

**International Council For The Exploration Of The Sea**



**The ICES Integrated Action Plan**

**Draft, 31 July 2002**

## Introduction

ICES strives for excellence, relevance, and vision in the activities and products of both its Core Science programme and its Advisory programme. The seven Science Committees and three Advisory Committees give ICES a diversity and breadth of interests and expertise that are its greatest strengths and its greatest challenges. The ICES Strategic Plan outlines a future for ICES that ensures it will continue to deserve the respect that it has received, doing science that is broad based, relevant, and farsighted, and providing advice that is rigorous, reliable, and objective. However the activities of the many Science and Advisory groups must be coordinated and integrated for ICES to achieve the potential in its Strategic Plan.

The Strategic Plan provides overall guidance for that coordination task. Through its ten Goals, and particularly the first five, the Strategic Plan clarifies what activities are needed for ICES to fulfil its Science and Advisory roles over the coming years. The ICES Committees have used these Goals in developing their individual Action Plans, which will be living documents. The Consultative Committee has, from these Committee-specific Action Plans, built the integrated Action Plan for Goals 1–5, for the next five years. These are complemented by the actions needed to deliver Goals 6–10 and provide a sound infrastructure for ICES, led by the Council, the Bureau and the Secretariat. The Action Plan specifies the activities that will be undertaken over the coming years, in order for the Goals of the Strategic Plan to be realized. It explains *how* ICES will continue to advance scientific knowledge and improve scientific advice, as the Goals in the Strategic Plan tell *what* the overall objectives will be.

This Action Plan illustrates the smooth transition from the basic science necessary for achieving Goals 1 and 2 (largely delivered by the Science Committees), through building the basis for the advisory role of ICES in Goal 3 (delivered jointly by the Science and Advisory Committees), and the provision of advice – Goal 4 - largely by the Advisory Committees with support from the Science Committees. All parts of ICES share in the outreach and communications activities of Goal 5 and benefit from the infrastructure delivered by Goals 6–10. As a whole, the integrated Action Plan promises a busy future for ICES, but a future that will be viewed as effective by all who have an interest in the Science or the Advice produced by ICES.

This Action Plan gives the information needed by Member States, client agencies, stakeholders, and the scientific community, to understand why they should support ICES activities. This support is essential, because, ultimately, ICES can only deliver its science and advisory products with wide support for its activities. ICES Member States and their national laboratories must support the scientists working on the activities in the Action Plan. The agencies must show their support through recognition that the reliable and relevant scientific advice they require can only come from an organisation that blends science and advisory roles as broadly and effectively as ICES does. The scientific community both inside and outside the traditional ICES circle also must support our work, as willing collaborators, eager to share knowledge and experience and pursue common scientific questions. ICES, in turn will play its part to continually examine itself, to ensure its work is of the highest quality, well-integrated, and focussed on the Goals of the Strategic Plan. It will also renew its commitment to communicate often and effectively with all those groups that support and work with it, in governments, in agencies, in the scientific community, and in the public.

## The ICES Science Committees

ICES includes seven Science Committees: Baltic (BLC), Fisheries Technology (FTC), Living Resources (LRC), Mariculture (MARC), Marine Habitat (MHC), Oceanography (OCC), and Resource Management (RMC). They are responsible, on behalf of the Council, for the scientific activities of ICES. A core task of all the Science Committees is to plan, guide, and review studies of the biotic and abiotic environment, the natural resources, and the interactions among the biological organisms in the sea. A second core task is to unravel the impacts of human uses of the seas, including exploitation of its living resources, and impacts of climate variability and climate change on marine ecosystems and their components. A third core task is to improve our ability to sample and measure the ocean, what lives in it, and what we put in it. The Science Committees also ensure that appropriate opportunities for internal and external collaboration are identified and that scientific information receives peer review.

Some of this scientific information is the foundation for the scientific advice prepared in the Advisory Committees. Feedback and guidance from the Advisory Process is of utmost importance for the Science Committees to plan and organise their scientific tasks.

## Science Planning Process

ICES has a substantial amount of scientific work in progress, and a significant amount merits retention under the Strategic Plan. The Strategic Plan also provides signposts towards new scientific work in some areas. This Action Plan brings existing work into line with the objectives of the Strategic Plan, and ensures all priorities are addressed effectively with existing and, when required, new scientific work. Guided by this Action Plan, the annual Council

Table 1. Sample of important topics which cross Committee boundaries for the six disciplinary Science Committees

<b>Living Resources</b>	Interaction between gear selectivity and biological parameters. The effect of biology on successful use of acoustic techniques.				
<b>Mariculture</b>	Monitoring the behaviour of fish in relation to technical installation. Monitor the movements and re-captures of escapes.	Understanding species life history in relation to mariculture and the impact of escapees on wild populations; management of the coastal zone.			
<b>Marine Habitat</b>	Effects of towed gears on the bottom habitat and fauna. Methods of reducing the physical impact of gears	Effect of contaminants on population biology. Implications of habitat change.	Effect of discharges and escapes of cultured organisms on marine ecosystems.		
<b>Oceanography</b>	Development of acoustic methods for measurement of currents	Effect of environment on population biology. Understanding the recruitment process.	Understanding the hydrographic environment in which mariculture occurs.	Role of hydrography in contaminant dispersal. Effect of oceanographic environment on pelagic fish distributions.	
<b>Resource Management</b>	Technical measures to support fishery management. Improving accuracy and precision of resource surveys	Population biology of target species especially of new fisheries in deep water	The implications of ranching on harvesting wild populations	The importance of marine habitat in fishery management.	Use of environmental data in fishery management. Importance of climate change in managing resources.
	<b>Fishing Technology</b>	<b>Living Resources</b>	<b>Mariculture</b>	<b>Marine Habitat</b>	<b>Oceanography</b>

Resolution procedure will automatically set out the detailed science Work Plan for ICES. To efficiently deliver the activities needed to achieve specific goals in the Strategic Plan, every Committee has core responsibilities to:

- Review and rationalise existing Committee Working, Steering, Planning and Study Groups,
- Identify and establish priority areas of activity with particular emphasis on cross-Committee collaboration,
- Identify areas of work to support the Advisory Process,
- Contribute to the Annual Science Conference and Symposia,
- Promote publications.

An important element in the identification of Committee research priorities is the linkage across committees. Table 1 illustrates a sample of the important topics which cross committee boundaries. The Science Committees must give careful attention to such linkages each time work is planned and implemented.

The Baltic Committee, with an ecosystem focus, has linkages with all the other Science Committees since it embraces the full range of marine science. The Publications Committee has a key role in ensuring that the scientific products of ICES reach a variety of audiences, both technical and general.

### The Value Added by ICES

ICES brings together a unique collection of scientific expertise from governmental and academic marine and aquatic research institutes, including all the specialities represented by ICES Science Committees (oceanography, fish biology, resource management, gear technology, mariculture, etc) and diverse complementary fields. These are blended into effective teams with the depth and breadth of knowledge and skills to plan, deliver, and evaluate complex multidisciplinary research. ICES can also co-ordinate logistics of surveys, equipment, facilities and research vessels, to help make ambitious research feasible. Of comparable importance ICES effectively applies and disseminates the results of such science efforts. Effective application is achieved through the reciprocal and anticipatory interactions between the science and advisory identities of ICES. The effective communication is achieved through the diverse publications of ICES, including the ICES Journal of Marine Science, Cooperative Research Reports, Advisory Documents, Newsletters, as well as its web site, meetings, conferences, symposia, briefings, press releases, etc.

## The ICES Advisory Committees

### Introduction

ICES has three Advisory Committees – the Advisory Committee on Fishery Management (ACFM), the Advisory Committee on the Marine Environment (ACME) and the Advisory Committee on Ecosystems (ACE). Close cooperation between the Advisory Committees is required for harmonising the advice. This harmonisation is supervised by the Management Committee for the Advisory Process (MCAP). MCAP allocates requests for advice among the Advisory Committees and, where necessary, ensures responses are integrated across their various expertises. The Advisory Committees are supported by various Subsidiary Groups (Working/Steering/Planning/Study Groups), many of which are parented by one or more of the Science Committees.

The Advisory Committees are responsible, on behalf of the Council, for peer review of scientific information and provision of scientific advice on living resources, their conservation and harvesting, the marine environment, and marine ecosystems. The Advisory Committees rely heavily on scientific input from the Science Committees and their Working Groups, as a basis for the scientific advice. The Advisory Committees also play an important role in providing feedback and guidance on information needs and priorities to the Science Committees.

### Advisory Planning Process

The main activities in the Advisory Process are in response to requests from users of ICES advice. The requests are of different natures and characters:

- repetitive, such as annual assessments and advice on fish stocks;
- specific and short-term, such as provision of scientific information on a specific topic (e.g. guidelines for the measurement of PAHs in sediments);
- general and long-term, such as development of approaches to expand the basis for fisheries management by including ecosystem considerations.

The requests are translated into Terms of Reference for the Advisory Committees, and Subsidiary Groups, in a clearly defined planning process. ICES planning attempts to be proactive; anticipating the need and preparing the basis for scientific advice well before requests are formulated by management agencies (e.g., Recovery Plans). This proactive role often leads Advisory Committees to compile scientific information generated in Subsidiary Groups and publish it as advice. The planning process is also reactive, learning from experience and trying to fill gaps in knowledge when requests for advice reveal them. Planning is done on three time scales, and a given request will be addressed on one or more of them:

- the annual sessional period of activities;
- *ad hoc* activities within the annual period;
- multi-annual period.

The main planning time frame is the annual cycle. MCAP and Consultative Committee have clear roles. MCAP assigns the responsibility to respond to a particular request to one of the three Advisory Committees. Responding to the request requires the input from one or more Subsidiary Groups, which may be overseen (parented) by any of the Advisory or Science Committees. Terms of References are formulated and assigned to appropriate Working or Study Groups, to assemble the scientific basis required for the Advisory Committees to formulate the requested advice. The Terms of References are reviewed and approved by the Consultative Committee that oversees the coordination between the advisory and science processes. The Working and Study Groups complete their tasks within the regular annual cycle, and advice based on their reports is formulated by the Advisory Committees.

Some requests are too urgent to address in the annual cycle. MCAP considers whether and how to deal with such requests. Usually responses must be based on existing material from past Reports, but occasionally *ad hoc* groups may be tasked with consolidating information on a topic through a fast-track procedure. Such groups report directly to their sponsoring Advisory Committee.

Other requests require work over several years. Such requests form a major part of the multi-annual work plans for the Advisory Committees. Dialogue through the Consultative Committee will also result in including relevant tasks in the work plans of the Science Committees and the Terms of Reference of appropriate Subsidiary Groups. The expertise available at meetings of the Consultative Committee sometimes will foresee future advisory needs, and ensure

preparatory work is included in the plans of Science Committees and their Subsidiary Groups. That way, when requests for scientific advice on new issues are received, the basis for such advice will more readily be available.

### **The Value Added by ICES**

A strength of ICES is the ability of Advisory Committees to draw upon the broad range of scientific activities coordinated by Science Committees, when responding to requests and formulating advice. Although responsibilities for the science and advisory activities are separated, there are major interactions and synergies. The Advisory Committees operate on the basis of cost-recovery for requested advice, but the costs do not include the information and knowledge from the Science Committees. Thus ICES is able through its machinery to provide scientific advice of the highest possible quality, at a cost that is small for the value received.

In addition to responding to specific external requests, ICES continuously works to improve the scientific basis and framework for provision of the advice. ICES continues to develop the Precautionary Approach to fisheries management and the Ecosystem Approach to evaluation of the status and use of marine resources and ecosystems. It also ensures that these approaches are applied consistently across advisory tasks. ICES includes rigorous peer review processes in all its science and advisory tasks, to enhance quality of inputs and reliability of results. Such peer review generally has been conducted within ICES to this point. However, ICES is exploring the role of external peer review, particularly as a quality control component of the advisory process.

## **The ICES Integrated Action Plan**

The following are the Goals taken directly from the Strategic Plan which together are addressed by the Science and Advisory Committees of ICES, the Delegates, Bureau, and the Secretariat. Following each Goal are the specific activities that will be undertaken over the next five years to achieve the Goal. For the Science and Advisory Goals 1-5 each activity is associated with one or more Committees, and is addressed and expanded upon in the Action Plans of the individual Committees. The comprehensiveness of activities under each goal, and the multiple Committees associated with many of the individual activities, shows both the breadth and integrated nature of ICES planning. The administrative Goals 6-10 show how ICES will deliver the Science and Advisory Goals. Together these activities comprise the Integrated Action Plan for ICES over the next five years.

All of the items listed under "Actions Required" are activities that ICES and its participating scientists will undertake in the coming years. Some are areas where ICES has been active for a considerable length of time, while others are new scientific initiatives. All require resources, and in the medium term there are always some uncertainties about continuity of support from funding sources and home laboratories. Even where funding is relatively secure, additional support nearly always means more comprehensive programs and/or their faster completion. Notwithstanding these factors, in preparing this Action Plan we have tried to judge those projects where we expect progress to continue at a pace comparable to the recent past, expecting, of course, that any increase in funding would accelerate progress.

In some cases, however, planned actions are so innovative, or the scope so ambitious, that little progress can be expected without major new investments in science. The slight progress does not reflect a low priority or half-hearted efforts by the science community. Rather, these actions are new, scientifically challenging, and to pursue science projects at necessary scales, new funding will be required. These action items are flagged with an asterisk (\*) in the lists that follow. We stress that the designation should not be interpreted as indicating a higher priority for these Actions than for the others. All the Actions are a priority or they would not be on the lists. Rather, the designation indicates actions where without increased funding, the progress is likely to be very slow.

The indication that additional funding is required for rapid progress on particular actions must be interpreted in the context that ICES adds value to science done in national laboratories, universities, and other research centres. In the majority of cases, the bulk of the funding requirements are for these centres, to increase their capacity to do the basic and applied science. Augmentation of funding to ICES itself would be warranted in many cases, to support scientific workshops, IT development, symposia, and other fora where science can be planned efficiently, reviewed rigorously, and integrated imaginatively, but the primary funding needs are for the science centres.

Finally, the needs for science continue to increase in scope and complexity. In the coming years we expect demands for completely new initiatives, which will only proceed with new commitments of resources. Such potential initiatives are not included in the Actions Required, because ICES should not commit to specific actions until the nature of the science and advisory questions is clear. Nonetheless, the scientific vision of ICES includes preparing for these future challenges, and key ones are highlighted in the Value Added by ICES at the end of each Goal.

### **Goal 1. Understand the physical, chemical, and biological functioning of marine ecosystems**

The world's oceans play a crucial role in the functioning of the global environment. They contain ecosystems driven by physical and chemical processes that shape the development of plants and animals. Their dependent biological communities influence these in turn. Humans are among the many components of the ecosystem that play a part in this process; understanding the physical and biological functioning of marine ecosystems is fundamental to interpreting human dependence and influence on them.

#### **Current activities**

The Subsidiary Groups under the Oceanography, Living Resources, Fisheries Technology, Baltic, and Marine Habitat Committees (see Annex 1) are particularly active in addressing Goal 1 issues.

For example, in 2002, the ICES *Study Group on Modelling of Physical/Biological Interactions* addressed specific actions under this goal, as did the ICES Symposium on Acoustics in Fisheries and Aquatic Ecology in Montpellier, France. A Theme Session *Transport Processes in the North Atlantic* was held during the 2001 ASC in Oslo, Norway. In 2003 an ICES-sponsored symposium entitled *The Role of Zooplankton in Global Ecosystem Dynamics: Comparative Studies from World Oceans* will take place in Gijón, Spain.

## Actions Required

- Provide feedback to Science Committees about research needs and priorities that are identified in the Advisory Process. [MCAP/Advisory Committees]
- Increase knowledge with respect to the functioning of marine ecosystems. This will be achieved through continued basic research on the biological, chemical and physical processes of marine ecosystems and specific activities directed at improved understanding of observed and potential variability in the marine environment due to physical forcing and biological interactions. [MHC/OCC/LRC/RMC/BLC].\* Particular planned activities include:
  - o Understand and quantify the biology and life history, stock structure, dynamics, and trophic relationships of commercially and ecologically important species. [LRC/OCC/BLC/MHC]
  - o Quantify the changes in spatio-temporal distribution of the stocks of important species in relation to environmental change using survey and commercial data. [OCC/LRC/RMC/BLC]\*
- Increase knowledge of the effects of physical forcing, including climate variability, and biological interactions, on recruitment processes of important commercial species. [MHC/OCC/RMC/LRC/MARC/BLC]\*
- Develop a comprehensive approach to habitat classification that will be the basis of a consistent application throughout the ICES area. [MHC/FTC]. Building upon the work of the past 3 years, the challenge now is to:
  - o Test the validity of the proposed classification by producing habitat maps based on physical and biological field samples. [MHC]
  - o Develop relationships between habitat characteristics and biological assemblages.[LRC/MHC]
  - o Establish a framework to evaluate acoustic seabed classification technology and applications in bottom mapping. [FTC/MHC]
- Develop and apply bio-physical modelling, and improve capacity in such modelling to cover biological-physical interactions in the sea. [LRC/OCC/BLC/MHC]\*
- Assess and predict impacts of climate variability and climate change, on scales from populations to marine ecosystems, including impacts on commercially important fish stocks. [OCC/LRC/BLC]
- Play an active role in the design, implementation, and execution of global and regional research and monitoring programmes, in collaborations between the ICES and other international oceanographic research or monitoring programmes such as GOOS and GLOBEC. [OCC/LRC/MHC/BLC]
- Implement a North Sea-oriented monitoring programme which incorporates oceanographic and fisheries data. [OCC/LRC/RMC/MHC]\*
- Develop and implement a program for gaining a fuller understanding of the factors that contribute to marine mortality of anadromous and catadromous fish, and how those factors vary in space and time. [LRC/ OCC/ MHC/ BLC]
- Develop better tools and training opportunities for monitoring and observation of physical, chemical and biological properties of marine ecosystems. [FTC]\* [Other Science Committees]
- Continue to improve the co-ordination, conduct, and analysis of oceanographic and biological surveys and to assure their accuracy and precision. [LRC/RMC/OCC/MHC]
- Address the substantial need for improved data and information on components of the marine ecosystem in the Baltic Sea including: [BLC/OCC/LRC/RMC/MHC/FTC]
  - o Meteorological and oceanographic conditions (exchange processes, input to the Baltic).
  - o Nutrient productivity and toxic blooms.
  - o Evaluation of the biomass and production of the main prey used by intensively exploited fish stocks.
  - o Evaluation of the condition of seabirds and marine mammals.
  - o Improve application of technology to surveys and monitoring.
  - o Evaluation of the state of the Baltic Sea Ecosystem.
- Enhance the efficiency of sampling tools and resource surveys [FTC/BLC/LRC/MHC] by:
  - o Improving the standardization and performance of survey gears.
  - o Promoting the development of techniques and protocols for studies of fish and plankton behaviour relative to survey gears.\*
  - o Implementing a common data format in acoustics for scientists and industry.

- o Promoting the development and use of new survey designs, data analysis methods, acoustic instrumentation and survey gears.
- o Establishing and evaluating a framework for the collection of hydroacoustic and ancillary data from commercial fishing vessels.
- Promote the development and use of hydroacoustics and other technologies, such as lidar, in quantifying the biological and physical components of the ecosystem. [FTC]\*

### **Value added by ICES**

ICES provides unique coordination and leadership in scientific efforts to advance the Goal of understanding the dynamics of marine ecosystems. Over the next five years ICES will be particularly important in ensuring that the full range of scientific experts work together in planning and delivering the new types of scientific understanding needed for an ecosystem approach to management of human activities in the seas in the ICES area. Bringing new tools like habitat classification and biophysical modelling, and conducting integrated ecosystem monitoring in changing ecosystems can only be planned and delivered when oceanographers, marine biologists, species specialists, systems modellers, acousticians, and other specialists all are fully coordinated. Taking our understanding of traditional problems, such as variation in recruitment or changes in abundance and occurrence in space and time, from reporting on patterns to understanding processes can only occur through well-integrated multi-disciplinary work as well. Through the Science Committees and their Subsidiary Groups, Conferences and Symposia that ICES supports, the full range of scientists can meet regularly to exchange ideas, develop ideas into integrated proposals and projects, keep abreast of progress on projects, and bring results together for integration and synthesis.

New challenges are expected in the near future, for all who are interested in understanding marine ecosystems. New generations of observing and monitoring tools, such as remote sensing methods, autonomous underwater vehicles, genetic technologies, and analytical/modelling tools, will become available. New classes of questions, in areas such as biodiversity and threatened and declining species, will become central concerns. The diversity of expertise and proven record of effective coordination of science planning, delivery, and integration will be invaluable in making best use of the new opportunities, and bring science of the right scope to bear on the new types of ecosystem questions.

### **Goal 2. Understand and quantify human impacts on marine ecosystems, including living marine resources**

Human activities on land and sea have an impact on marine ecosystems. The effects can be direct, as when, for example, a fishing boat catches fish, or they can be indirect, as when, for instance, a farmer puts fertiliser on his land which then runs off into the sea and causes nutrient enrichment. Understanding the effects of human activities on marine ecosystems is essential if scientists are to provide advice that will help to improve the way in which human activities that affect the sea are managed.

### **Current Activities**

The Subsidiary Groups under the Mariculture, Marine Habitat, Living Resources, and Oceanography Committees are particularly active in addressing Goal 2 issues.

For example, in 2002, the ICES *Working Group on the Application of Genetics in Fisheries and Mariculture* addressed specific actions under this goal. A theme session entitled *Eutrophication, for Better or for Worse: Can it be Controlled?* was held during the 2001 ASC in Oslo, Norway. In 1999 a joint ICES/SCOR symposium entitled *Ecosystem Effects of Fishing* was held in Montpellier, France.

### **Actions Required**

- Provide feedback to Science Committees about research needs as identified in the Advisory Process [MCAP/Advisory Committees]
- Develop a process for conducting holistic assessments of the impact of human activities, and identify a suite of indicators or variables that will facilitate the monitoring of ecosystem status and evaluating whether ecosystem quality objectives (EcoQOs) are being met. This will be achieved by:
  - o contributing to the scientific advice for the development of EcoQOs that will ensure the environmental health of marine ecosystems [MHC/LRC/OCC/BLC/ACFM/ACME/ACE]
  - o assisting in the development of spatial and temporal assessments of the indicators for those EcoQOs [MHC/LRC/OCC/BLC/RMC]\*, and
  - o producing holistic assessments of spatial and temporal patterns of contaminants and their effects on marine ecosystems. [MHC/LRC/OCC/BLC]\*



- Evaluate and increase knowledge of the effects of fishing activities, particularly mobile gears, on seabed structures and benthic communities and habitats, and on the ecosystem consequences of such effects. [MHC/FTC/LRC/MARC/ACME/ACE]
- Update the ICES Code of Practice on Introductions and Transfers and Transfers of Non-indigenous Organisms, including genetically modified organisms. [MARC/ACME]
- Assess and evaluate the genetic consequences of human-induced selective factors, whether intentional (such as selective breeding for mariculture) or unintentional (such as selective effects of fishing). [MARC/LRC/RMC/ACE/ACME]
- Evaluate and assess the intra- and inter-specific interactions of wild and farm-reared stock as well as disease and genetic interactions. [MARC/LRC]
- Assess the variety and amounts of chemicals used in mariculture and their potential environmental impacts. [MARC/MHC/ACME]
- Continue and further improve assessments of the transport, fate and biological effect of contaminants on the marine ecosystem through sampling, analyses, data collection and the evaluation of sampling, analytical and data processing techniques. [MHC/OCC/LRC/BLC]
- Determine the biological response to eutrophication taking into account oceanographic conditions. [OCC/MHC/LRC]\*
- Evaluate and increase knowledge on the potential impacts of intentional and accidental introductions of non-native species and their vectors of introductions. [LRC/MHC/MARC/ACFM/ACME]\*
- Evaluate and increase knowledge of the effects of built structures, such as windmill farms, artificial reefs, and other structures, on marine ecosystem structure and functions. [MHC/OCC/ACME/ACE]\*
- Evaluate and increase knowledge of the effects of human activities on the productive capacity of estuarine and freshwater habitats of anadromous and catadromous fish. [MHC/OCC/MARC/BLC]
- Evaluate and increase knowledge of the effects of activities that alter physical habitat structure, such as dredging and extractions, on marine ecosystem structure and functions. [MHC/OCC/ACME/ACE].

### **Value added by ICES**

The Ecosystem Approach represents an ambitious challenge to marine science. The increasing desire to understand in more integrated ways how human activities affect marine ecosystems has raised interest in Ecological Qualities and Ecological Quality Objectives, and in holistic and integrated assessments of ecosystem status. Concerns about genetic consequences of mariculture and selective fishing are increasing. Correspondingly, there are more demanding questions regarding how those effects can be kept sustainable, whether the questions are about ecosystem effects of eutrophication, mariculture, windmill farms, exotic species introductions or many other activities. The Action Plan illustrates how ICES is using its broad disciplinary makeup to bring the science community to address all these new challenges effectively. Single research centres, and single disciplines are individually only pieces of the science capacity needed to meet these challenges of understanding human impacts on an ecosystem scale. Only when the science is planned and delivered on conceptual and practical scales comparable to the scales of the questions, can these challenges be met. ICES provides the setting to scale up the programmes of single centres and disciplines to appropriate ecosystem scales.

Looking ahead, a large number of policy initiatives, including the Code of Conduct for Responsible Fishing, the Reykjavik Declaration, the European Community Action Plan to integrate environmental protection requirements to the Common Fisheries Policy, the Bergen Declaration and others place a spotlight on the need for greatly expanded efforts in understanding human impacts on marine ecosystems. The science community is going to have move at great speed, if it is to progress from pilot projects on Ecosystem Quality Objectives and Indicators of Environmental Integration to a comprehensive and integrated Ecosystem Approach to management of the seas in the ICES area. As the commitments in these policy instruments are implemented, demands will escalate for better understanding of more impacts of human activities on marine ecosystems, integration of the partial understandings, and vision of what can be done about unsustainable impacts. ICES will be the right focus for the science needed for that future embodied in these policies.

### **Goal 3. Evaluate options for sustainable marine-related industries, particularly fishing and mariculture**

Marine-related industries, such as fishing and mariculture, provide many benefits to society, including food, recreation, employment, and cultural satisfaction. However, marine-related industries affect marine ecosystems, and they are affected by natural changes in the marine environment. For fisheries and mariculture, sustainability is usually a pre-requisite for a high level of benefits without undue adverse impact on marine ecosystems.

Evaluating the performance (benefits, costs, ecosystem impacts) of alternative ways of conducting marine-related industries is a challenging scientific endeavour. For example, fisheries exist within complex ecosystems with many elements of uncertainty. New exploitation strategies that take account of complexity (such as trophic interactions) and uncertainty (such as effects of natural variability and climate change) need to be evaluated. Research to advance mariculture techniques in an environmentally sound manner, is also a challenge. All human activities that depend on, and affect, marine ecosystems, have social and economic consequences that need to be better understood.

### Current Activities

The Subsidiary Groups under the Resource Management, Mariculture, Marine Habitat, and Fish Technology Committees are particularly active in addressing Goal 3 issues.

For example, in 2002, the ICES *Working Group on Fishery Systems* addressed specific actions under this goal. A theme session entitled *The Sustainable Development and Conservation of Natural Resources of the Coastal Zone* was held during the 2001 ASC in Oslo, Norway. In 2003 an ICES-sponsored symposium entitled *Fish Behaviour in Exploited Ecosystems* will take place in Bergen, Norway.

### Actions Required

- Provide feedback to Science Committees about research needs as identified in the Advisory Process [MCAP/Advisory Committees]
- Further develop, and evaluate performance of, indicators of the status of stocks and ecosystems, relative to effects of fishing and other human activities by new analyses and modelling. [ACFM/ACME/ACE/LRC/RMC/MHC/OCC/BLC]
- Develop a framework for an integrated evaluation of the impacts of human activities in the coastal zone, (e.g., mariculture, dredging/extraction, building structures), as an aid to coastal zone management. [MHC/MARC/RMC/OCC/ACE/ACME]\*
- Evaluate alternative fisheries management regimes and strategies with regard to robustness, cost effectiveness, and sustainability through analysis of new types of data and simulation modelling. [MHC/MARC/RMC/BLC]\*
- Develop and improve fisheries assessment tools that use environmental information, consider biological and socio-economic interactions, and address issues of uncertainty, risk, and sustainability [RMC/BLC]
- Evaluate the sensitivity and robustness of analytical methods for assessing the impact of human activities, including fishing, on ecosystem properties and processes, through statistical analyses and modelling. [RMC/MHC/LRC/BLC]\*
- Evaluate and improve analytical tools for quantifying the consequences of habitat alterations, including enhancement and mitigation measures, for conservation and rebuilding of salmonid stocks. [RMC/LRC/MARC/BLC/MHC/ACFM]
- Assess and evaluate alternative sources in fish feed composition that reduce organic loading in the environment. [MARC]
- Develop standard culture conditions under which strains, stocks, or species might be tested to evaluate their performance [MARC]
- Review and inform clients regarding the use of major technological advances in mariculture that have significantly improved marine finfish production capabilities or survival. [MARC/ACME]
- Evaluate information on technological change in mariculture, including the utilisation of new species, with particular emphasis on the consequences for production and the environment. [MARC/ACME]
- Collaborate on development of research methods for assessing the social and economic aspects of human interactions with marine ecosystems. [RMC/MHC/ACFM]\*
- Explore analytically the potential for incorporating data from commercial fisheries in the analysis of survey data for consequences such as potential use in assessment and management and better understanding of changes in distribution and migration. [LRC/RMC/FTC]
- Provide information to the mariculture industry regarding effects of organic loading, diseases and chemical treatments. [ACME/MARC]

- Develop and use an ecosystem analysis of the Baltic Sea to investigate consequences of different fisheries management options, considering species interactions, climate variation or changes, and changes in nutrient loads. [BLC/RMC/ACFM/ACE]
- Expand investigations on species and size selectivity of fishing gears in order to reduce by-catch, minimize discards and improve survival of fish escaping from fishing gears. [FTC]
- Expand investigations of target-specific fishing methods which reduce impact on bottom habitats and other non-target ecosystem components. [FTC]
- Conduct further research on fish behaviour that is critical to the further development of mobile and static fishing gears for responsible fishing. [FTC/LRC]\*
- Evaluate information on technological change in mariculture, including the utilization of new species, with particular emphasis on the consequences for production and the environment. [MARC/ACME]

### **Value added by ICES**

The major new initiatives with regard to evaluating options for sustainable marine-related industries are all intrinsically multi-disciplinary. Providing the scientific basis for integrated impact assessments, for selecting indicators of ecosystem status, and for evaluating the performance of such ecosystem metrics, will require an effective mix of physical, chemical, and biological oceanographers, fisheries and marine biologists, fishing technologists, quantitative experts, and others. These scientists will have to work closely with individuals experienced not just in conducting good science, but in converting science into advice that is timely and relevant to decision-making and policy-setting. ICES adds value in two ways. First it is the forum where all the scientific experts can work together, to make sure that the science truly is integrated, when these “integrated evaluations” are done. Second, ICES is the setting where experienced science advisers work with the larger scientific community, to make sure that the science is understood by those who will provide the advice to clients.

Looking ahead, ICES has made a commitment to greater involvement of stakeholders and experts in a much wider range of fields, including social and economic sciences in its work. As those linkages develop, the current interdisciplinary strength of ICES will be enlarged even more. This will allow ICES to be the forum for planning, integrating, and reviewing projects of even greater scope, and give ICES the potential for identifying resource use options that are sustainable ecologically, economically, and socially.

### **Goal 4. Advise on the sustainable use of living marine resources and protection of the marine environment**

The Advisory Committees and their Subsidiary Groups supported by all the Science Committees, particularly the Resource Management, Marine Habitat, and Mariculture Committees, are particularly active in addressing Goal 4 issues.

Whilst scientific information is the foundation of ICES advice, the way in which the advice is prepared must meet the needs of decision-makers. ICES has been pioneering the development of protocols to meet these needs, and it is ICES’ goal to continue to do so in the future. ICES intends to provide high quality, objective, robust, and timely scientific advice. ICES’ access to a large number of experts means it is uniquely placed to provide such advice. To achieve its goal, however, ICES must ensure that all the components of the advisory process work effectively together. It will apply quality assurance procedures to its advisory processes, ensure full consideration of data from a wide range of sources, be flexible and timely, ensure ecosystem considerations are taken into account, and frame advice in relation to management systems.

### **Current activities**

In 2002, the *Study Group on GEOHAB Implementation in the Baltic* addressed specific actions under this goal. A theme session entitled *The Quality and Precision of Basic Data Underlying Fish Stock Assessment and Implications for Fisheries Management Advice* was held during the 2001 ASC in Oslo, Norway. In 2004 an ICES-sponsored symposium entitled *The Influence of Climatic Change on North Atlantic Fisheries* will take place in Bergen, Norway.

### **Actions Required**

- Provide feedback to Science Committees about research needs as identified in the Advisory Process. [MCAP/Advisory Committees]
- Provide scientific advice and information on the status and outlook for the fish stocks, marine ecosystems, and the marine environment requested by the Commissions, other regulatory agencies, and Member Countries of ICES, and any other advice which ICES may consider relevant. [MCAP/Advisory Committees]

- Organise Working Groups, Study Groups and Workshops to carry out assessments and provide the basis for the advice. [CONC/ACFM/ACE/ACME]
- Explain, through written communications and meetings with stakeholders and interested parties, the basis for ICES advice and the ICES Advisory Process. [CONC/ACFM/ACE/ACME]
- Further evaluate and implement quality control procedures for ACFM and the Stock Assessment Working Groups. [ACFM]
- Develop document guidelines for the preparation of Environmental Impact Assessments, and appropriate monitoring programmes. [MARC/MHC/ACME/ACE]
- Review issues of sustainability in mariculture, including interactions between mariculture and other users of resources in the coastal zone, and between cultured and wild stocks. [MARC/ACME/ACE]
- Review issues of habitat protection and enhancement in freshwater, estuarine, and coastal habitats of anadromous and catadromous fish, as a basis for advice on sustainable practices in such ecosystems. [MHC/OCC/MARC/BLC/LRC/ACFM/ACME/ACE]
- Assess the effectiveness of salmon farming management control methods for the control of fish parasites. [MARC]
- Promote, through workshops, study groups, and training courses, the development and better application of methods for resource enumeration, status evaluations and forecasts. [RMC/FTC]
- Develop the scientific basis for an ecosystem approach to management, including assessments and the provision of scientific advice. Specifically there is a need to:
  - o Continue and expand the development of tools, possibly ecosystem models, that facilitate the assessment of monitoring and scientific knowledge of ecosystem functions in a holistic manner; [MHC/OCC/RMC/BLC]\*
  - o Incorporate scientific information on ecosystem components and processes into the advice that is provided to clients; [MHC/RMC/BLC/Advisory Committees]\*
  - o Consider more fully impacts of human activities on the marine ecosystem, through provision of more integrated ecosystem advice. [MHC/RMC/OCC/BLC/Advisory Committees]
  - o Work towards the use of indicators of sustainability for a wider range of ecological properties in the provision of scientific advice to clients. [Advisory Committees/MHC/RMC/LRC/BLC]
- Review and advise on procedures for quality assurance of biological, chemical and physical measurements. [OCC/MHC/ACME]
- Evaluate, through analyses and modelling, the historical effectiveness of technical measures and establish a framework for evaluation of new technical measures suitable for the management of particular fisheries before they are legislated into use. [FTC/RMC/LRC/ACFM]
- Provide scientific advice relevant to integrated coastal zone management, including guidelines for sand and gravel extraction, mariculture, and guidelines for monitoring programs that would be included in integrated coastal zone management. [MHC/MARC/ACME/ACE]
- Improve the scientific basis for the application of the precautionary approach in advice on and management of human activities, including fisheries, mariculture and other activities, in marine ecosystems. [RMC/all Advisory Committees]\*

## Value Added

Many of the actions listed above are already the foundation for ICES' vital role as the organisation that applies scientific knowledge to societal choices regarding uses of marine ecosystems. Those activities will continue to be the centre for efforts by the best scientists from the countries under the ICES umbrella, meeting common standards for soundness, reliability, and relevance. As the Ecosystem Approach comes to be applied more widely in decision-making and management, the uniqueness of ICES will become more essential to all the customers of ICES advice. The communities of scientists, managers, policy-setters, and the public will look to ICES to assemble the necessary breadth of science experts, entrain them in the formal advisory process, and integrate advice across issues and disciplines; all tasks necessary for integrated science advice on sustainable uses of marine ecosystems.

Looking ahead, customers of ICES advice are themselves embarking on ambitious new tasks. Recovery planning for depleted stocks, conservation of threatened and declining species, applying an ecosystem approach to management, and many other new management challenges will all create needs for new types of science advice. At the same time, the opening of the ICES Advisory Process to clients and stakeholders promises new ways of doing business within ICES. The combination of new advisory issues and more open advisory processes promise challenges that can only be met by an organisation with ICES' breadth of expertise and century of excellence in marine science.

## **Goal 5. Enhance collaboration with organisations, scientific programmes, and stakeholders (including the fishing industry) that are relevant to the ICES goals**

ICES can accomplish more through collaboration than it can alone, particularly since there are other organisations that have more experience and expertise than ICES in some scientific disciplines (e.g., fundamental oceanographic processes, advanced technologies, social sciences) that are needed to fulfil the ICES goals.

ICES has a long history of cooperation among and between its Member Countries and international organisations. This has led to its successful implementation of regional research programmes that address issues ranging from transboundary fishery matters to large oceanographic experiments requiring substantial resources. ICES provides a forum for coordinating such work and mobilising assets to address issues of regional and potential global interest. Where appropriate, ICES will take the lead in such programmes and will play an active supporting role in others.

### **Current Activities**

All Subsidiary Groups of the ICES Committees, led by CONC and MCAP, and facilitated by the Publications Committee, are committed to the enhanced collaboration represented by Goal 5.

For example, in 2002, the ICES-IOC *Study Group on the Development of Marine Data Exchange Systems using XML* addressed specific actions under this goal. Also starting in 2002, the Working Group on Fisheries Technology and Fish Behaviour is co-sponsored by FAO. A theme session entitled *Fisheries Managers and Scientists on the Development of Reference Points and Management Systems for the Fisheries and Marine Ecosystem* was held during the 2000 ASC in Brugge, Belgium. This provided a forum for scientists, fishery managers, and other stakeholders and interested parties to meet under a common theme.

### **Actions Required**

- Explore processes to bring a stakeholder presence into the Advisory Committees, while preserving the objectivity and scientific rigour of those Committees. [MCAP/ACFM/ACME/ACE]
- Encourage wider involvement by stakeholders, academics, and the public in ICES-sponsored Symposia and the ICES ASC, including evaluating the possibility of sessions for non-technical audiences. [ConC]
- Establish and maintain links with scientists in other disciplines (such as economists and social scientists), fisheries management agencies and other interested parties (such as stakeholders in the fishing industry) with a view to widen the sources of knowledge incorporated in fisheries models. [RMC]
- Develop guidelines and standards for the participation by partners outside the traditional network of ICES-collaborating laboratories in monitoring programmes (such as RV surveys) that underpin on-going ICES science programmes. [All Committees]
- Contribute to ICES Dialogue meetings information related to marine environmental issues [ACME/ACE]
- Collaborate with and support the Baltic Global Environmental Fund Project for the Baltic Large Marine Ecosystem, and related projects from other areas such as NATO, IMO etc. to develop integrated approaches for specific sea areas. [BLC]
- Further develop and maintain joint activities with FAO in support of the ICES/FAO Memorandum of Understanding including co-sponsorship of symposia, joint working groups, and collaboration on projects in fishing technology development, responsible fishing, environmental processes and global assessments of the status and trends of fish stocks and fisheries. [FTC/RMC/OCC]
- Further develop the existing informal relationship with SCOR, including closer collaboration on the development of quantitative ecosystem indicators for fisheries management, and collaboration on its planning effort to develop an integrative framework for ocean research. [RMC/MHC/ACFM]
- Further develop joint activities with PICES in support of the ICES/PICES Memorandum of Understanding including co-sponsorship of symposia, joint working groups, and collaboration on projects with marine ecology and environmental processes, and on advancing our capacity to understand marine ecosystem, climate variability and marine ecosystem impacts. [OCC/MHC/LRC]
- Consult with and provide technical advice to the fishing industry and fisheries management agencies in the development of technical devices to be used in harvesting technology and the modernization of the methods and technologies presently used in the enforcement of technical measures. [FTC]

- Provide advice on research design and in some cases participate in projects with research and development agencies in the acoustic and the fishing technology industries. [FTC]
- Develop and maintain joint activities with IOC in support of the ICES/IOC Memorandum of Understanding including: [OCC/MHC]
  - o Assisting and participating in the implementation of GOOS and regional GOOS components (in particular EuroGOOS)
  - o Continue to act as the North Atlantic regional implementation body for GLOBEC (The Cod and Climate Change Programme)
  - o Provide input to the implementation of GEOHAB activities in the ICES area, in particular the Baltic, and on other Harmful Algal Bloom initiatives such as the HAB event database and IOC Intergovernmental Panel on Harmful Algal Blooms
  - o contribute expertise and know-how for the development of modern marine data management systems and maintain such systems that are of relevance to ICES activities
  - o contribute expertise on IOC advisory and expert panels as appropriate, e.g., the SCOR-IOC Carbon Dioxide Advisory Panel and GESAMP
  - o develop a specific plan of action for enhanced collaboration, taking into account the development and implementation of GOOS
- Establish more consistent mechanisms such as joint working groups, co-sponsored symposia and cross-attendance at meetings, for regular exchange of information and progress with other marine scientific organisations for which ICES does not have a formal MoU, such as ICLARM, CCAMLR, NAFO Scientific Council, Arctic Council, European Science Foundation's Marine Board, and the World Fisheries Council [CONC – all]
- Establish relationships with international marine science organisations which have a substantive academic membership, e.g. the American Society for Limnology and Oceanography (ASLO), the European Geophysical Society and similar organisations. [CONC-all]
- Increase the sharing of ICES knowledge and experience with other non-member countries, through work with Countries that have official observer status and through linkages with other marine science organisations. [Conc – all]
- Through co-sponsorship and collaboration with projects under the Census of Marine Life, improve knowledge of marine biodiversity and related fields of study. [LMR/BLC]\*

### **Value Added by ICES**

ICES is already part of a broader international marine science community that studies marine ecosystems and their relationships to humanity. Linkages across that community are numerous and fruitful. Although the importance of scientist to scientist linkages cannot be overestimated, ICES provides a formal organisational structure that facilitates planning and delivery of joint activities, and much more rapid dissemination of advances and insights throughout the scientific community. Moreover, the growing network of ICES formal and informal linkages includes environmental groups, marine industry organisations, and many other potential partners from outside the science disciplines traditionally associated with ICES. These linkages will position ICES to facilitate science in even more integrative and synthetic ways, bringing new types of knowledge and new paths to understanding to the problems where ICES already has established a record of excellence.

Looking ahead, stronger international linkages, and wider linkages with disciplines beyond the marine sciences will increase the ability of ICES to address the scientific challenges of holistic understanding of marine ecosystems, their dynamics, and the interactions of humanity with them. The linkages with partners and stakeholders will increase the leverage that ICES has in getting high-quality, cost-effective science done, giving ICES a focal coordinating role in an even wider range of science-based initiatives. These linkages will also increase the impact and credibility of results, and advice based on the results, when applied to decision-making about sustainability of marine activities in the sea.

### **Goal 6. Maintain and further develop a modern and effective infrastructure to support ICES programmes**

To accomplish its strategy, ICES must provide many forms of support, referred to as infrastructure. Effective infrastructure takes advantage of modern technology, it applies sound administrative practices, and it invests in staff. It includes the publication of scientific information in a manner that is appealing to a broad scientific community, so that ICES can continue to attract outstanding scientists.

## Current Activities

Secretariat action towards an integrated approach to the ICES databases was initiated in 2001. In 2002, the Bureau created an Information Technology/Printer Reserve Fund in order to implement essential upgrading of these facilities. The staff grading evaluation carried out in 2001 is being implemented on a phased basis with effect from 1 July 2002. The Bureau has formulated proposals for revisions of the Council's budgetary policy, including an expenditure review, to provide the necessary secure infrastructure.

## Actions Required

- Integrate and expand databases to support ICES programmes within a well-defined data management policy [CONC/MCAP/All Science Committees]\*
- Develop a co-operative framework for the production and exchange of scientific software for managing ICES' information [RMC/ACFM]
- Encourage the production of high-quality scientific publications by ICES [CONC – All Science Committees]
- Assess and, where possible, improve, the quality of marine biological data [LRC/RMC/OCC]
- Ensure that ICES processes are embedded in quality management procedures to minimise errors, and increase transparency and efficiency, by:
  - ☐ Making the review process more transparent and inclusive of a wider range of expertise,
  - ☐ Adjusting workloads of Working Groups and Advisory Committees to allow more thorough review of analyses and interpretations
  - ☐ Further developing procedures for standardisation and certification of software for assessments and report preparation;
  - ☐ Carrying out regular outside reviews in order to address the issues in a non-routine way, since Working Groups and Advisory Committees are already full occupied with carrying out their routine tasks. \*
- Through recruitment policies, enable Secretariat staff to respond flexibly to the changing demands on ICES.
- Maintain and improve the motivation and productivity of the Secretariat [Bureau and General Secretary]\*
  - o Implement staff grade evaluation
  - o Conduct routine performance reviews of staff
  - o Provide staff training to keep pace with evolving needs
- Integrate annual Secretariat Work Plan with ICES Action Plan.

## Goal 7. Keep abreast of the needs and expectations of ICES Member Countries

First and foremost, ICES must be responsive to the scientific information needs of its members. As the needs of the Member Countries are becoming more complex, diverse, and dynamic, ICES must enhance the ways that it communicates with Member Countries and other clients, in order to maintain a comprehensive and up-to-date overview of their needs.

## Current Activities

The Strategic Plan has been widely circulated. Achievements under this Goal must await feedback from Delegates and others on (for example): the Copenhagen Declaration and this Action Plan.

## Actions Required

- Make national authorities aware of the ICES Strategic Plan and seek their advice on future refinements of it.
- Be responsive to requests for advice within the remit of each Advisory Committee. [MCAP/ACFM/ACME/ACE]
- Encourage Delegates to establish arrangements for gathering broad input (i.e., going beyond the organisations that have traditionally had an interest in ICES) for the identification of national needs and priorities. [President and Bureau]
- Produce information packages about ICES and its accomplishments, tailored to national interests and needs. [Secretariat]

- Hold informal electronic dialogue meetings at the national level with key stakeholders [President, General Secretary, Bureau].

### **Goal 8. Broaden the diversity of the scientists who participate in ICES activities**

ICES cannot fully realise its vision without mobilising a broader community of marine scientists. Participants in ICES activities have traditionally been from government laboratories, with relatively few academic participants. The credibility and authority of ICES is weakened if significant groups of the marine science community do not contribute to ICES activities. ICES must become more accessible and attractive to this wider community.

#### **Current Activities**

Despite having introduced an “open door” policy towards participation in the Annual Science Conference, the proportion of scientists from universities and from non-member countries has not changed significantly. The numbers of participants giving a university address within the country where the Annual Science Conference is held do show a peak in that particular year, but very few member countries show any sustained increase in university participation.

Some Working Groups and Study Groups have regularly or frequently invited non-member specialists to make presentations to the meeting, relevant to the Group’s terms of reference. Such activities are encouraged.

#### **Actions Required**

- Identify scientific communities in each member country that are candidates for increased participation in ICES, and develop a plan for attracting them [Bureau and Delegates]
- Encourage more participation in ICES by scientists from non-member countries by establishing and encouraging “affiliate members.” [Bureau, Secretariat]

### **Goal 9. Match the budget of ICES to the needs and expectations for scientific information and advice**

The high-quality scientific information and advice that ICES envisages cannot be produced without adequate financial resources. Stable funding is required to fulfil needs for increasing scientific understanding, providing scientific advice on an ongoing basis, and maintaining necessary infrastructure. Since funding will always be limited, it is essential that it be used in a cost-effective manner, and that ICES look for synergistic cooperation with other organisations to fulfil its Mission.

#### **Current Activities**

In 2001 and 2002, the Council initiated a review of the ICES budgetary policy, including the Secretariat’s structure, staffing, operating procedures and cost recovery. The Bureau is evaluating the possibility of moving to a medium-term project-oriented budgeting process.

#### **Actions Required**

- In the medium term, address the issue of ICES costs increasing at a rate exceeding that of inflation. \*
- Provide for recovering the full costs of capital replacement in medium term financial plans. \*
- Develop programme based budgeting
- Implement a mechanism for volunteer increases in membership shares

### **Goal 10. Make the scientific products of ICES more accessible to the public**

Ultimately, the greatest contribution made by sound scientific information may be the influence it has on public opinion. There are many organisations that use scientific information to help stress their points of view when it comes to environmental issues and living marine resources. However, their interpretation of scientific information is not always objective. The sole reason for ICES to make scientific information more accessible to a wider public is to provide an unbiased scientific basis for public opinion and policies.

#### **Current Activities**

The new-look Newsletter, which first appeared in 2001, has received widespread and favourable comment on its effective communication of topical scientific information.



Active contact with national newspapers and fishing industry journals has achieved extensive publicity for ICES science (passages from ASC papers, Advisory Committee reports and the Newsletter, as well as interviews with ICES scientists and Secretariat staff, have been extensively quoted).

These developments have resulted from the work of the ICES Communications Officer, a post which was created in 2000 and filled early in 2001. The Communications Officer has also updated the ICES website, making it more attractive and considerably facilitating public access to ICES information.

### **Actions Required**

- Make the results of ICES coordinated resource surveys available to a wide public (in an easily understood manner) via the World Wide Web. (LRC)
- Advertise ICES by linking to electronic calendars and newsletters worldwide

## Annex 1 - ICES Committees and their Subsidiary Groups

The following is a list of the ICES Consultative, Advisory, and Science Committees together with the Working, Study, Planning, Steering, and other Groups and Workshops in existence in 2002.

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### Management Committee for the Advisory Process (MCAP)

Study Group on ACFM Working Procedures (SGWP)

### Advisory Committee on Ecosystems (ACE)

Working Group on Marine Mammal Population Dynamics and Habitats (WGMMPH)

Working Group on Ecosystem Effects of Fishing Activities (WGECO)

Study Group on Integrated Data Management (SGIDM)

Study Group on Mapping the Occurrence of Cold Water Corals (SGCOR)

Study Group on Ecosystem Assessment and Monitoring (SGEAM)

### Advisory Committee on Fishery Management (ACFM)

Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP)

EIFAC/ICES Working Group on Eels (WGEEL)

Working Group on *Nephrops* Stocks (WGNEPH)

ICES/NAFO Working Group on Harp and Hooded Seals (WGHARP)

Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine, and Anchovy (WGMHSA)

Working Group on the Assessment of Northern Shelf Demersal Stocks (WGNSSD)

Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk, and Megrin (WGHMM)

North-Western Working Group (NWWG)

Northern Pelagic and Blue Whiting Fisheries Working Group (WGNPBW)

Baltic Salmon and Trout Assessment Working Group (WGBAST)

Baltic Fisheries Assessment Working Group (WGBFAS)

Working Group on North Atlantic Salmon (WGNAS)

Arctic Fisheries Working Group (AFWG)

Working Group on the Assessment of Southern Shelf Demersal Stocks (WGSSD)

*Pandalus* Assessment Working Group (WGPAND)

Herring Assessment Working Group for the Area South of 62°N (HAWG)

Fisheries Statistics Liaison Working Group (WGSTAL)

Planning Group on Commercial Catch, Discards, and Biological Sampling (PGCCDBS)

Study Group on the Further Development of the Precautionary Approach (SGPA)

Study Group on Sea Bass (SGBASS)

Study Group on Baltic Herring and Sprat Maturity (SGBHSM)

Study Group on Discard and By-Catch Information (SGDBI)

### Advisory Committee on the Marine Environment (ACME)

Working Group on Introductions and Transfers of Marine Organisms (WGITMO)

ICES/HELCOM Steering Group on Quality Assurance of Chemical Measurements in the Baltic Sea (SGQAC)

ICES/HELCOM Steering Group on Quality Assurance of Biological Measurements in the Baltic Sea (SGQAB)

ICES/OSPAR Steering Group on Quality Assurance of Biological Measurements in the Northeast Atlantic (SGQAE)

ICES//IMO/IOC Study Group on Ballast Water and Other Ship Vectors (SGBOSV)

ICES/AMAP Study Group for the Assessment of AMAP POPs and Heavy Metals Data (SGPOP)

### Consultative Committee (CONC)

### Fisheries Technology Committee (FTC)

Working Group on Fisheries Acoustics Science and Technology (WGFAST)

ICES-FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB)

Study Group on Mesh Measurement Methodology (SGMESH)

Study Group on Target Strength Estimation in the Baltic Sea (SGTSEB)

Planning Group on the HAC Data Exchange Format (PGHAC)

### Oceanography Committee (OCC)

ICES/GLOBEC Working Group on Cod and Climate Change (WGCCC)

Working Group on Oceanic Hydrography (WGOH)

Working Group on Marine Data Management (WGMDM)

Working Group on Seabird Ecology (WGSE)

Working Group on Zooplankton Ecology (WGZE)

Working Group on Phytoplankton Ecology (WGPE)

ICES/IOC Working Group on Harmful Algal Bloom Dynamics (WGHABD)

Working Group on Recruitment Processes (WGRP)

Study Group on an ICES/IOC Checklist of Phytoplankton and other Protists (SGPHYT)

Study Group on the Incorporation of Process Information into Stock-Recruitment Models (SGPRISM)

Study Group on Modelling of Physical/Biological Interactions (SGPBI)

Steering Group for the ICES/GLOBEC North Atlantic Regional Office (SGNARO)  
ICES-IOC Study Group on the Development of Marine Data Exchange Systems using XML (SGXML)  
ICES-EuroGOOS Planning Group on the North Sea Pilot Project (PGNSP)  
ICES-IOC Steering Group on GOOS (SGGOOS)  
Workshop on the Transport of Cod Larvae (WKTCL)  
Workshop on New Perspectives in Understanding and Predicting Eutrophication (WKNUPPE)

#### **Resource Management Committee (RMC)**

Working Group on Fish Stock Assessment Methods (WGMG)  
Working Group on Fishery Systems (WGFS)  
International Bottom Trawl Survey Working Group (IBTSWG)  
Study Group on Age-Length Structured Assessment Models (SGASAM)  
Planning Group on Surveys on Pelagic Fish in the Norwegian Sea (PGSPFN)  
Planning Group on Redfish Stocks (PGRS)  
Planning Group on North Sea Cod and Plaice Egg Surveys (PGEGBS)  
Workshop Course on Fish Stock Assessment Techniques (WKCFAT)  
Workshop on MSVPA in the North Sea (WKMSNS)

#### **Marine Habitat Committee (MHC)**

Working Group on Marine Habitat Mapping (WGMHM)  
Benthos Ecology Working Group (BEWG)  
Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT)  
Working Group on Biological Effects of Contaminants (WGBEC)  
Working Group on Statistical Aspects of Environmental Monitoring (WGSAM)  
Working Group on Marine Sediments in Relation to Pollution (WGMS)  
Marine Chemistry Working Group (MCWG)

#### **Mariculture Committee (MARC)**

Working Group on Marine Fish Culture (WGMAFC)  
Working Group on the Application of Genetics in Fisheries and Mariculture (WGAGFM)  
Working Group on Environmental Interactions of Mariculture (WGEIM)  
Working Group on Pathology and Diseases of Marine Organisms (WGPDMO)

#### **Living Resources Committee (LRC)**

Baltic International Fish Survey Working Group (WGBIFS)  
Stock Identification Methods Working Group (SIMWG)  
Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS)  
Working Group on *Crangon* Fisheries and Life History (WGCRAH)  
Working Group on Cephalopod Fisheries and Life History (WGCEPH)  
Working Group on Beam Trawl Surveys (WGBEAM)  
Study Group on Elasmobranch Fishes (SGEF)  
Study Group on the Biology and Life History of Crabs (SGCRAB)  
Study Group on the Estimation of Spawning Stock Biomass of Sardine and Anchovy (SGSBSA)  
Planning Group for Herring Surveys (PGHERS)  
Planning Group on Aerial and Acoustic Surveys for Mackerel (PGAAM)

#### **Baltic Committee (BLC)**

Study Group on Ecosystem and Multispecies Predictions (SGMPB)  
Study Group on Salmon Scale-Reading Problems (SGSSR)  
Study Group on Herring Assessment Units in the Baltic Sea (SGHAUB)  
Study Group on GEOHAB Implementation in the Baltic (SGGIB)

### **Proposed changes/additions to the draft ICES Integrated Action Plan**

The Consultative Committee requests Delegates to consider the following changes and additions to the draft Integrated Action Plan (Doc Del:7). These changes were made at the request of the Publications Committee. Given that this Committee has been going through an evolutionary phase in the past year, the Consultative Committee recognises the difficulty the Publication Committee had in providing an earlier input to the Draft Integrated Action Plan. It therefore recommends that Delegates accept these changes. The proposed changes are shaded in the following text.

#### **Goal 6. Maintain and further develop a modern and effective infrastructure to support ICES programmes**

##### Actions Required

- Encourage the production of high-quality scientific publications by ICES through a co-ordinated publications policy, involving continuous review of ICES scientific output and pro-active support for its publications through diverse routes [PUB, CONC – All Science Committees]

#### **Goal 7. Keep abreast of the needs and expectations of ICES Member Countries**

##### Actions Required

- Produce information packages about ICES and its accomplishments, tailored to national interests and needs. [Secretariat, PUB, CONC]

#### **Goal 8 Broaden the diversity of the scientists who participate in ICES activities**

##### Actions Required

- Promote ICES publications which reach out to diverse scientific communities and engender their participation, using a variety of media [PUB, Secretariat]

#### **Goal 10 Make the scientific products of ICES more accessible to the public**

##### Current Activities

- In addition the role of the Publications Committee has been redefined, and by realigning its position in the ICES structure, ICES has ensured that it can now play an active role in improving the quality and accessibility of ICES publications.

##### Actions required:

- Make the results of ICES coordinated resource surveys available to a wide public (in an easily understood manner) via the World Wide Web. [LRC, Secretariat, PUB]
- Advertise ICES by promoting links with Internet portal sites, electronic calendars and newsletters world-wide. [Secretariat, PUB]
- Actively review the current range of ICES publications, and material suitable for publication, and increase accessibility through a co-ordinated publications policy including the redefinition of existing series and the creation of new publication routes using all available media. [PUB, Secretariat, CONC, All]

- Ensure publication resources, publication commitments and existing and new publication demands are balanced within ICES. [PUB, Secretariat, CONC, All]
- Make the publication process within ICES more transparent, to engender new and progressive ICES publications and information dissemination. [PUB, Secretariat, CONC, All]