We see the recovery plans as a key means of working with stakeholders to build sustainable stocks.

7.11 UK scientists conduct many marine investigations, especially in the fisheries areas, to inform the work of the ICES. The ICES' Advisory Committee on Fishery Management (ACFM) convenes international working groups to collate data and to undertake the assessment of the size and trends in fish and shellfish stocks. ACFM uses these assessments to give advice on the status of fish stocks, and on the short and long-term consequences for fisheries and stocks of various catch-options. Similarly, ICES' Advisory Committee on the Marine Environment (ACME) provides advice on the state of the marine environment. A new Advisory Committee on Ecosystems was established in 2000. The UK is represented on all Advisory Committees.

Stakeholder involvement and good governance

7.12 The UK has taken a lead in pressing for greater stakeholder involvement under the CFP. We welcome this recognition in the Green Paper. Close industry involvement, for example, in drawing up recovery plans, has brought experience and local knowledge to the framing of

The North Sea Cod Recovery Plan

- **was introduced at the start of 2001**
- **closed 40,000 square miles from 14 February to 30 April 2001 to protect cod at spawning time**
- **and, from 1 January 2002, provides new technical conservation measures to allow more juvenile cod to live on to join the spawning stock**

ICES

This intergovernmental organisation was established in 1902. Its geographical remit is for the North Atlantic Ocean and its adjacent Seas. Its role is to promote and co-ordinate research into the sea and its living marine resources, and to provide advice on the sea and those resources. Its clients include the EC and OSPAR and 19 member countries.

policies. This and other technical issues have been discussed between fisheries managers, fisheries scientists, enforcement experts, gear technologists, net-makers and members of the fishing industry in the UK Fisheries Conservation Group. This group, set up in 1998, has provided a further means of communication between industry and Government on conservation and management issues.

7.13 The CFP Review also provides an opportunity to give recognition to the role of fishermen using selective and environmentally friendly fishing gear, that has low impact on stocks, such as the mackerel hand-liners. Recreational sea anglers also have a strong interest in the development of the CFP. They make a major economic contribution to local communities. The UK wants to build on this progress by developing the regional dimension of the CFP, bringing fishermen closer to decision-making.

Third country agreements

7.14 The EC has negotiated fisheries agreements with a number of developing countries. The UK is concerned that some of these agreements may not meet the environmental and developmental needs of the countries and regions concerned. We are urging the EC to negotiate such agreements in a more structured and transparent way. This should involve automatic impact assessments of the proposed agreement on the sustainable development of the fishery. Clear objectives should be set and the Council of Fisheries Ministers should be given the time and opportunity to check whether they are being met. We hope to secure agreement to such an approach within the framework of the forthcoming review of the CFP.

NATIONAL DIMENSIONS – FISHERIES AND AQUACULTURE

7.15 The current restrictions on access to the UK's territorial waters for fishing vessels from other countries have helped facilitate more local management and stakeholder involvement. In England and Wales, local management is exercised by the twelve Sea Fisheries Committees (SFCs), which regulate local sea fisheries around virtually the entire coast of England and Wales out to 6 miles and are empowered to make bye-laws for the management and conservation of their district's fisheries. In 1995 their powers were widened to include the control of fisheries in their districts for environmental reasons.

7.16 In Scotland, in May 2001, the Scottish Executive launched a *Strategic Framework for the Scottish Sea Fishing Industry.* It sets out a number of aims, which the Scottish Executive intends to pursue to help to deliver the best possible conditions for the successful operation

Integration and local management in practice: Loch Torridon

The loch has great economic importance for the local economy through a variety of activities including a Norwegian lobster fishery and finfish and shellfish farming. However, gear conflict between creelers and trawlers was a long running problem. Local creelers felt that creel fishing was the most valuable and sustainable method for the local community and that seasonal closures to mobile gear boats should be extended all-year round. Trawler fishermen argued that, having fished the area for a number of years, they had a right to continue the practice. Although scientific research suggested that fishing by creel provided benefits in terms of selectivity and quality, it also suggested that stocks were reasonably healthy in the area and that the existing fishing patterns were sustainable. Creel and trawl interests presented the Scottish Executive with an agreed set of measures covering a defined all-year round trawl free area, a defined all-year creel-free area and a mixed gear area with certain restrictions on mobile gear vessels. This work would feed into consideration of more permanent arrangements for fishing in the area with sustainability the goal. The next step of the project will involve the establishment of a loch users' group which will involve all the relevant stakeholders in the development of a sustainable management scheme and subsequent monitoring of its effectiveness in relation to stocks and the wider environment.

of the Scottish industry. The document was prepared with a focus on how the Executive could promote a sustainable fishing industry. The strategic framework places sustainable fish stocks at its centre, supported by further themes of support for fishing communities, an economically competitive industry, a focus on quality and an inclusive approach to fisheries management.

7.17 The Scottish Executive and Scotland's inshore fishermen have also come together to form the Scottish Inshore Fisheries Advisory Group. It brings together not only Government and the fishing industry but also scientists and environmental interests. These approaches have also facilitated the adoption of participatory, local management schemes and control throughout the UK, including eco-labelling schemes.

Aquaculture

7.18 The UK's policy is to encourage the development of efficient, competitive and sustainable aquaculture industries whilst protecting the health status of UK farmed and wild fish and shellfish. Central to the policy is sustainable use of the marine and rural environment and the prosperity of the economies and communities in associated areas.

7.19 Aquaculture is an important part of the UK's overall fisheries sector, with 90 per cent of production taking place in Scotland. There are more than 1,000 fish and shellfish farming businesses in the UK operating on 1,400 sites and directly employing more than 3,000 people (some 2,500 in Scotland). First sale value of aquaculture production is in excess of £350 million.

Fish health

7.20 The UK is an 'approved zone' under the EU Fish Health regime, recognised as free from certain serious diseases, which affect salmonid species and other fish. This high health status provides significant additional protection to wild and farmed fish stock. The UK has well-established licensing and health certification controls on direct imports of fish and shellfish from third countries to help prevent the introduction of disease. From 2001, there has also been the development of a Government database to track live fish movements, including introductions to inland waters and inland farm transfers. This is designed to enhance existing capability to prevent and control the spread of fish/shellfish disease and help detect fish thefts and illegal imports.

7.21 Following an outbreak of the serious disease Infectious Salmon Anaemia (ISA) in 1998/99 a Joint Scottish Executive/Industry Working Group on ISA was established and made recommendations to change working practices, which might have contributed to the spread of ISA. The recommendations were included in an industry *Code of Practice*. A similar joint approach was taken with the *Containment Code of Practice*, worked up between the Scottish Executive and farmed and wild fish stakeholders to prevent escapes of farmed fish.

Aquaculture in the UK

The main finfish species are salmon and rainbow trout. Almost all salmon production is concentrated in the west coast and outer isles of Scotland, with production having increased steadily from some 40,500 tonnes in 1991 to 130,000 tonnes in 2000. Rainbow trout is farmed throughout the UK and production has increased from 9,300 tonnes in 1991 to 15,000 tonnes in 2000. There is also limited production of other species such as carp, brown trout and diversification into new species such as cod, halibut and turbot. The main shellfish production is mussels (11,000 tonnes) with some farming of oysters, clams and cockles.

Labelling and quality:

The industry has taken action to improve the quality of their products through product identification schemes. Scottish Quality Salmon has developed the *Tartan Quality Mark* for UK sales and *Label Rouge* for sales in France. For trout, the British Trout Association brought together existing schemes under the new quality mark *Quality Trout UK Ltd*.

Stakeholder involvement

7.22 Linking in with fish health and other concerns, we have developed policy initiatives in consultation with a wide range of stakeholders, including wild fishery interests, fish farming industry, environmental NGOs, scientific advisers, relevant government agencies, local authorities and local communities. Leading examples are:

- *the Aquaculture Health Joint Working Group* which promotes communication between Government and industry on health and disease issues, and on research and development priorities;

- *the Tripartite Working Group* which promotes dialogue between fish farmers and wild fishery interests in Scotland and aims to safeguard and improve the health of wild and farmed fish stocks, in particular, the problem of sea lice;

- *the Aquaculture Forum* established by the Highlands and Islands Convention in 1999, and drawn from local authorities, wild fishery interests and environmental NGOs, the Crown Estate, government and agencies; and

- *the Committee for Aquaculture Research and Development* made up of UK Government Departments/agencies, industry stakeholders and independent funders of research.

Aquaculture: next steps and challenges

7.23 Fish farming in the UK is at an important stage in its development and its future is the subject of extensive public debate. In England and Wales, proposals are being developed to take forward the recommendations from the review of salmon and freshwater fisheries affecting wild and farmed fish stocks. Also, industry strategies are being looked at for developing finfish and shellfish aquaculture. In Scotland consultations are taking place on the development of a long-term strategic framework for the industry. A review of current aquaculture regulation was completed at the end of 2001. Guidelines for the location of marine fish farms in Scotland are also the subject of review.

SUSTAINABLE FISHERIES: THE INTERNATIONAL DIMENSION

7.24 Working with partners, our policy is to build a regional and international framework which promotes long-term conservation of fish stocks, sustainable livelihoods, and the conservation of marine biodiversity and habitats.

7.25 Two closely related strands underlie our approach:

- the importance of the implementation of the key fisheries agreements, and action plans; and

- developing the regional fisheries organisations (RFOs), which are pivotal in effective implementation of policies, into cornerstones of effective regional fisheries management.

7.26 There are over 30 RFOs covering various geographic areas around the world. Existing RFOs are being reformed and their activities expanded to increase effectiveness, as well as moves to establish new RFOs to manage resources in currently unregulated areas of the high seas. By setting TACs and quotas for certain stocks RFOs play an important part in the effort to conserve stocks. RFOs establish principles and standards applicable to the conservation, management and development of fisheries under their jurisdiction. Through control and enforcement schemes they regulate fishing by vessels of Contracting Parties. These measures also make a positive contribution towards eliminating IUU fishing.

Partnerships in practice: regional fisheries organisations:

7.27 UK policy is to develop effective co-operation in regional fisheries organisations, using them to promote implementation of the *UN Straddling Fish Stocks Agreement* (UNFA), the FAO *Code of Conduct for Responsible Fisheries, the Compliance Agreement*, and the FAO *Action Plans*. In so doing, we will:

- use the RFOs to promote coherence between fisheries and development policies;

- support efforts to increase the effectiveness of existing RFOs;
- work to identify and establish new RFOs where needed;
- take a leading role in discussions in RFOs on improving the regulation of high seas fisheries;
- seek the use of more effective control and management measures – in all waters, and in ports – pressing for greater use of satellite tracking and automatic data transmission to monitor catches;
- take a lead in the RFOs in addressing illegal, unregulated and unreported (IUU) fishing as a priority – entailing action by states, including the EU, relevant UN agencies, and focusing on urgent implementation of the FAO Action Plan; and
- seek agreement that the criteria by which RFO stocks are allocated should take account of the position of coastal and developing states, in accordance with the principles set out in the UNFA.

7.28 We welcome the recently completed negotiations to establish the South East Atlantic Fisheries Organisation, which successfully adopted the principles of the UNFA. The UK will seek to include these principles in the negotiations of other new RFOs.

Partnerships in practice: the sustainable fisheries livelihood programme

7.29 We also want to demonstrate that effective international co-operation can help deliver real improvements to people's lives. An example, is the *Sustainable Fisheries Livelihood Programme* (SFLP). Operational in the field since the beginning of 2000, it is being implemented by the FAO in partnership with 25 West African countries. Funded by the UK's Department for International Development (DFID), the programme seeks to reduce poverty in coastal and inland fishing communities in West Africa. SFLP is pioneering the use of a 'livelihoods' approach where support is focused on poor people's human and social assets as well as their natural, physical and financial ones. SFLP also uses the FAO's Code of Conduct for Responsible Fisheries as a basis for developing improved policy and governance of fisheries.

7.30 From practical experiences generated in partnership with local communities, wider civil society and governments (at different levels), SFLP will develop guidelines for addressing poverty in fisheries. These will be disseminated both within the different sub-regions of West Africa

International fisheries agreements and machinery

- ***The 1982 UN Convention on the Law of the Sea*** **lays down the comprehensive legal framework for the governance of the world's oceans and seas, including fisheries and the establishment and use of regional fisheries organisations**
- ***The 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea*** **of 10 December 1982 relating to the *Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks* includes important provisions on the application of the precautionary approach to international fisheries management and develops the role to be played by RFOs**
- ***The 1995 FAO Code of Conduct for Responsible Fisheries*** **sets out principles and standards on the conservation, management and development of all fisheries**
- ***The FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas*** **seeks to deter re-flagging of vessels as a means of avoiding compliance with applicable conservation and management rules for fishing activities on the high seas**
- **A suite of four *FAO Action Plans* on fleet capacity, seabirds, sharks, and illegal, unreported and unregulated fishing. These have been established within the umbrella of the FAO Code of Conduct**

Illegal, unreported and unregulated (IUU) fishing

IUU fishing is found in all capture fisheries, irrespective of the location, species targeted, fishing gears employed or level and intensity of exploitation. Efforts are under way to assess how serious and widespread IUU fishing is, but no complete and comprehensive picture of the situation has yet emerged. FAO has been informed that, in some important fisheries, IUU fishing accounts for up to 30 percent of total catches, and in one instance it has been indicated that IUU catches could be as high as three times the permitted catch level. Where IUU fishing is common, it has major consequences for national and regional scientific assessments, determination of catch levels and management measures.

and more widely through FAO's international networks. In this way, it is expected that SFLP will contribute to improved policy at international, national and local levels. Improvements in policy will be reflected by higher levels of responsibility both in terms of the management of the fisheries resources and in terms of the people whose livelihoods depend on these resources.

TAKING THINGS FORWARD

7.31 This chapter has demonstrated that there is already a substantial commitment by Government and other stakeholders to work towards a vision of responsible and sustainable fisheries to ensure healthy marine ecosystems and maintain the quality, diversity and availability of marine resources and habitats. But it has shown that we must take our partners and stakeholders with us and develop a coherent, shared approach. The globalisation of the fishing industry underlines this, entailing not only supply side issues such as over-capacity of fleets and the subsidies they receive, but also the role of consumers in determining market trends.

7.32 A significant marker of the progress we are making towards shared approaches to sustainable fisheries will come later this year during the conclusion of negotiations on the future of the CFP. We will be working assiduously to secure as many of our objectives as possible. We recognise, of course, that success is not in our hands alone. Whatever the formal outcome, however, our past work on integration and use of existing management flexibilities under the present regime has shown the scope for leading the debate and introducing practical measures.

7.33 We will continue to take this lead and in so doing link our fisheries policies to our broader aim of the sustainable use of the marine environment and the prosperity of the rural economies and communities that it supports. We will take an active role at the North Sea Ministerial Meeting on the environmental consequences of fishing. It was agreed at the *5th North Sea Conference* that this will take place by 2006 in Sweden and will also address the environmental impacts of shipping.

7.34 Internationally, 2002 also sees the World Summit on Sustainable Development (WSSD). As this chapter has illustrated, fisheries are a key part of the international community's efforts to build sustainable development at the global level. We will seek to tackle global issues such as over-fishing and illegal fishing, and work to ensure that national and EU policies on fisheries are compatible with wider initiatives including the EU's input to WSSD.

Facing up to climate change

- **The effects of climate change on the marine ecosystem and on human activities that the marine environment supports are potentially enormous.**
- **The *UK Climate Change Programme* sets out how we are rising to the challenge to address the threats. It includes new measures to reduce greenhouse gas emissions further and build adaptation to the impacts of climate change into policies.**
- **The UK is playing a leading role in the fight against climate change. We have begun the process of ratifying the Kyoto Protocol. This will help to deliver our sustainable development goals and to conserve marine biodiversity.**
- **The UK fully supports and plays a significant role in the Intergovernmental Panel on Climate Change which assesses the scientific and technical aspects of climate change.**

HOW WILL CLIMATE CHANGE IN THE FUTURE?

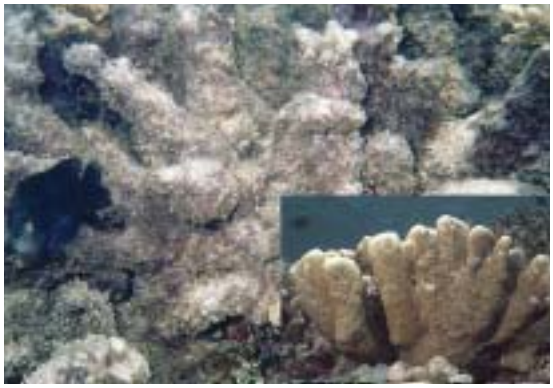
8.1 Climate change is a global problem requiring a global response. It is well recognised that global emissions need to be cut by more than 60 per cent from today's levels to avoid the worst effects of climate change. It is also recognised that some degree of climate change is now inevitable, which we will need to adapt to, however successful we are at reducing emissions. The UK is playing a leading role in taking action to reduce emissions of greenhouse gases, and to adapt to the impacts of climate change.

Intergovernmental Panel on Climate Change

8.2 The Intergovernmental Panel on Climate Change (IPCC), sponsored by the United Nations Environment Programme (UNEP) and the World Meteorological Organisation (WMO), was set up in 1988 to organise the preparation of detailed scientific assessments covering all scientific and technical aspects of climate change. The UK supports the role and conclusions of the IPCC.

Thermohaline Circulation or 'Ocean Conveyer'

The formation of North Atlantic Deep Water in the Arctic constitutes one of the deepest branches of the thermohaline circulation (THC) of the world's oceans (or Ocean Conveyer). The North Atlantic Deep Water (NADW) maintains the direction and intensity of the ocean current by acting as a pulling mechanism. This warms the climate of the UK and North West Europe by about 8°C. Most Global Circulation Models show weakening of the ocean THC due to climate change which leads to a reduction of the heat transport into high latitudes of the Northern Hemisphere. However, even in models where the THC weakens, there is still warming over Europe due to increased greenhouse gases. The current projections using climate models do not exhibit a complete shut-down of the THC by 2100. Beyond 2100, the THC could completely, and possibly irreversibly, shut-down in either hemisphere if the change in radiative forcing is large enough and applied long enough. Since marked cooling linked to circulation changes are known to have occurred over 10,000 years ago, an active area of research is the potential for such occurrences in the future.



Coral bleaching – coral reefs contain more than one-third of the world's marine species, but are under threat from climate change Photographer Charles Sheppard

8.3 In 2001, the IPCC published their *Third Assessment Report* (TAR), comprising major assessments of the science, impacts and responses to climate change. The report confirms that there is new and stronger evidence that over the last century temperatures have increased by 0.6°C and that most of the observed warming over the past fifty years is attributable to human activities.

8.4 The IPCC predicts that global average temperature is expected to rise by between 1.4 and 5.8°C by 2100. The future warming rate is expected to be without precedent in the last 10,000 years. Global mean sea level is projected to rise by 9 to 88cm by 2100, due primarily to thermal expansion and loss of mass from glaciers and ice caps. Changes in average conditions will be accompanied by changes in the frequency and magnitude of extreme events, such as droughts, floods, heat waves and storms. Recent regional climate changes, particularly temperature increases, have already affected some marine ecosystems, including glacial retreat and thawing permafrost.

Climate change in the UK

8.5 The UK's climate has warmed over the last century. Temperatures in central England have risen by nearly 1°C over this period and the 1990s was the warmest decade in central England since records began in the 1660s. Sea temperatures have also increased since records began in the late 19th Century. Average sea-level is rising by about 1mm a year (after adjusting for natural land movements). There is also evidence that the index of the North Atlantic Oscillation has become more positive (*ie* weather is becoming more westerly) in recent years.

New UK climate change scenarios

8.6 As a result of climate change we expect that the UK's climate will continue to warm. New climate change scenarios, published by DEFRA in April, indicated that:

- Average annual temperatures may increase by between 2 and 3.5°C by the 2080s depending on the future rate of greenhouse gas emissions. Regional differences across the UK will be greater however. Warming is likely to be less in the north while in parts of the south east summer temperatures could rise by up to 5°C;
- The temperature of UK coastal waters will also increase, although not as rapidly as over land;
- We will see generally wetter winters with fewer cold spells and significantly hotter, drier summers, particularly in the south east. By the 2080s, in England and Wales, summers as hot as the one experienced in 1995 may occur 2 out of 3 years, or more, and a very dry summer like 1995 every other year. Extreme winter precipitation may also become more frequent; and
- By the 2080s sea level will have risen around most of the coast of the UK. For example, in south east England, sea level rise may be between 26 and 86 cm above current level. Extreme sea levels (combinations of high tides, sea-level rise and changes in winds) may be experienced more frequently, perhaps 10 to 20 times more frequently at some east coast locations.

IMPACTS ON COASTAL AND MARINE ECOSYSTEMS

Global impacts

8.7 Scientific evidence confirms that greenhouse gas emissions are having a profound effect on the earth's climate which have consequences for the marine environment. Studies are continuing to understand how the

oceans deal with this. Global warming will compound the impact of natural climate-oceans' variations and fishing activity and make management solutions more complex.

8.8 Climate change threatens the marine environment in a number of significant ways. Global climate change will affect the physical, biological and biogeochemical characteristics of the oceans and coasts, modifying their ecological structure, their functions and the goods and services they provide. Feedback processes to the climate system will occur through changes in ocean mixing, deep water production and coastal upwelling. Collectively these changes will have profound impacts on the status, sustainability, productivity and biodiversity of the coastal zone and marine ecosystems.

8.9 It is anticipated that the adaptive capacity of marine and coastal ecosystems varies among species, sectors and geographical regions. The IPCC has indicated that integrated assessments of coastal zones and marine ecosystems and better understanding of their interaction with human development and multi-year climate variability could lead to improvements in sustainable development and management. It considers that adaptation options for coastal and marine management are most effective when they are incorporated with policies in other areas, such as disaster mitigation plans and land-use plans.

8.10 The increase in sea level will have a profound effect on small low-lying islands and may in some instances result in some islands being lost to the sea. This is a particular concern to Small Island Developing States (SIDS) which, in addition to a loss in income from tourism do not have sufficient resources to provide effective coastal defence.

Marine fisheries

8.11 Global warming will alter the relationship between natural climate-ocean variations and the effects of fishing activity and make management issues more complex to resolve. As noted in Chapter 8, there is now a cautious acceptance that climate change will have major impacts on the abundance and distribution of marine fish.

Conclusions of the IPCC Third Assessment Report include:

Large-scale impacts of Climate Change are expected to include:

- **Increases in sea surface temperature and mean global sea level**
- **Decrease in sea-ice cover**
- **Changes in salinity, wave conditions and ocean circulation**

These can affect fish abundance and population dynamics. Coastal areas could experience:

- **Increased flooding**
- **Accelerated erosion**
- **Loss of wetlands and mangroves**
- **Seawater intrusion into freshwater sources**
- **Increase in storm-surge floods and shore erosion**

Fishing impacts may be particularly harmful if natural declines in productivity occur without corresponding reductions in exploitation rates and adoption of bilateral and multilateral fishing agreements.

Aquaculture

8.12 The IPCC has found, in its report *Effects of Climate Change on Marine Activities: Aquaculture* that scope for aquaculture may be limited if key fish species used in feed production are adversely affected by climate change. Climate change could also have dramatic impacts on fish production, which would affect the supply of fishmeal and fish oils. This could limit future aquaculture production, unless alternative sources of protein are found.

8.13 Climate change is also expected to have physical and ecosystem impacts in the freshwater and marine environments in which aquaculture is sited. Water and air temperatures in mid to high latitudes are expected to rise, with a consequent lengthening of the growing season for cultured fish and shellfish. These changes could have beneficial impacts on growth rate and feed

conversion efficiency, and could lead to increased production as aquaculture species expand their geographical range.

8.14 However, increased water temperature and changes in dissolved oxygen levels have been linked to increases in the intensity and frequency of disease outbreaks and may result in more frequent algal blooms in coastal areas. Any increases in the frequency and intensity of extreme events such as storm surges could also result in significant infrastructure damage to aquaculture. Elevated temperatures of coastal waters could also lead to increased production of aquaculture species by expanding their range.

Disappearing sea-ice

8.15 In the winter months, the underside and edges of sea-ice provide a surface for marine algae to grow. When the ice melts in the warmer months, the algae are released into the water and fed on by krill. In turn krill are fed on by great whales and other marine predators. A series of studies has shown that as temperatures have increased in recent decades, apparently in correlation with rising concentrations of atmospheric greenhouse gases, the sea-ice extent has been diminishing rapidly. It has been estimated that the sea-ice extent in Antarctica has decreased by 25 per cent between the mid-1950s and mid-1970s. While, in the Arctic a 3 per cent decrease in the area of sea-ice is evident from satellite images since the late 1970s and the rate of loss has increased in the 1990s.

Marine mammals

8.16 Climate change may have effects on the availability and access to prey among marine mammals. Several marine mammal and bird species, including polar bears, arctic foxes and some penguins, may be threatened by long-term climate change. For example, reduced ice cover would limit hunting success by polar bears and arctic foxes, with resulting reductions in bear and fox populations.

8.17 This dynamic could have negative effects on the lifestyle, food and health standards of some indigenous peoples. Because global climate change is likely to have profound impacts on sea-ice extent and duration, it is in this habitat where the initial impacts on marine mammals may be first evident.

Coral reefs

8.18 As noted in Chapter 2, coral reefs face a number of stresses and problems from human impacts. Their resilience and development can also be greatly reduced by rising sea levels, increasing sea surface temperatures and other climate-ocean-related changes, including prevailing wind activity and storm waves and surges.

8.19 Projections suggest that healthy reefs are able to keep pace with projected sea level rise. However, the situation is less clear for the large numbers of degraded reefs in densely populated regions of south and south-east Asia, eastern Africa, and the Caribbean, as well as those close to population centres in the Pacific. Many coral reefs occur at, or close to, temperature tolerance thresholds. Research has discovered that it takes only a 1°C change in sea-surface temperature to cause severe bleaching effects. The worldwide proliferation of coral bleaching can therefore be expected to be exacerbated by global warming.

Coastal wetlands

8.20 Sea level rise will compound the existing decline of global coastal wetlands (*ie* saltmarshes, mangroves, deltas and intertidal areas) resulting from human reclamation, which is reducing global stock by about 1 per cent per year. Preliminary work commissioned by DEFRA shows that without action to reduce emissions of greenhouse gases, global wetland losses increase rapidly with time. By the 2080s, estimates suggest that between 13 per cent and 25 per cent of the world's coastal wetlands could be lost due to sea level rise alone and we could expect substantial additional losses in the 22nd century. However, if we can limit emissions of greenhouse gases and stabilise concentrations of carbon dioxide in the atmosphere, we can slow the rate of change giving wetlands more time to adjust, reducing these losses, and aiding their long-term survival.

UK impacts

8.21 Climate change may already be having an effect on marine ecosystems in the UK. For example the abundance of some species of marine plankton may be affected by ocean currents and sea temperatures. There have been changes in the prevalence of certain species of fish, such as bass in the North Sea, indicating that temperature changes may be impacting on fish populations.

8.22 The threat of rising sea levels, more intense rain and snowfall and the possibility of increased storminess, flooding and accelerated erosion is likely to increase as a result of climate change. Sea level rise will have profound effects causing frequent high tide levels around parts of the UK coastline, making low lying land in coastal and river areas more vulnerable to flooding. Changes in relative sea level will vary locally as a result of other factors such as uplift and subsidence. Higher-latitude coasts will experience impacts from higher wave energy and permafrost degradation.

8.23 Recent research (the MONARCH project) carried out by English Nature and other conservation agencies indicates that coastal habitats such as wetlands could be one of the ecosystems especially vulnerable to climate change in the UK because of the threat of coastal squeeze between hard defences and rising sea-level. The Regis project (sponsored by DEFRA and UKWIR) suggests that even where saltmarshes persist their composition could change as species migrate to new sites.

Policy responses

United Nations Framework Convention on Climate Change and the Kyoto Protocol

8.24 The international community has put in place a framework for action through agreement to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Under the Kyoto Protocol, adopted in 1997, industrialised countries agreed to reduce their combined greenhouse gas emissions by an average of 5.2 per cent compared to 1990 levels by the period 2008–2012. Kyoto provides a framework for action to tackle emissions but further cuts of more than 60 per cent in global emissions will be needed if we are to avoid some of the worst effects of climate change. Whatever we do, some degree of climate change is now inevitable and we need to assess its likely impact and plan to adapt to its effects.

UK Climate Change and Climate Impacts Programme

8.25 The Government also established the *UK Climate Impacts Programme* (UKCIP), in 1997, to help decision-makers and other stakeholders assess their vulnerability to climate change so that they could plan adaptation strategies. UKCIP also facilitates a stakeholder network for organisations to share experience and take a partnership approach to assessing their vulnerability to climate change. The UKCIP website is: www.ukcip.org.uk.

8.26 In November 2000, UKCIP set out the Government's and the devolved administrations' approach to the challenge of climate change. It outlines the progress that the UK has already made in cutting its greenhouse gas emissions and explains how climate change is expected to affect the UK and how we might need to adapt. It also provides an initial view of what the priorities for adaptation might be, and details how we have started to build adaptation into policies, for example in coastal and flood defence, as set out in Chapter 3.

Coastal wetlands and habitats

8.27 The UK Biodiversity Action Plan has set an overall objective of maintaining the existing extent of saltmarsh habitat of approximately 45,500 ha, and restoring this habitat to 1992 levels. The intention is to create 140 ha of saltmarsh each year to offset current losses and to replace the 600 ha lost between 1992 and 1998. This is likely to involve managed realignment – a technique which can be utilised as an adaptation strategy to climate change which is able to restore lost coastal wetlands as well as recreate a natural first line of defence against the energy of the sea.

Estimated Habitat Losses for SAC/SPA and Ramsar sites in England and Wales in the next 50 years as a result of existing shoreline management policies

Habitat type	Area loss by 2050 (ha)	Annual loss (ha)
Mudflat/sandflats	11,459	229
Saltmarsh	6,996	140
Sand dunes	504	10
Shingle bank	238	5
Coastal lagoons	530	11

Source: Lee, E.M. (1998): The implications of future shoreline management on protected habitats in England and Wales, Environment Agency, R&D Technical Report W150.

8.28 A recent study by DEFRA on the implications of climate change for conservation policy concluded that policy needs to be flexible. There will be a need to assess forward conservation status and it may not always be possible to maintain some species or habitats at a particular location. There may be tension between what we believe is likely under climate change and the achievement of policy goals that are site-specific, such as the preservation of special sites such as SACs.

TAKING THINGS FORWARD

8.29 We are committed to manage and respond to the effects of climate change in the development of future policies for coastal and marine environments. We intend to ratify the Kyoto Protocol, along with our EU partners, in time to allow it to enter into force before the World Summit on Sustainable Development. We aim to go further than the Kyoto commitment and move towards a domestic goal of a 20 per cent reduction in carbon dioxide emissions below 1990 levels by 2010.

8.30 Implementation of adaptation strategies on the ground at a local and regional level will require high resolution climate scenarios. To help meet this need, UKCIP will be issuing higher resolution scenarios in 2002, which will be based on the Hadley Centre's[22] Regional Climate Model and provide an improved treatment of extreme events. The scenarios will also include information on future changes in sea level. We will be using publication to raise awareness of the need for organisations to build climate change adaptation into strategic decision-making. In the longer term, DEFRA is funding the Hadley Centre to carry out further detailed research to improve our understanding of the likely impacts of climate change on terrestrial and aquatic ecosystems.

8.31 A major new four year study, *Marine Biodiversity and Climate Change* (MarClim) commenced in early 2001, under the *UK Climate Impacts Programme*, managed by Marine Biological Association. The study will cover UK and Irish waters and will assess the influence of climate change on marine biodiversity, using measurements and models of intertidal species. It is funded by a range of organisations including DEFRA, the Environment Agency, the Scottish Executive, the JNCC, Scottish Natural Heritage, the Countryside Council for Wales and WWF-UK.

8.32 The results of the study will be used to inform policies concerning the marine environment, and will provide contextual information to assist in reporting the success or otherwise of marine aspects of *Sustainable Development Strategies, Biodiversity Action Plans*, and the *Habitats, Birds and Water Framework Directives*. It will also assist those managing and monitoring marine activities and resources, including fisheries.

8.33 We will also continue to assess and monitor the impacts of climate change on the marine environment. Activities such as the Continuous Plankton Recorder and Global Climate Observation System, which are discussed further in Chapter 9, can make an important contribution to the study of climate change and its effects on the oceans and seas.

[22]The Hadley Centre for Climate Prediction and Research is part of the Met Office. It provides the UK with an up-to-date expert assessment of natural and man-made changes in global and regional climate.

Making best use of marine science

- **Our stewardship of the marine environment must be informed by the best available scientific evidence. We are working to ensure that we maximise the value of Government-funded science in delivering our vision.**

- **We will develop better integration of marine environment monitoring and observation. We will continue to encourage appropriate collaboration with industry and other non-governmental organisations.**

- **Integrated management must be informed by improved co-ordination and access to spatial data and mapping of the marine environment. We will move towards ensuring that publicly-funded marine environmental data is made as freely available as possible.**

THE IMPORTANCE OF MARINE SCIENCE

9.1 In the previous chapters the fundamental importance of scientific evidence in guiding and advising the development of policy for, and management of, the marine environment has been highlighted. This chapter describes how we are developing our organisation of marine science and monitoring, as a key element of an ecosystem approach. It outlines how UK Government Departments and agencies, with the substantial support of the research councils, deliver a high-quality marine science programme on the quality, structure and functioning of the marine environment. This programme complements the science supported by international organisations such as the EC's *Framework Research Programmes*.

Research vessel Cirolana – marine scientific research helps us to better understand our seas and make more informed policy

9.2 Improved scientific evidence is particularly important in areas of uncertainty or where a range of scientific opinion exists. Scientific evidence may help to identify areas of uncertainty where a precautionary approach should be adopted. We will seek to provide support for both broad-based longer-term science and research to inform specific policy questions.

9.3 Government agencies responsible for marine environment protection provide dedicated scientific expertise and infrastructure for marine observation, modelling, monitoring and research, emergency pollution response and proactive pollution control, supporting their responsibilities for regulating deposits in the sea, regulating aggregate extraction and consenting discharges to the marine environment. These agencies include the fisheries laboratories, the Centre for Environment Fisheries and Aquaculture Science (CEFAS), the Fisheries Research Service, Marine Laboratory in Aberdeen (FRS) and the Department of Agriculture and Rural Development in Northern Ireland (DARDNI) in addition to the environmental protection agencies: The Environment Agency (EA) (England and Wales), the Scottish Environment Protection Agency (SEPA) and Environment and Heritage service (Northern Ireland) (EHS).

Research into oil spill incidents

Considerable experience and expertise has been built up in FRS and CEFAS to predict the likely impact of the spills, and to design monitoring programmes which both allowed effective control of fishery closure and aided the overall assessment of environmental impact. Scientists also gave advice on the operational use of dispersants. For example, during the *Sea Empress* incident, experts from CEFAS advised on when and where it would be beneficial to spray dispersants, and on where their use was undesirable because of the damage dispersed oil might cause to fisheries and the marine environment. This carefully considered approach helped to minimise the overall impact of the spill on marine life.

9.4 The Country Conservation Agencies Joint Nature Conservation Committee (JNCC), English Nature (EN), Scottish National Heritage (SNH), Countryside Council for Wales (CCW), and EHS carry out research and monitoring to aid the development of management strategies and decisions on the coastal zone, particularly in relation to their responsibilities for designated areas and the need to respond on the needs of managing Special Areas of Conservation (SACs) under the *Habitats Directive*.

9.5 The Met Office provides operational information on ocean climate including forecasts of wave height, ocean currents and storm surges. For example, it uses the FOAM (Forecast Ocean-Atmosphere Model) to produce real-time analyses and forecasts of the temperature, salinity and currents of the deep ocean up to five days ahead for the Royal Navy.

9.6 As well as establishing an evidence base to support the development of policy, outputs from government marine science programmes feed into the wider development of marine science. The Government maintains a policy of openness with regard to the outputs from publicly funded science to ensure that the maximum possible benefit accrues from its expenditure on research. Relevant research reports and assessments of monitoring data are published and Government Departments strongly encourage the publication of scientific papers arising from their programmes in the scientific literature following appropriate peer review.

Co-ordination of Marine Science

9.7 The Inter Agency Committee on Marine Science and Technology (IACMST), which reports annually to the Government's Chief Scientific Adviser, maintains an overview of national and international activities in marine science and technology. This ensures that the arrangements for the co-ordination of national and international marine science and technology activities are adequately maintained. IACMST supports two action groups, one co-ordinating Marine Environmental Data and the other co-ordinating the UK contribution to the Global Ocean

Recent co-ordination initiatives from IACMST

- **Report on the Climate of the UK Waters at the Millennium (2001)**
- **Review of Current UK Marine Observations in relation to present and future needs (2000)**
- **Directory of marine environmental datasets held by UK laboratories (2000)**
- **Workshop on Sensors and platforms (2001)**
- **Marine sample collections: their value use and future (2001)**
- **Workshop on Oceanographic Modelling (1999)**
- **Workshop on Data Access and charging policy (2000)**
- **Workshop on the Future of Operational Oceanography (2001) (with MIC)**

Key MPMMG achievements

- **Established National Marine Monitoring Programme (NMMP) to monitor long-term trends in ecosystem and biological diversity, trophic status and environmental pollution**
- **Co-ordination of internationally recognised analytical quality control schemes for biology, sediments and chemistry**
- **Established technical working groups to review the environmental effects of various activities *eg* discharges of radioactivity, fish farming and disposal to sea.**
- **First NMMP report *The Quality of UK Coastal Waters* published in 1998**
- **Established inter-agency task teams to co-ordinate classification and typology issues for coastal and transitional waters under the *Water Framework Directive*, including close links with Republic of Ireland**

Observing System (GOOS) of the Intergovernmental Oceanographic Commission. Each year IACMST runs a number of special events and produces reports to facilitate the co-ordination of marine science and technology across Government.

9.8 The Marine Pollution Monitoring Management Group (MPMMG) has the responsibility for co-ordinating monitoring of marine environmental quality in relation to a number of European Directives, including the *Water Framework Directive*, and other international commitments, including OSPAR requirements. As a function of these responsibilities MPMMG ensures scientific co-ordination of approaches to the monitoring of marine environmental quality and related research.

9.9 Co-ordination between industry and the Government is being developed by the Marine Information Council (MIC), a new initiative implementing the Marine Foresight strategy for the development of the UK's marine information industry. This brings together government, institutional, academic and industry bodies, which collectively span all components of the UK marine information sector. The primary task of MIC is to seek improved funding for marine research and to foster the application of this research to customer needs through the development of the intermediary marine information products and services industry. Internationally, a major output of scientific co-operation was the publication of the OSPAR Quality Status Report in 2000.

9.10 Reflecting the linkages between the global ocean and the local marine environment, the UK actively supports international marine institutions and actively participates in a wide range of international science programmes. A key part of this, reflecting the range of sectors involved in marine issues, is strengthened co-operation within the UN system, which the UK is working to develop. Along with other countries and UN bodies we are looking at the scope for a more regular and co-ordinated global assessment of the marine environment.

MARINE ENVIRONMENT MONITORING AND OBSERVATION

9.11 As part of an ecosystem-based approach to management of the marine environment we are now seeking to achieve greater integration of government marine monitoring programmes.

Smart buoy – providing real-time monitoring of the marine environment

Monitoring the quality of the environment

9.12 The UK has one of the best programmes in Europe for monitoring the extent and effects of pollution in the marine environment, co-ordinated by the MPMMG. The National Marine Monitoring Programme (NMMP) ensures co-ordinated quality status monitoring between UK Government Departments and agencies with environmental protection responsibilities. Those agencies with regulatory responsibilities also monitor the marine environment to assess compliance with statutory regulatory regimes *eg* in relation to EC Directives, Food and Environment Protection Act and COPA. MPMMG also co-ordinates monitoring activities in relation to marine litter and monitoring of the recovery of sewage sludge dumping sites following the cessation of dumping in 1998.

9.13 The NMMP was initiated in 1993 with the aim of detecting, with appropriate accuracy, long–term trends in environmental quality at selected coastal and estuarine sites. Under the NMMP a network of estuarine and coastal stations has been sampled annually since 1999. A key element of the network has been the development and adoption of internationally-recognised quality control schemes for field sampling and sample analysis.

9.14 The JNCC is responsible for co-ordinating the collection of a variety of information on the biota found around the UK coast. JNCC's Marine Environmental Resource Mapping and Information Database (MERMAID) has been developed to provide wider access to information on marine sites, habitats and species around Britain and Ireland. JNCC has co-ordinated the Marine SACs project, as described in Chapter 2, and developed a Marine Monitoring Handbook. This provides guidance by the UK Government's statutory nature conservation agencies and their key partners in drawing up monitoring schemes for marine SACs.

Observing variability in ocean climate and circulation

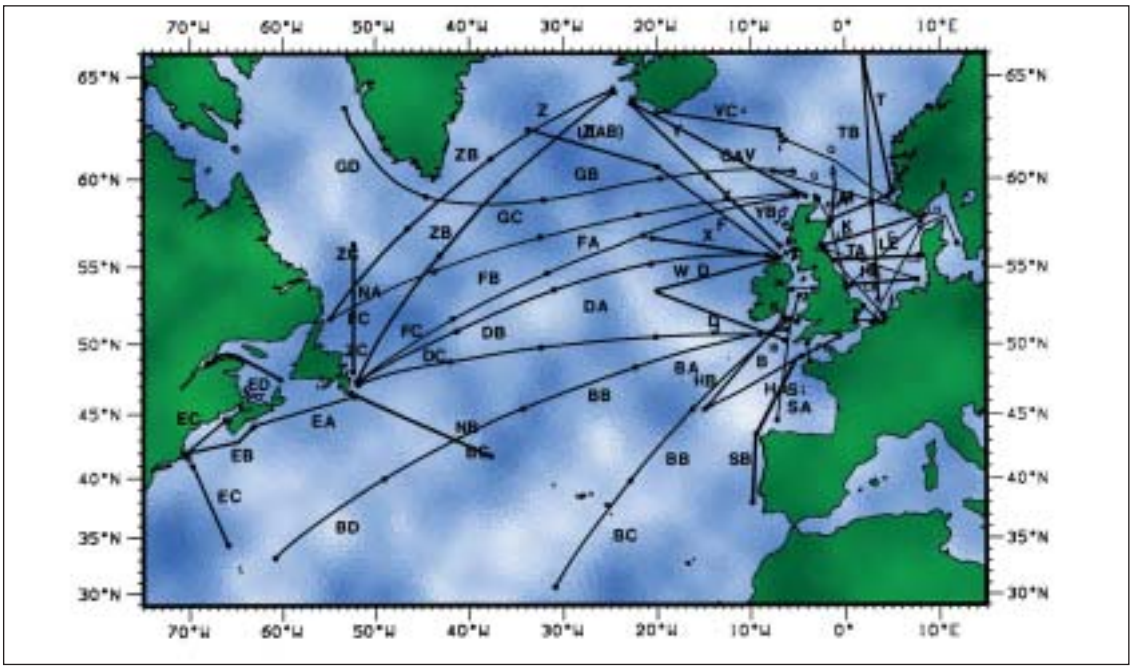
9.15 Understanding the coupled ocean-atmospheric system is important for our understanding of both climate change and the context within which our management of the marine environment takes place. To do so we need to make use of long term observation and new technologies. The oceanic inflow from the Atlantic into UK waters is one of the key drivers of the background variability of our marine environment, and the temperature and salinity of this water affects the biology and chemical processes.

9.16 The UK is an active participant in the development of the Intergovernmental Oceanographic Commission's Global Ocean Observing System (GOOS), which is developing a co-ordinated international strategy for marine observations particularly those related to physical oceanography. The UK's contribution to GOOS is co-ordinated by the GOOS Action Group of IACMST.

9.17 The Natural Environmental Research Council (NERC), through the Southampton Oceanography Centre and Plymouth Marine Laboratory, has hosted the project offices for three globally important programmes that have supported the development of GOOS:

- World Ocean Circulation Experiment (WOCE) to develop models for predicting climate change and the collection of relevant data.

Figure 9.1. The Continuous Plankton Recorder Survey network in the north Atlantic



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- Climate Variability and Predictability (CLIVAR) which is an international research programme addressing many issues of natural climate variability and anthropogenic climate change. As part of the wider World Climate Research Programme (WCRP), CLIVAR is giving insights into the working of the climate system and hence answers to important questions regarding the occurrence of El Nino events and the extent of sea level rise.

- Global Ocean Ecosystem Dynamics Project (GLOBEC) which aimed to understand how changes in the global environment affect the abundance, diversity and production of animal populations comprising a major component of ocean ecosystems.

9.18 Key UK contributions to the operational GOOS will include:

- the Array for Real-time Geotrophic Oceanography (ARGO). DEFRA, the Met Office and Southampton Oceanographic Centre are the major partners in the UK contribution to the ARGO project. This is the planned deployment of 3000 open-ocean drifting floats, which by rising and sinking over 14 day cycles, will profile temperature and salinity in the oceans to depths of 2000m depth. The first UK ARGO floats were put in the water in September 2000.

- The Continuous Plankton Recorder (CPR). CPRs are survey instruments that are towed voluntarily from merchant ships and catch plankton on a moving band of silk that is wound onto a storage spool. The survey (figure 9.1) is supported by an international consortium, within which DEFRA and NERC are the largest funders and environmental NGOs are represented. It provides a valuable record of long term change in the UK marine waters. The distribution of plankton also acts as a strong indicator of water temperature, currents and man-made inputs to the sea.

- The UK participates in a number of global programmes using voluntary observing ships, ships of opportunity, moored buoys and drifting floats to take observations of ocean climate.

- The Permanent Service for Mean Sea Level (PSMSL) is hosted by Proudman Oceanographic Laboratory and is the global data bank for long-term sea level change information.

9.19 Marine monitoring and observations may be enhanced through the latest developments in technology (*in-situ* monitoring, remote sensing, modelling, data management) and maximised through better operational co-ordination. DEFRA has recently initiated the development of a Marine Environmental Change Network. In its first phase this will aim to maximise the value of existing long term marine observation data but we will seek to embrace new technology, and the results of research such as the MarCLIM study, to build a network for observation and prediction of the effects of environmental change.

Future development of Marine Environment Monitoring

9.20 The marine environment is a complex system. An ecosystem-based approach requires a better understanding of the way ecosystems as a whole function. Our approach will seek to improve co-ordination of the interfaces between monitoring and observation for different sectoral interests, *ie* to co-ordinate the assessment of oceanographic climate and fisheries with the monitoring of environmental and ecological quality and nature conservation status. The aim will be to support more integrated and coherent assessments of the state of the UK marine environment at regular intervals.

9.21 We will produce a first integrated assessment in the form of a State of Our Seas report in 2004. Performance indicators for reporting on management of the marine environment are currently being developed through government research programmes which will contribute to this assessment.

9.22 New technological developments, particularly in oceanographic sensors, data transmission and management, allow real-time monitoring of an increasing range of environmental parameters. These provide the potential for the collection of increasing quantities of environmental data, which, in connection with remote sensing and physical and biological modelling, is already invaluable in coastal management and offers great potential for improving our management of the environmental impact of marine activities. We need to explore, and where appropriate exploit, the potential of these technologies in developing the way we collect and make use of scientific evidence.

RESEARCH AND DEVELOPMENT

9.23 In addition to regular marine observation and monitoring, Government departments and agencies support the development of policy and

Natural Environmental Research Council (NERC):

NERC's mission is to promote and support high quality basic, strategic and applied research, survey and long-term environmental monitoring to advance knowledge and technology, and thus contribute to the economic competitiveness of the United Kingdom, the effectiveness of public services and policy and the quality of life;

Major marine research themes currently supported by NERC include:

- ***Auto-sub Under Ice* – exploring the marine environment under floating ice shelves.**
- ***Marine & Freshwater Microbial Biodiversity* – biodiversity, community interactions and ecosystem functions.**
- ***Environmental Genomics* – advancing evolutionary and ecological theory through genomics and proteomics.**
- ***Marine Productivity* – how physical factors affect zooplankton population dynamics.**
- ***Rapid Climate Change* – the role of the ocean's thermohaline circulation in influencing NW European climate.**
- ***Seasense* – developing new marine sensors.**
- ***Developmental Ecology of Marine Animals* – how environmental changes affect early development.**
- ***Coupled Ocean* – Atmosphere Processes and European Climate**

NERC Research Centres and Collaborative Centres include Plymouth Marine Laboratory, Dunstaffnage Marine Laboratory, Proudman Oceanographic Laboratory and Southampton Oceanography Centre.

management of the marine environment through a range of varied investigative research, which extends and enhances the evidence base used to develop policy. Research programmes are also undertaken in the NERC Marine Laboratories and specialist university departments.

9.24 The development of marine research occurs in partnership with the science community. Government Departments and the research councils invite research proposals and hold seminars and workshops to review and discuss the development of science programmes with the science community at different stages of the process. Departmental research into the marine environment is co-ordinated and managed by the widest possible range of consultation amongst relevant research managers and policy makers and where appropriate the use of external specialist advice. The remainder of this chapter looks at a small number of key pieces of research.

Biological effects of pollutants

9.25 A co-ordinated programme of research into the effects of pollution on marine organisms has investigated genetic, cellular disruption, behaviour and physiology in different groups of organisms and marine populations. This research will help us to judge whether current regulatory programmes and measures are providing sufficient environmental protection.

9.26 A government-industry consortium was established to support the Endocrine Disruption in the Marine Environment (EDMAR) Research Programme, which aimed to investigate whether there is evidence that changes in the reproductive health of both marine fish and invertebrates are due to endocrine disruption. EDMAR has shown effects in five species of estuarine fish. It is not yet clear whether the observed effects are likely to have consequences for reproductive success or whether they also occur in other groups of species *eg* invertebrates. Further research is needed to identify the substances responsible and the potential impacts.

Impact of anthropogenically–derived nutrients on the marine environment

9.27 A six year study into the impacts of nutrients in key UK coastal areas (JoNuS) was led by CEFAS and funded by a consortium of Government departments. This supported the development of policy decisions on the management of flows of nutrient elements from society and understanding of the way the coastal system works and contributed to decisions on what level of impact on the ecosystem is acceptable and what is not. Further research is developing robust approaches to how we classify and manage marine areas with regard to nutrient impacts.

Environmental effects of sand and gravel extraction

9.28 As noted in Chapter 6, research into the effects of human activities on the seabed supports the regulation of the activity, allowing potential conflicts with other uses of the sea to be identified. Research into the movement of the plume of sediment resulting from extraction of aggregates at Race Bank, off north Norfolk, enabled the Government to advise that licence conditions should be set to minimise the impact of the activity on the local crab fishery. These conditions restricted extraction of aggregate to neap tides and thus reduced the dispersion of sediment.

Habitat mapping

9.29 The need to gain a greater understanding of the marine environment and the inaccessibility of the sea floor has led to the development of sophisticated acoustic technologies for assessing seabed topography and deep ocean currents. These technologies have made it possible to map seabed habitats and marine resources. DEFRA and EHS in Northern Ireland are currently funding research by CEFAS and DARD to investigate the combined use of these techniques and biological sampling to map seabed biotopes (habitats and their associated biological communities).

9.30 This work is directly applicable to the development of policy on aggregate extraction from the seabed whilst ensuring the sustainability of the associated ecosystem. These studies have therefore focused on mapping areas of the seabed that consist predominantly of gravel and sand deposits. However, there are wider applications and to support integrated management and conservation objectives we need to work with marine industries to produce accessible computer based mapping of the distribution of key environmental feature, biodiversity and human use of the sea.

TAKING THINGS FORWARD

9.31 The creation of DEFRA in 2001 brought together into one Government Department interests in marine science to support conservation, environmental protection, fisheries and coastal management objectives. This provides a major opportunity to maximise and co-ordinate the value of government-funded marine science in informing policy and the management of the marine environment. Similarly the creation of SEERAD in Scotland has brought together interests in marine science to support Scottish conservation, environment protection, fisheries and coastal management objectives.

9.32 To support our objectives for integrated management of the marine environment we will use this opportunity to ensure that we optimise the development of science programmes to meet a range of needs in policy development, particularly with respect to science infrastructure projects. We will make sure that marine scientific research and monitoring is fully integrated into policy making. We will continue to undertake research to provide a better understanding of the significance of the effects of hazardous substances and endocrine disruptors, particularly population and community level effects.

9.33 We will take forward a number of new initiatives with stakeholders. We will work through OSPAR to develop Ecological Quality Objectives to assess our success in delivering a ecosystem-based approach. We will also develop our environment monitoring and observation framework to deliver integrated assessments of state of the marine environment using a framework of environmental indicators. We will produce a first integrated assessment of the State of Our Seas in 2004.

9.34 We will develop a pilot programme in operational oceanography harnessing modelling, remote sensing and real time data collection techniques to support coastal management, emergency response and management of marine activities. We will encourage open access to marine environmental data.

9.35 We will develop a marine environmental change network to maximise the value of the UK's long-term time series in monitoring the effects of climate change on UK marine ecosystems. We will also work toward providing publicly accessible integrated marine mapping, initially in the coastal area. This will help to promote integrated and ecosystem based approaches to management through a better understanding of the interactions between environmental features and human activities.

Annex A

Timeline for key dates and achievements

2002 – commencement of regional seas pilot scheme in the Irish Sea as the next step of our Review of Marine Nature Conservation.

2002 – publication of Government's strategy for managing radioactive discharges up to 2020 to show how UK is working to deliver its OSPAR target.

2002 – designation of Marine Environmental High Risk Areas (MEHRAS) and consultation on protective measures proposed for individual MEHRAs.

2002 – International Safety Management (ISM) Code to apply to most ships that trade internationally to provide an international standard for the safe management and operation of ships and pollution prevention.

2002 – hold autumn workshop with key stakeholders on how best to take forward the initiatives and ideas contained in this report.

2002 – start process of reviewing the regulatory framework affecting development in the coastal area with a view to simplifying the regulatory system and protecting the marine environment.

2002 – consultation on Regulations to extend the Habitats and Birds Directives to all waters over which the UK exercises sovereign rights.

2002 – JNCC to recommend potential sites for SPA and SAC status in the 12 to 200 nautical mile zone to apply once the regulations to extend the Habitats and Birds Directives are in place.

2002 – preparation of the next round of Shoreline Management Plans (SMPs) to further improve handling of long–term natural processes affecting coastal defence planning.

2002 – expected adoption of the EC Recommendation on Integrated Coastal Zone Management (ICZM) followed by a joint conference of national coastal fora on how best to implement the Recommendation.

2002 – ratification of the Kyoto Protocol with our European partners in time for it to enter into force before the World Summit on Sustainable Development (WSSD) in August 2002.

2002 – WSSD. UK promotes marine issues as a priority, including sustainable fisheries, marine protected areas and better oceans governance.

2002 – publication of Government's Energy White Paper.

2002 – EC Directive to establish a port waste reception regime across the EC to come into force.

2002 – publication of the UK's Small Cetacean By-catch Response Strategy.

2002 – issue consultation paper by the end of the year on the scope and content of future marine stewardship reports and whether a new overarching stakeholder forum is needed.

2003 – completion of the UK's initial assessment under OSPAR of the eutrophication status of UK waters to complement assessments of estuaries and nearshore waters which are being done under relevant EC Directives.

2003 – the International Convention on the Control of Harmful Anti-Fouling Systems on ships bans the application of organotin from 1 January 2003 and its use as an anti-foulant on ships from 1 January 2008.

2003 – amount of compensation available for any single oil spill from a tanker will rise by 50 per cent to approximately £180 million.

2003 – development of an integrated, comprehensive, environmental regulatory regime for offshore oil and gas licensing seamless from pre-licensing through exploration, development and eventual decommissioning.

2003 – revised Common Fisheries Policy (CFP) to come into effect following completion of the current review of the CFP.

2003 – next OSPAR Ministerial Meeting

2003 – completion of Coastal Habitat Mapping Plans (CHaMPS) initiative, including seven CHaMPS, best practice guidance on habitat creation and a framework for managing habitats on changing coastlines.

Annex A

Summary of targets and timescales for delivering our vision

2004 – findings of the regional seas pilot scheme in the Irish Sea, which forms part of the Review of Marine Nature Conservation, available in early 2004.

2004 – latest date for the Strategic Environmental Assessment (SEA) Directive to be transposed to complement the Environmental Impact Assessment (EIA) Directive.

2004 – target date for completion of development of a full set of Ecological Quality Objectives and development of a first integrated indicator-based assessment in the form of a State of the Seas report.

2004 – disposal of vessels or aircraft at sea will be prohibited after the end of 2004 under Annex II of the OSPAR Convention.

2004 – between 2001 and 2004 funding of over £260 million will have been granted to encourage further research and development in renewable energy to support early projects.

2004 – production of our integrated assessment of our seas.

2005 – by 2005 a further £600 million will have been invested to drive up bathing water compliance.

2006 – date for meeting the OSPAR target of a reduction of 15 per cent of current oil inputs from produced water.

2006 – North Sea Ministerial Meeting on the environmental impacts of shipping and the environmental consequences of fishing.

2006 – we will have developed an overarching vision for the future of the UK's coastline, underpinned by a fully integrated set of strategies for England, Wales, Scotland and Northern Ireland.

2007 – unprotected single hull tankers will not be allowed to operate anywhere in the world after 2007.

2010 – we are committed to halting the decline of biodiversity by 2010 as part of the EU's 6th Environmental Action Programme.

2010 – by 2010, we will have identified and designated relevant areas of the UK's seas as marine protected areas belonging to a network of well-managed sites.

2010 – we are committed to renewable energy making up 10 per cent of electricity sales from licensed suppliers by 2010.

2010 – target date for going further than the Kyoto commitment and achieve a domestic goal of a 20 per cent reduction in carbon dioxide emissions below 1990 levels.

2010 – target date for meeting individual ceilings for four transboundary pollutants: sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia under the Gothenberg Protocol.

2015 – deadline for meeting demanding water quality targets under the Water Framework Directive's strategic framework for managing inland and coastal waters in an integrated and sustainable way.

2015 – from 2015 newer tankers with partial hull protection will not be allowed into the ports of EU Member States, UK Overseas Territories, Russia and the Baltic States unless they are double hulled.

2020 – Performance Innovation Unit recommended target date for electricity generated by renewable sources to be increased to 20 per cent.

2020 – OSPAR target for reducing or eliminating discharges, emissions or losses of hazardous substances into the marine environment as far as practicable.

2020 – OSPAR target for reducing discharges, emissions and losses of radioactive substances in the marine environment to historic levels or close to zero.

Annex B

Glossary of acronyms and abbreviations

ACAP	Agreement on Albatrosses and Petrels
ACFM	Advisory Committee on Fishery Management
ACME	Advisory Committee on the Marine Environment
ARGO	Array for Real-time Geotropic Oceanography Project
ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North seas
BAP	Biodiversity Action Plan
BAT	Best Available Techniques
BEP	Best Environmental Practice
BNFL	British Nuclear Fuels Limited
CBD	Convention on Biological Diversity
CCALMR	Commission for the Conservation of Antarctic Living Marine Resources
CCW	Countryside Council for Wales
CEFAS	Centre for Environment Fisheries and Aquaculture Science
CFP	Common Fisheries Policy
CHaMPS	Coastal Habitat Management Plans
CITES	Convention on International Trade in Endangered Specie
CLIVAR	Climate Variability and Predictability Research Programme
CPR	Continuous Plankton Recorder
DARDNI	Department of Agriculture and Rural Development Northern Ireland
DEFRA	Department for Environment, Food and Rural Affairs
DFID	Department for International Development
DoENI	Department of Environment Northern Ireland
DTI	Department of Trade and Industry
DTLR	Department for Transport, Local Government and the Regions
DDT	Dichlorodiphenyltrichloroethane
EA	Environment Agency
EBFM	Ecosystem–Based Approaches to Fisheries Management
EC	European Commission
EcoQO	Ecological Quality Objective
EDC	Endocrine Disrupting Chemical
EDMAR	Endocrine Disruption in the Marine Environment Research Programme
EEC	European Economic Community
EHS	Environment and Heritage Service (Northern Ireland)
EIA	Environmental Impact Assessment
EMS	Electronic Monitoring System
EN	English Nature
ETV	Emergency Towing Vessel(s)
EU	European Union
FAO	Food and Agriculture Organisation
FCO	Foreign and Commonwealth Office
FEPA	Food and Environment Protection Act 1985
FOAM	Forecast Ocean-Atmosphere Model (Meteorological Office)
FRS	Fisheries Research Service
GDP	Gross Domestic Product
GIS	Geographical Information System
GLOBEC	Global Ocean Ecosystem Dynamics Project
GOOS	Global Ocean Observing System
GPA	Global Programme of Action
GV	Government View (Procedure on Aggregate Dredging)
HNS	Hazardous and Noxious Substances Convention 1996
IACMST	Inter Agency Committee on Marine Science and Technology
ICES	International Council for the Exploration of the Sea
ICZM	Integrated Coastal Zone Management
IMDG	International Maritime Dangerous Goods Code (IMO)
IMO	International Maritime Organisation
IPPC	Integrated Pollution Prevention Control
IPCC	Intergovernmental Panel on Climate Change
ISA	Infectious Salmon Anaemia
ISM	International Safety Management
IUU	Illegal, Unregulated and Unreported Fishing
IWC	International Whaling Commission
JoNuS	Joint Nutrients Study
JNCC	Joint Nature Conservation Committee
MADP	Marine Aggregate Dredging Policy
MAFF	Ministry of Agriculture, Fisheries and Food
MarClim	Marine Biodiversity and Climate Study
MARPOL	International Convention for the Prevention of Pollution from Ships
MCEU	Marine Consents & Environment Unit
MEHRAs	Marine Environmental High Risk Areas
MIC	Marine Information Council

Annex B

Glossary of terms

MNR	Marine Nature Reserves
MPAG	Maritime Pollution Advisory Group
MPG6	Minerals Planning Guidance Note (No.6)
MPMMG	Marine Pollution Monitoring Management Group
MPPW	Minerals Planning Policy Wales
MS	Member States (of the European Union)
MSR	Marine Stewardship Report
MW	Mega Watts (Unit of Measurement)
NADW	North Atlantic Deep Water
NASCO	North Atlantic Salmon Conservation Organisation
NAW	National Assembly for Wales
NERC	Natural Environmental Research Council
NGO	Non Governmental Organisations
NMMP	The National Marine Monitoring Programme
NSC	North Sea Conference
NPPG	National Planning Policy Guideline (Scotland)
OPRC	International Convention on Oil Pollution Preparedness, Response and Co–operation
OSPAR	OSPAR Convention for the Protection of the Marine Environment of the North East Atlantic
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PIU	Performance and Innovation Unit at Cabinet Office
PNTL	Pacific Nuclear Transport Limited
POP	Persistent Organic Pollutant(s)
PPG	Planning Policy Guidance
PPW	Planning Policy Wales
QSR	Quality Status Report (OSPAR)
R&D	Research and Development
RFO	Regional Fisheries Organisation(s)
RMNC	Review of Marine Nature Conservation
SAC	Special Area of Conservation
SCANS	Small Cetacean Abundance in the North Sea
SE	Scottish Executive
SEA	Strategic Environmental Assessment
SEEEC	Sea Empress Environmental Evaluation Committee
SEERAD	Scottish Executive Environment and Rural Affairs Department
SEPA	Scottish Environment Protection Agency
SFCs	Sea Fisheries Committees
SFLP	Sustainable Fisheries Livelihood Programme
SIDS	Small Island Developing States
SMP	Shoreline Management Plan(s)
SNH	Scottish Natural Heritage
SOSREP	Secretary of State's Representative for Maritime Salvage and Intervention
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
SWSFC	South Wales Sea Fisheries Committee
TAC	Total Allowable Catch(es)
TAN	(Aggregates) Technical Advice Note
TAR	Third Assessment Report (IPCC)
TBT	Tributyltin
THC	Thermohaline Circulation
UK	United Kingdom
UKBAP	UK Biodiversity Action Plan(s)
UKCC	UK Climate Change Programme
UKCIP	UK Climate Impacts Programme
UKCS	UK Continental Shelf
UKOOA	UK Offshore Operators Association
UKWIR	UK Water Industry Research
UN	United Nations
UNCLOS	UN Convention on the Law of the Sea
UNECE	UN Environment Economic Commission for Europe
UNEP	UN Environment Programme
UNFA	UN Agreement on Straddling and Highly Migratory Stocks
UNFCCC	UN Framework Convention on Climate Change
UWWTD	Urban Waste Water Treatment Directive
WCRP	World Climate Research Programme
WMO	World Meteorological Organisation
WOCE	World Ocean Circulation Experiment
WSSD	World Summit on Sustainable Development
WWF–UK	World Wide Fund for Nature – United Kingdom

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