

SCIENCE STRATEGY FOR THE WATER DIRECTORATE DIRECTORATE OVERVIEW

Introduction

The Water Directorate (WD) is responsible for:

- policy on water resources, and on economic regulation of the water industry and regulation of the water environment and drinking water;
- marine environment policy, both for British waters and globally and for integrated coastal zone management;
- inland waterways navigation.

The four WD Divisions: Drinking Water Inspectorate; Marine and Waterways; Water Quality; and Water Supply and Regulation, integrate science and policy work. As part of this, WD has integrated responsibility for development and management of the ex-MAFF marine science research programme.

In drawing up and executing the science strategy, close attention is paid to the scope for working with others in the UK and elsewhere, particularly Europe, as well as to the close relationship the Directorate has with the Environment Agency (EA) and Ofwat. Achievement of WD targets for the water environment relies on the EA's operational activities. The Office of Water Services (OFWAT) determines the prices for water and sewerage services and, in doing so, makes allowance for improvements in the water environment, drinking water and sewerage services.

Context

The relevant WD objectives are:

- the promotion of an effective and competitive water industry and development of a water management strategy, which provides high quality drinking water, protects public health and meets environmental objectives for fresh water, and
- to protect the marine environment and conserve and enhance biodiversity.

WD's ability to deploy science in tackling these objectives will play a pivotal role in Defra's achievement of these objectives.

This policy area is subject to profound international influences. Around 80% of the standards that apply in the aquatic environment are derived from EC Directives or other international agreements. The science and research activities in the four divisional science strategies will support development, implementation and evaluation of water policy. It is, therefore, crucial to provide a science base that will carry conviction at home and within the EU.

Timely provision of a robust, relevant base of scientific evidence depends on effective engagement with internal and external funders of water environment research, the water industry and organisations responsible for monitoring public health and the environment. Internally, WD relies on research carried out by other parts of the Department in achieving its policy objectives, for example on work commissioned by LMID on agricultural diffuse pollution of water. With increased emphasis on policy integration as identified in the water policy document, this dependence is likely to grow.

Key external players to be consulted in the development of the WD research programme will be the EA, OFWAT, other Government Departments, the Devolved Administrations and EU institutions. The Research Councils have an important role in building the water environment science base and especially so in respect of the emerging importance of social dimensions of policy development.

Key Principles and Approaches

The long-term objectives of the Science Strategy include:

- Improving understanding of processes that affect the freshwater and marine environment and providing a basis for identifying problems and developing policy responses.
- Acquiring and using effectively the scientific evidence needed to challenge standards that are unnecessarily strict or, that offer inadequate protection.

Government policy on compliance cost assessment implies the need to take also a long-term view of costs vs. risks and to consult widely on all policy initiatives that will affect industry.

Achieving these aims requires data on exposure levels, health effects and broader ecological effects. WD will need to promote quality assurance in environmental monitoring and risk assessment if it is to ensure fitness for purpose of the data generated. Where appropriate, WD will need to promote ecological studies, e.g. through Defra's sponsorship of the Small Area Health Statistics Unit.

Long-term aspirations will be more readily achieved by a proactive role in international fora, including the EU Framework Programmes. This brings the benefit of cost reduction via collaboration. It also permits consensus building in identifying priorities for action. Given that the EU environment agenda is a corporate issue, consensus on long-term priorities is important if we are to avoid duplication and conflict between member states in determining the relative allocation of scarce resources.

WD will also undertake horizon-scanning as a long-term activity. This includes the process of challenging conventional assumptions, which can provide a check that measures protective for the population majority do not constitute an unacceptable risk to a hitherto unidentified susceptible minority.

Other longer-term objectives are of a voluntary, rather than obligatory nature, though there are implications for Defra's reputation and the economy. For example, insufficient investment in research could result in an inability to counter effectively expensive proposals internationally, which may run counter to the UK's interests.

Medium-term challenges will centre on providing the science to promote UK interests in negotiations of EU water environment Directives and in international agreements on the marine environment. These activities and the subsequent development of UK measures to give effect to international obligations are all obligatory. Other medium-term challenges, of a voluntary nature but important for Defra's reputation, include promotion of water economy and support for green technology.

The short-term issues will include evaluating the impact of standards and regulation and the science support needed to inform policy development and evaluation of different options. Short-term science support needs include also WD's operational activities: informing decisions on licensing construction or disposal operations at sea; regulation of the water supply industry; and approval of drinking water construction products and water treatment chemicals.

Business Priorities and Impact of Resource Allocations

In priority order, the ten key business priorities requiring science support in the SR period 2003/4-2005/6 are to:

- Complete by 2004 the technical appraisal of the water company's proposals for investment under AMP4
- Provide a sound basis for implementing the Water Framework Directive, with particular reference to the need to consider costs and benefits and the impact of diffuse pollution
- Audit compliance with the Water Supply (Water Quality) Regulations 2000 and where necessary take action to achieve improvements
- Provide the science basis for EU negotiations in the sewage sludge, groundwater, bathing waters and priority substances Directives
- Identify land use and climate change factors that may affect availability of water resources in future and take action to ensure efficient use of resources
- Obtain a better understanding of marine ecosystems in order to underpin negotiations in OSPAR and the EU
- Take forward the Water Policy document and to secure better integration between WP objectives and between WP and non-WP objectives
- Assess the impact of increased competition in the water industry on the quality of services to be provided

- Investigate the nature and extent of problems associated with private sewers investigate drainage practices and sewer flooding
- Develop an ecosystem-based approach to management of human impacts on the marine environment, to ensure that resources can be exploited sustainably and that habitats biodiversity can be conserved.

The availability of staff resources to manage research already acts as a very effective restraint. Research and monitoring programme proposals have to fight for their place alongside the other demands on the Directorate. The overall pressure on staff resources from resourcing a Water Bill, the periodic review of water prices, and transposing the Water Framework Directive on top of normal business means that only high priority proposals can go forward. It is against this background that the bid for some additional resources should be seen, i.e., they are judged critical to the attainment of our policy objectives.

A reduction in resources would lead to reduced allocations or re-scheduling, rather than the removal of a topic from the list. It follows that the effects of 5/10% cuts over the 2nd and 3rd SR years would be a progressive degradation of the level of service provided including:

- Pressure to cut back on the long term horizon scanning, leaving only more immediate considerations, would bring risks to Defra's reputation and could have other serious consequences in the longer term.
- Missed opportunities for better policy development and/or renegeing on Water Policy Document commitments because of inadequate integration between different policies affecting water.
- Potential delays in identifying new risks to health via drinking water and risks to the aquatic environment from man-made chemicals
- Abandonment of announced marine policy commitments
- Increased risk of inappropriate international obligations that either offer inadequate protection, or incur unnecessary costs

Conversely, a 10% increase in the research programme resources would enable us to:

- Put more resources into understanding the processes that affect the freshwater and marine environment, including the physical and biological structure of the sea floor of the UK shelf.
- Provide further support for marine requirements arising from international obligations and especially sources of anthropogenic inputs and better cross-government coordination including data exchange;
- Monitor the integrity of membranes for drinking water treatment and assess the impact of European test requirements for drinking water construction products;

- Promote best practice in water conservation and efficiency, and also to assess risks to dams from seismic activity and erosion;
- Develop criteria for public perception of river water quality, and criteria for assessing technologies proposed under the Green Technology Challenge.

Resources devoted to science, and our proposals for research spending, over the period 2003/04 to 2005/06 are shown in Tables 1 and 2 of Annex 1.

Arrangements for development, monitoring and evaluation of research are common throughout the WD research programmes and full details are included in the respective ROAME statements.

Annex 1

Table 1: Directorate spend on scientific activities

Directorate science area	Science spend (£k)			
	2002/03	2003/04	2004/05	2005/06
Drinking Water Inspectorate	2220	2220	2220	2220
Marine Environment	10439	11578	11764	11900
Inland Waterways		65	35	30
Water Quality Division	1552	1552	1552	1552
Water Supply & Regulations Division	594	594	594	594
Water Directorate Head	390	390	390	390
Totals	15195	17399	16555	16686

Table 2: Proposed research spend (Directorate level)

Directorate science area	ROAME Programme	Proposed research spend (£k)					
		Baselines			Bids above baseline		
		2003/04	2004/05	2005/06	2003/04	2004/05	2005/06
Water Resources & Reservoir Safety	Water Resources & Reservoir Safety	483	483	483	48	48	48
Water Distribution, Conservation & Quality	Water Distribution, Conservation & Quality	761	761	761			
Quality of Controlled Waters	Quality of Controlled Waters	606	606	606			
Sewage Sludge Disposal to Land	Sewage Sludge Disposal to Land	282	282	282			
Marine Environment	Managing Marine Activities	1,524	1,524	1,524			
	Marine Emergencies	209	209	209			
	Inputs to Sea	653	653	653	125	125	125
	Understanding the Sea	1,307	1,307	1,307	125	125	125
	Marine Monitoring and Assessment R&D	1,198	1,198	1,198	100	100	100
Inland Waterways		65	35	30			
New Research vessel – Capital charge ^{(a)(b)}		399	399	399			
CEFAS Land and Buildings ^(a)		230	230	230			
Totals		7717	7687	7682	398	398	398

^(a) Used for all Marine Environment activities

^(b) Previously covered by SD

MARINE ENVIRONMENT

Business area and Objectives

In May 2002 the government published its first Marine Stewardship Report, "Safeguarding Our Seas", which set out the vision of clean, healthy, safe, productive and biologically diverse oceans and seas with a real difference made within one generation. To achieve this goal we are promoting a more sustainable and integrated approach to the management and conservation and use of the living and mineral resources of our seas (an ecosystem-based approach), both at home and internationally. MW's responsibilities are:

- to provide a focus for marine environmental policy and marine stewardship across government;
- UK representation in OSPAR (the Convention for the Protection of the Marine Environment of the North East Atlantic) and the global London Convention on dumping, and, with regard to marine environment policy, in the European Union, UN and other international forums;
- to implement the EU Recommendation on Integrated Coastal Zone Management (ICZM) in the UK;
- to co-ordinate the environmental response to pollution incidents at sea, and to licence the use of dispersants, and;
- to licence construction work and disposal of wastes (mainly dredged material) at sea.

This work contributes to DEFRA's Objective 1 - to protect the marine environment and conserve and enhance biodiversity- and DEFRA Objective 6 -to promote the sustainable management and prudent use of natural resources domestically and internationally.

By comparison with the terrestrial environment, marine ecosystems are poorly understood. The seas are internationally continuous so we work nationally and globally to develop our policy programme

MW business areas requirements for scientific support and current uncertainties;

Licencing - MW's Marine Consents Unit grants licences for the placing of structures and the deposit of dredge spoil on seabed under FEPA Part II. MW provide advice to ODPM on the environmental impact of extraction of minerals from the seabed. Decisions must be based on the fullest possible Environmental Impact Assessment (EIA) of the proposal. We rely heavily on science to offer scoping advice to applicants, and to reach decisions based on the EIA. Current uncertainties and science needs include:

- the distribution of marine habitats and scales of impact of human activities
- identification of suitable locations for future rounds of windfarm licences.
- improved data sharing between organisations, and development of methods for classifying and predicting marine habitats.
- Better understanding of how human activities interfere with the scales and variability of natural processes.

Marine Emergencies - MW advise the Maritime and Coastguard Agency on the risks to marine life when oil and hazardous cargoes are lost at sea and licences oil spill dispersants and their use. Current scientific uncertainties and science needs:

- Knowledge of location of key features and ecosystems and dispersion pathways;
- Incorporating the best-available knowledge into models for predicting the way losses to the sea disperse and testing protocols for oil spill dispersant products.

International Negotiations. Measures agreed in OSPAR and in the frame of the emerging EU Marine Strategy need to be appropriate and offer the best available means of protecting and conserving the marine environment. In the absence of thorough scientific evaluation and evidence, political pressure can lead to a failure to protect vulnerable species or ecosystems or impose excessive costs on industry, wastewater treatment and agriculture. Current uncertainties and science needs include:

- new hazardous substances are continually considered for prioritisation and risk assessment. Relevant data on sources, inputs, effects and concentrations in the marine environment is often absent or scarce. Data gaps on endocrine disrupting effects need to be addressed.
- assessments of eutrophication in UK waters are inconclusive for some areas. Improved monitoring and research is needed to resolve uncertainty and, where problems are identified, to identify the most effective form of remedial action.
- understanding of the location of key habitats and species is insufficient to guide appropriate designation of Marine Protected Areas. We need to ensure that proposed methods for designation and management of Marine Protected Areas are scientifically robust.
- understanding of how the physics and biology of UK seas will respond to climate change, and how this relates to management scenarios;

Developing Marine Stewardship – “Safeguarding Our Seas” outlined the need to develop a more sustainable and integrated approach to the management, conservation and use of the living and mineral resources of our seas. This will require us to promote the use of marine science so that our policy making is based upon the best available scientific knowledge about the ecosystem and its dynamics. This will require development of regular assessment processes at national, regional and global scales based upon systematic environmental monitoring, which is rationalised and harmonised across the needs of different regulatory regimes (e.g. OSPAR and Water Framework Directive) and co-ordinating the development of geographical information systems for use in marine management. We need to consider other studies on integrated management e.g. Royal Commission on Environmental Pollution study on the environmental impact of fishing.

Current uncertainties and science needs include:

- relative impacts of competing pressures on the marine environment;

- co-ordination of geographical information on biology and human activities;
- identifying and testing appropriate indicators to aid management
- how to build knowledge of ecosystem function into ecosystem-based management.

Integrated Coastal Zone Management (ICZM)

The EU Recommendation on implementing ICZM in Europe asks Member States to undertake a national stocktaking of legislation, institutions and stakeholders involved in the management of the coastal zone and, based on this, to develop national strategies to implement ICZM. ICZM describes the dynamic, multi-disciplinary and iterative process to promote sustainable management of coastal zones. This will be a cross cutting strategy, looking at economic, social and environmental issues. Current science needs include:

- development of the national stocktaking describing the framework for managing coastal activities in the UK and identifying any gaps or inconsistencies;

MW's scientific objectives/target outcomes

Listed, in order of priority, to be achieved by the end of the strategy period in 2006 with the key future scientific issues that we envisage will become important in the next five years:

Scientific support for ecosystem-based management (Marine Stewardship)

- To produce a first UK State of the Seas report in 2004 using data from UK monitoring and observation programmes and contribute to marine assessments at OSPAR and global scales.
 - For the next 5 years to produce a 2nd State of the Seas report in 2009 and contribute to a holistic OSPAR Quality Status Report also in 2009
- To have developed by 2006 a methodology for preparing habitat maps of the OSPAR area, and to implement a system for integrated mapping of biological information and human activities;
 - For the following 5 years to survey priority areas and to use the integrated mapping tools operationally to advise integrated spatial planning
- To have produced and implemented by 2006 an integrated UK strategy for marine environment monitoring and internationally by 2011;
- To have produced a national stocktaking and national strategy (by Feb 2006) for implementing ICZM in the UK;
- To develop by 2006 methodologies for the designation of marine protected areas
 - For the next 5 years to develop methodologies for management of MPAs

- To have developed by 2006 marine climate change scenarios e.g. possible changes in biogeography/ changes in water circulation and to establish by 2006 a Marine Environmental Change Network
 - For the next 5 years to monitor longer term marine environmental change

Marine Emergencies

- To incorporate the latest developments in shelf sea circulation into the operational models used to support DEFRA's emergency response function and to update by 2006 the testing regime for oil spill dispersant approvals.

International negotiations

- To ensure that information gaps on the sources, inputs, effects and (marine) environmental concentrations of chemicals for priority action identified up to 2006 are addressed, and particularly:
 - to identify those substances causing endocrine disrupting in the marine environment, and;
 - to broaden the range of approaches for assessing the marine effects of contaminant and mixtures of contaminants;
- to support requirements under OSPAR and the new EU Marine Strategy Research to further enhance understanding of where anthropogenic inputs of nutrients into the marine environment are likely directly, or indirectly to cause problems – to ensure that only effective and proportionate regulation is put in place.

Opportunities: Development of an EU Marine Strategy may provide opportunities to benefit from joint infrastructure developments for e.g. under GMES programme.

Threats: A major marine emergency would require diversion of resources away from longer-term priorities unless extra resource became available.

Areas of work that could be taken forward up to 2006 if resources become available

- i) Implementation of a monitoring programme to gather high quality data on the effects of nutrients in the marine environment using the best available techniques (Inputs to the Sea).
- ii) Providing a share of the DEFRA contribution towards the UK's subscription to the JASON II satellite (not more than 25K), thus ensuring the provision of real time altimetry data to support circulation models and environmental process and pathways research (Understanding the Sea).
- ii) Fulfilling the UK's commitment to the production of a UN global marine assessment, to follow up the commitment made at WSSD (Monitoring and Assessment R&D).
- iii) Enabling a DEFRA contribution to strategic research on systematic surveying of the physical and biological structure of the seafloor of the UK shelf and its contribution to the UK's integrated marine mapping strategy. Supporting spatial planning with an improved knowledge base and increasing

the robustness of designation and protection of marine species and habitats, to promote sustainable exploitation of resources (Understanding the Sea).

iv) Developing cross government co-ordination of UK marine science and technology through IACMST (Monitoring and Assessment R&D).

v) Underpinning the rationalisation and integration of UK marine environment monitoring through the strengthening of data handling and exchange infrastructure (Monitoring and Assessment R&D).

Implications of 5% reduction in resources.

A 5% cut would fall on two areas:

International Negotiations: A risk of insufficient scientific evaluation of proposals under OSPAR or EU legislation leading to the non-opposition of proposals that would impose high costs to industry, wastewater treatment and agriculture with negligible environmental benefit. Potential embarrassment in the lead up and follow up to OSPAR ministerial Meeting in 2003.

Marine Stewardship. A 5% cut would lead to the total closure of the monitoring programme and failure to produce the State of the Seas report in 2004, (a commitment of the Safeguarding our Seas report), since it would have to fall almost entirely on staff costs, (since the costs of the Research Vessel, laboratories, equipment etc are fixed and cannot be reduced). Any cut or closure in the marine monitoring programme would be unacceptable in legal, environmental and presentational terms

Means of fulfilling science needs

Scientific advice

Routine

- Scientific Staff working in MW provide scientific advice on policy development and advise on and manage scientific input into MW business.
- The Marine Pollution Monitoring Management Group (MPMMG) advise MW in relation to monitoring of marine pollution and environmental quality (Table 3).
- Inter-Agency Committee on Marine Science and Technology (IACMST) advise MW on the general development of marine science and technology (Table 3).
- The Centre for Environment, Fisheries and Aquaculture Sciences (CEFAS) are employed under two non R&D MOUs to provide advice:
 - on licensing for FEPA Part II (recharged to industry), including for wind farm developments ;
 - on the prospecting for and extraction of marine aggregates;
 - in relation to hydrocarbon exploration and exploitation, including on the oil treatment product approval scheme, and;
 - to convene and chair MPMMG
- MW also use advice funded outside MW, e.g. on:
 - monitoring of fish stocks by CEFAS funded by DEFRA FISH III;

- conservation advice from JNCC and English Nature funded DEFRA–EWD;
and advice from Environment Agency (and from the equivalent agencies in the Devolved Administrations), Crown Estate, Local Councils and sometimes NGOs. We also draw on work undertaken by the industries (e.g. the Ports Industry and the Aggregate Extraction Industries) and from Environmental NGOs (e.g. monitoring of bird populations by the RSPB). Scientific Committees under OSPAR and ICES provide internationally considered advice. Emergency

CEFAS are employed under a non R&D MOU to provide an emergency response facility to advise on the environmental consequences of accidental releases to the marine environment and impacts arising from the historical legacy of marine pollution. CEFAS advise on most issues, but where necessary, this is augmented by advice from Sea Fisheries Inspectorate, English Nature, Countryside Council for Wales and Food standards Agency and occasionally academia.

Guidance

In the Marine Stewardship Report, the importance of obtaining the best available scientific evidence in order to deliver a high-quality marine science programme is stressed. To do this, MW adhere to guidance set out in 'Guidelines 2000' and, where appropriate, to the 'Code of Practice for Scientific Advisory Committees'.

Science Facilities

Research Vessel: MW's Research and monitoring programmes rely on use of the CEFAS Research Vessels which are used jointly with Fisheries Division. A new research vessel will be launched in 2003.

Skills and facilities: MW rely on scientific expertise and facilities in physical oceanography, sedimentology, geochemistry, benthic ecology, ecotoxicology, analytical chemistry, biogeochemistry, statistics, radioecology and fisheries ecology.

Scientific representation (Table 7)

MW international negotiations are underpinned by high quality scientific advice:

- CEFAS Scientists lead delegations for technical working groups in OSPAR and London Convention. CEFAS, EA, JNCC and academic scientists provide support.
- CEFAS, EA and JNCC scientists support heads of delegation in the OSPAR policy committees and the London Convention annual consultative meeting.
- CEFAS scientists represent the UK at the committees and working groups of the International Council for Exploration of the Seas (ICES) and advise MW on issues connected to international policy negotiations.
- Roles are fulfilled only by internationally respected scientists.

Hence the importance of providing appropriate training and development for junior scientific staff, in order that their skills are retained, is recognised.

Science information and services

Monitoring: Assessing the quality of the marine environment and progress towards environmental goals needs to be supported by systematic monitoring of the marine environment. MW employ CEFAS under a non R&D MOU to monitor chemical, physical and biological quality of the seas around England and Wales. At a UK level MW, through CEFAS, convene MPMMG to co-ordinate monitoring by CEFAS, Environment Agency, and the Scottish and North Irish Governments to fulfil international commitments under OSPAR etc. MPMMG co-ordinate a UK National Marine Monitoring Programme to agreed national and international standards, which is internationally inter-calibrated

Following "Safeguarding our Seas" we are working with the organisations co-ordinating monitoring of fish stocks, biodiversity and ocean climate and MPMMG to develop a more integrated strategy for monitoring of the marine environment, which will meet our increasing needs for integrated assessment of the marine environment as part of an ecosystem-based approach. MW also work internationally to develop integrated approaches to monitoring.

Scientific foresight

The monitoring we support, although vital, cannot be comprehensive enough, due to resource constraints, to provide conclusive evidence for policy development. MW's monitoring programmes are updated and developed through research. Foresight is sought in the following ways:

- MW's Marine Environment Research Requirements Committee (Table 3) considers emerging science issues and co-ordination with OGDs and Agencies.
- OSPAR, ICES, IACMST and Marine Information Council (Table 4) provide foresight on emerging science and technology issues.
- MW holds bi-annual open seminars on marine science which consider current and future directions in marine science.
- Peer evaluated reviews of the MW research programme consider of gaps in relation to future needs.
- Staff from MW, SD and CEFAS maintain a watching brief of the latest developments in marine science.

Scientific Research

MW's scientific objectives rely on research to provide a basis for scientific advice and to augment information collected through regular monitoring, Research is supported under four ROAME A defined areas

- **Understanding the Seas:** to assess how biological and physical processes in determining the structure and functioning of marine ecosystems and to develop understanding of wider aspects of ecological quality e.g. genetic or population level effects of contaminants;
- **Inputs to Sea:** to assess the impact of land-based inputs to sea and other discharges on the marine environment and to consider scope for action;
- **Managing Marine Activities:** to understand the impact of marine activities and to develop management approaches;
- **Monitoring and Assessment R&D:** to develop tools to augment assessment and monitoring programmes;

Research-based approaches help to predict the risks associated with land based inputs and marine activities, ensuring that regulatory decisions are taken on the basis of the best-available scientific understanding.

Management and quality assurance of research:

- MW Research is developed in accordance with the WD procedures for development, management and evaluation of research programmes (see Annex 1)
- The formulation and management of the research programme is advised upon by scientists working both in MW division and SD. These scientists collaborate to manage the programme;
- A Research Requirements Committee (table 3) meets annually to advise on the priorities for the marine environment research programme;
- Research proposals are generally subject to external peer review before commissioning;
- Larger research projects and those most closely driven by policy are overseen by steering groups which advise on research direction and the quality of outputs.
- All research reports are subject to external peer review;
- Research outputs are exposed through ICES, OSPAR and research conferences to international peer review

Knowledge Transfer and Innovation

MW research is commissioned either to directly address policy questions or to develop fundamental knowledge and technical innovation which will improve and support the way policy questions are addressed in future. The role of scientists in CEFAS, SD and MW in facilitating knowledge transfer is crucial. CEFAS scientists fulfil both MW's business and research needs and the process of knowledge transfer is streamlined. Knowledge developed through research commissioned in other institutions is transferred by the involvement of regulatory or monitoring experts in management and evaluation and also through expert workshops on particular issues to share knowledge and develop future direction. Innovative intellectual property may arise as part of the research process. In these cases MW and SD will maintain a dialogue with research providers to ensure that regulatory and commercial exploitation can be achieved in the most beneficial way, and in line with current guidance (e.g. the Baker report).

Partnership/Collaboration

To meet business needs MW, and SD and CEFAS as MW's agents, collaborate nationally and internationally on the development of science. The seas are internationally contiguous, so international collaboration is vital. The UK needs a strong scientific presence to ensure that its national interests are understood and represented. Internationally MW and CEFAS work through OSPAR, ICES, the EU and UNEP to develop collaborative science to meet business needs, although other than in the EU, ideas must have national financial support. Nationally MW and SD collaborate within DEFRA and its Agencies, Other Government Departments, the Devolved Administrations and the Research Councils to develop collaborative science in relation to common science needs (see Table 4): . e.g.

- MW collaborate with the Research Councils, particularly NERC, on development of marine science, although NERC marine science does not usually provide consideration of human use of the sea adequate to MW's business needs. The general paucity of conclusive knowledge on the marine environment leads to complementary approaches, rather than duplication.
- CEFAS work through ICES to promote Marine Research in the North Atlantic and ensure that UK science is well represented internationally
- MW support the involvement of UK scientists in EU Framework bids and work through DEFRA to ensure that EU priorities documents reflect MW business needs. Although MW have limited influence over the success of bids relevant to their business needs provision of matching funding is used to support EU Framework bids. MW and CEFAS scientists have been involved in both recent EU concerted actions (e.g. SEANET and MARAQUA) and Framework 5 projects (eg. COST-IMPACT, REMOTRANS, AVINSI, EDEN). A full list can be provided.
- MW and CEFAS work with other contracting parties to OSPAR on a Joint Assessment and Monitoring Programme and joint assessments of NE Atlantic.
- MW are working within UNEP to produce a Global Marine Assessment in 2004.
- Staff from MW and SD work closely with the UK marine science community to encourage the development of science and particularly to encourage and multidisciplinary approaches to policy issues.

Communication

Public interest in the marine environment is high; in consideration of this, MW seeks to be open about the use of science in advising its policy work and seeks to provide frequent opportunity for stakeholders to comment on its science programme and express any concerns, e.g.

- All research reports are published [through the DEFRA website].
- We encourage publication of research outputs in the peer-reviewed literature.
- A series of research reviews are organised by SD to evaluate subject areas under the MW research programme, which are open to interested parties.
- A Marine Science Seminar is held bi-annually as an open event to present the latest policy directions, relevant research and consider future priorities;

Other open meetings and workshops are held when necessary to consult stakeholders on science directions (e.g. Marine Monitoring (May 2002); Marine Mapping (September 2002)).

Proposed Budget Allocations

See Tables 1 and 2 in the WD Science Strategy overview.

SCIENCE STRATEGY: TABLES

Table 3: Scientific Advisory Committees

Committee	Remit/Purpose	Membership	DEFRA contact
Marine Pollution Monitoring Management Group	To ensure that monitoring of the quality of the UK marine environment is soundly based upon science, is well targeted to obtain the most from limited resources and is responsive to new needs and priorities as they arise	DEFRA, CEFAS (Chair), EA, JNCC, Scottish Executive SEPA, FRS, DoE(NI), DARD (NI), NAW,	Richard Emmerson (DEFRA – MW)
Marine Environment Research Requirements Committee	To advise on the development of the Marine Environment Research programme	DEFRA(MW (Chair), EWD, WQ, CGMP), EA, Scottish Executive, DoE(NI), DARD (NI), NAW, Independent x1	Dr Richard Emmerson (DEFRA-MW)
Inter- agency committee on Marine science and Technology	To maintains an overview of marine activities across Government. To encourage links between Government and the national marine community, the wider application of marine science and technology, optimum use of major UK marine facilities, training and education and international links	OST (Chair),DEFRA, UKHO,SEPA,CEFAS, EA, NERC,NHM, FRS, HR Wallingford, Met Office, 2 Independent members	Dr John Lock (DEFRA-SD)
IACMST – GOOS Action Group (GOOSAG)	To co-ordinate and improve the UK involvement in, and input to, the Global Ocean Observing System (GOOS) of the Intergovernmental Oceanographic Commission.	Independent Chair, DEFRA, EA, FRS, DARD-NI, MOD, Met Office, SOC, CEFAS, SAHFOS, UKOAA, WWF, Marine Information Council, JNCC	Dr Richard Emmerson (DEFRA-MW)
IACMST - Marine Environment Data Action Group (MEDAG)	To improve the accessibility and availability of UK data relating to the marine environment.	Independent Chair, DEFRA, UKHO, SEPA, CEFAS, BODC, NHM, FRS, Marine Information Council, Met Office, Marine Conservation Society, UKOAA, DSTL,	Paul Leonard (DEFRA-SD)

Table 4: Research co-ordination fora and mechanisms to which DEFRA contribute

Committee/Group/Mechanism used	Remit/Purpose	Membership	DEFRA Contact
Oil and Gas research Committee	To enable representatives from relevant bodies to frame a strategic view on future research into the environmental aspects of offshore oil and gas activity	DTI, DEFRA, Scottish Executive, FRS, JNCC, UKOAA, NERC, The Crown Estate	Mr Paul Leonard (DEFRA -SD)
Government Inter-departmental Group on Endocrine Disruptors	To co-ordinate government funded research on endocrine disruption	DEFRA, DH, HSE, EA, SNIFFER, SEPA, NAW, NERC, BBSRC, EHS, MRC	Dr Mike Roberts (DEFRA-CGMP)
Fisheries Science Co-ordination Group (FSCG)	Co-ordinates marine fisheries science between the devolved administrations, accordingly takes an interest in fisheries related marine environment research	DEFRA, Scottish Executive, DARD-NI	Mr John Roberts (DEFRA_MW) Dr John Lock (DEFRA_SD)
Marine Information Council	to seek improved funding for marine research and to foster the application of this research to end-customer needs through the development of the intermediary marine information products and services industry	CEFAS, Met Office, NERC, European Oceanographic Industry Association, UKOAA, UKHO, HSE, DARD-NI	John Roberts (DEFRA- MW)
ICES	to promote and co-ordinate research into the sea and its living marine geographical remit is for the North Atlantic Ocean and its adjacent Seas.	Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Latvia, Netherlands, Norway, Poland, Portugal, Russia, Spain, Sweden, UK, USA. Accession of Lithuania is pending	Paul Leonard (DEFRA-SD)
EU Framework Research Programmes	To strengthen the scientific and technological bases of Community industry and	EU Member States	Jonathan Radcliffe (DEFRA -EED); Ann Mogg (DEFRA-SD)

	encouraging it to become more competitive at international level, while promoting all the research activities deemed necessary by virtue of other chapters of the Treaty.		
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