

# **ICES COOPERATIVE RESEARCH REPORT**

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## **REPORT OF THE 12<sup>th</sup> ICES DIALOGUE MEETING (First Environmental Dialogue Meeting)**

Bonn, Germany  
7–8 September 2000

International Council for the Exploration of the Sea  
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## **1 Venue, Participation and Terms of Reference**

The Dialogue Meeting was held in the offices of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety in Bonn on 7 and 8 September 2000. The list of participants is contained in Annex 1. The agenda is presented in Annex 2.

Since 1980, ICES has been organising Dialogue Meetings to provide a forum at which scientists and managers can come together to discuss matters of mutual importance in relation to the provision of scientific advice.

The ICES Environmental Dialogue Meeting was the twelfth in the series of Dialogue Meetings. The intention was to have the participation of senior managers (administrative or scientific) in national administrations and intergovernmental Commissions who are responsible for marine environmental policy on any of the topics on the agenda, as affected by the environmental advice provided by ICES:

- Scientific assessment and advice on environmental/ecosystem issues.
- Scientific advice: What is needed? What can ICES provide? What should ICES provide?
- How to improve the efficiency of information flow.
- Developing an integrated approach to advice.

## **2 Welcome and Introductory Addresses**

Prof. Pentti Mälikki, First Vice-President of ICES, opened the meeting and welcomed the participants. In particular, he expressed his appreciation to the German government for hosting this meeting.

### **2.1 The President of ICES**

Dr Scott Parsons, ICES President, welcomed the participants and noted that this was the First Environmental Dialogue Meeting, held to improve the dialogue and strengthen the relationships between ICES and its partner Commissions that request and use information from ICES. He thanked the German government for hosting this meeting and expressed his pleasure at the attendance.

He said that ICES is now reflecting on its nearly one-hundred-year-old past. As ICES approaches its second century, it has been reviewing and changing certain aspects of its structure, including developing memoranda

of understanding with its partner Commissions. ICES has also developed a Strategic Plan for its future direction, that will be discussed in an Open Session in association with the 2000 Annual Science Conference (ASC) in Brugge, Belgium.

Dr Parsons then provided a brief history of the scientific work in ICES on environmentally related issues, and the evolution of this work from single disciplinary studies to the growing need for integrated and multidisciplinary studies of marine ecosystems and human impacts on them. He noted that there are many challenges for ICES regarding the development of scientific advice to support integrated assessments of the marine environment and ecosystem-based management. These challenges include the development of priorities to decide which types of information are most important to determine key characteristics of ecosystems, given the finite amount of resources available for studies and monitoring. The requirements for developing advice relevant to ecosystem management will be one of the key topics covered at this meeting.

In conclusion, Dr Parsons stated that the meeting was intended to foster a practical and open dialogue, with the real working part of the meeting carried out in the three workshops to be held in the afternoon. In these workshops, it was expected that the various views will be brought forward and debated, and that recommendations and conclusions would be developed for activities and cooperative efforts for the future. It was intended that this meeting would serve as the beginning of a process of consultation and working together between ICES, its Member Countries, and partner Commissions on the environmental advisory issues.

The full text of Dr Parson's speech is attached as Annex 3.

### **2.2 The German Director-General for the Environment**

Dr Dietrich Ruchay, Director-General, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, welcomed the participants to the Dialogue Meeting and to Bonn which, though far from the marine environment, is connected to it via the Rhine River.

He noted that ICES has been involved with marine science and fisheries ever since its inception in 1902. Concern with marine pollution began much later, and in recent years the focus has shifted again, towards an integrative approach to all matters related to the marine environment. Based on the Rio Declaration, sustainable development must take into account environmental issues to a much greater extent. The OSPAR Quality Status Report (QSR) 2000 has recently been prepared assessing the status of the environment of the Northeast Atlantic; this document pointed out that sustainable management of fish stocks, the continuing impact of

fisheries on fragile ecosystems, and the elimination of inputs of hazardous substances were the main fields where action is needed. However, it also showed that there have been some successes in decreasing the discharges of some hazardous substances. Further work will need to be done to meet the goals of the Fourth North Sea Conference, to reduce environmental concentrations of chemical substances to natural levels or to nearly zero for man-made substances. Work is still needed to move towards sustainable fisheries, requiring technical improvements to fishing gear, decreasing by-catch, and other actions. In order to safeguard a sustainable use of marine resources and to prevent damage to ecosystems, the current exploitation rates require that advice for fisheries management draws upon the development and application of an ecosystem approach.

Furthermore, there is little doubt that the climate is changing, but the effect of this change on the marine environment and how it should be managed is not clear. The problems are manifold, as also are the expectations from ICES in terms of its scientific advice. How ICES could respond to these many changes is one important aspect of this Dialogue Meeting.

The full text of Dr Dietrich Ruchay's address is attached as Annex 4.

### **3 The need for scientific assessment and advice on environmental/ecosystem issues**

#### **3.1 Summary of Presentation by Jean Piuze**

Dr Jean Piuze, Regional Director in the Department of Fisheries and Oceans, Canada, and member of the ICES Advisory Committee on the Marine Environment, presented views of an ICES Member Country from the North American perspective.

*ICES Member Countries may request generic advice related to the marine environment on broad issues, approaches, methods, techniques, and tools related to the effects of human activities on marine ecosystems or the implications of changes occurring naturally. The advice sought could also take other forms: specific requests about key international or national issues, requests for assessments of broad topics, advice on implementing an ecosystem approach, or review of Quality Status Reports. In such instances, Member Countries are looking for independent and credible scientific advice to complement their own national processes.*

*ICES, as an international marine science organisation, highlights the provision of high-quality advice to its customers as a key area in its draft Strategic Plan. As*

*Member Countries within ICES, Canada and the United States differ from their seventeen European counterparts not only because they lie on opposite sides of the North Atlantic, but also in the types of marine environmental advice needed in the context of the management of their ocean space. In Europe, to ensure the protection of the marine environment, the fact that the management of coastal seas such as the North Sea or the Baltic Sea involves many countries has necessitated over time the development of an international management structure with Commissions such as OSPAR and HELCOM, which require sound, neutral scientific advice on a regular basis.*

*For the North American side of the North Atlantic, most coastal waters are under the exclusive jurisdiction of either Canada or the United States. Hence, the management structures for the environmental protection of marine coastal waters are mostly national, which means that the main customers for environmental and ecosystem advice from ICES in North America are the two Member Countries themselves rather than international Commissions. This difference in emphasis on the two sides of the Atlantic is important, because it highlights the fact that customers for ICES advice on environmental issues are varied, and that individual Member Countries can be important customers for such advice.*

*Looking at the situation for Canada as an example, the main users of marine environmental advice are a number of federal departments as well as provincial/territorial governments. Additionally, stakeholders such as coastal communities, Aborigines, NGOs, academic institutions, and the private sector are also involved in the management and protection of the marine environment. The lead ocean agency in Canada is the federal Department of Fisheries and Oceans (DFO), which has primary responsibility for the integrated management of oceans, including the establishment of Marine Protected Areas and guidelines for Marine Environmental Quality, for the management of fisheries, the conservation of marine living resources and the protection of fish habitats, and for marine safety and the protection of the marine environment in case of emergencies. DFO decision-making is based on science and the Department conducts significant research, monitoring, and assessments in fisheries science, oceanography, and environmental science. Environment Canada is the lead Canadian environmental agency for issues such as land-based sources of marine pollution, ocean dumping, climate change, species at risk, and seabird research. Major Canadian pieces of legislation to protect the marine environment include the Fisheries Act, the Oceans Act, and the Canadian Environmental Protection Act. Key issues for Canada with respect to the protection of the marine environment include the incorporation of ecosystem objectives into ocean management, the ecosystem effects of fishing and aquaculture, the effects of contaminants, and climate change.*

*From Canada's point of view, ICES advice on the marine environment is valued because it comes from a scientific organisation with a strong reputation and a unique expertise on the North Atlantic and its adjacent seas, which brings together scientists from many countries in the fields of fisheries science, oceanography, and marine environmental science. It is felt that much of the peer-reviewed scientific information and advice coming out of ICES (Advisory Committees, Working and Study Groups, Annual Science Conferences, workshops and symposia, publications) can be used as guidance or as reference material by the various Canadian federal and provincial/territorial departments and agencies which are involved in the protection of the marine environment.*

*Some suggestions for possible improvements to the ICES process for providing environmental advice to Member Countries include raising the profile of Member Countries as direct customers of environmental advice and examining cost implications, enhancing the focus on environmental issues at the ICES Annual Science Conference, reviewing the remit and efficiency of Working and Study Groups on a regular basis, increasing emphasis on developing approaches and tools to incorporate ecosystem objectives into ocean management, and putting more focus on North American environmental issues/examples in ACME and in relevant Working/Study Groups. For their part, individual Member Countries could resort to ICES advice more often, contribute more data more regularly to ICES data banks, and also, where appropriate, involve more stakeholders from sectors other than national governments, such as academia or other levels of government, in ICES activities.*

### **3.2 Summary of Presentation by Steinar Hermansen**

Mr Steinar Hermansen, Deputy Director-General, Ministry of the Environment, Norway, gave a presentation, which is summarised below.

- *The basis for future management of the marine environment has to be a holistic, ecosystem approach. Today our measures are diverse and fragmented. They are managed by different authorities without proper coordination. However, physical, chemical, and biological factors are closely linked and provide the framework for our management of the system.*
- *The different ecosystems can be regarded as reservoirs of biodiversity and other ecological services that provide values for ourselves as well as for future generations. However, our complex societies have the possibility to make such an enormous impact on nature that it is absolutely necessary to regulate most activities. This is an enormous task where measures have to build on scientific advice.*

- *Private and public actors in all sectors have an independent responsibility to integrate environmental considerations into their activities. To achieve this in Norway, national targets for eight selected priority areas have been developed. These targets form the basis of sectoral environmental action plans where the main elements of environmental measures in each sector are presented. The aim of the sectoral plans is to develop environmentally and commercially viable industries in all sectors.*
- *The Ministry of Environment, together with the Ministries of Fisheries and Foreign Affairs, have recently started a review of all industries and other activities that have an impact on the marine environment. The aim is to make sure that we have a consistent national policy for the marine environment.*
- *The interaction between scientists and managers is crucial if we are to reach our goals. We need the scientists to:*
  - a) *give advice concerning environmental objectives, i.e., ecological quality objectives such as the ones ICES is working on for the North Sea;*
  - b) *give advice on how to adjust industries and other activities to the environment;*
  - c) *assess impacts of human activities and effects of protective measures;*
  - d) *give advice in our work on mapping resources and habitats;*
  - e) *monitor the different biological, chemical, and physical parameters of the ecosystems and help us separate the variations of nature from human impacts;*
  - f) *work out status reports like the Quality Status Report of the North Sea, which has just been released;*
  - g) *help us find the tolerance limits of our ecosystems to be able to continuously evaluate their state;*
  - h) *give advice on sustainable quotas.*

### **3.3 Summary of Presentation by Ton IJlstra**

Mr Ton IJlstra, Ministry of Agriculture, Fisheries and Nature Management, Netherlands, gave a presentation based on the views of a manager, especially his perception of the role and the importance of ecosystem-oriented advice, as summarised below.

*Managers are working at the interface of scientific advice and the use of that advice for policy purposes. For that reason, it is important for scientists to*

understand this context. The manager has to provide an output which meets the demands of transparency and integrity of procedures, taking into account political realities and the role of democratic control. A balance has to be struck between the need to conserve the natural environment and the wish to exploit natural resources and other considerations.

The scientist working on ecosystem issues should draw up the advice in such a way that a distinction is made between human-induced changes and other changes. Furthermore, the scientist should indicate scientific certainties and uncertainties.

Scientists have an important procedural role to the extent that through their professional actions they should contribute to the acceptance of the quality of the research among fellow scientists. In the statement of the problem, interested parties should be able to recognise the problem under study.

It has been stated that an ecosystem approach has some weaknesses. These relate to the ambitiousness of the concept of ecosystem research, which may sometimes be too high to meet more practical requirements of, i.a., comprehensiveness. The lack of integration between sciences, due to different reference frameworks, is also a weakness which is inherent in ecosystem approaches. Finally, there is the problem that ecological boundaries do not always match legal boundaries.

Mr IJlstra concluded:

- 1) A product-oriented ecosystem approach demands more from scientists than just “knowing their business” (having regard to the needs of the customer).
- 2) Managers should be able to deal better with uncertainties which are necessarily implied in the ecosystem-approach.
- 3) Scientists should work towards a better integration between chemistry, biology, morphology, and marine physics.

### 3.4 Summary of Presentation by Roland Salchow

Dr Roland Salchow, Bundesamt für Seeschifffahrt und Hydrographie, Germany; Chair of the Environmental Assessment and Monitoring Committee (ASMO) of OSPAR, presented some views, primarily based on the experience gained in the preparation of the regional Quality Status Reports (QSRs) and the QSR 2000 under OSPAR.

*The QSR 2000 Experience: The Quality Status Report 2000 was adopted by OSPAR in June 2000. It will influence future work under the OSPAR Convention. The Environmental Assessment and Monitoring Committee (ASMO) will now need to revise the JAMP (Joint*

*Assessment and Monitoring Programme), and this must be done in close cooperation with the other OSPAR committees.*

*There is also—after the QSR—the need for further scientific assessment, because of*

- a) *the pressures defined in the QSR;*
- b) *the known gaps in knowledge;*
- c) *the deficiencies in the QSR 2000.*

*As the environmental commitment has become weaker, we need convincing assessments to trigger policy decisions.*

### 3.5 Summary of Presentation by Armando Astudillo

Dr Armando Astudillo, Senior Administrator, DG-Environment, European Commission, presented his views, as summarised below.

*The need for sound, well-founded scientific advice to build up decisions on environmental issues is obvious, and does not require explicit justification. However, just for illustrative purposes, let us underline three main reasons:*

- *the responsibility of managers to society;*
- *the credibility of managers, intimately related to the acceptance of their decisions by society; and*
- *the possibility of defence against objections to the decisions taken.*

*There are four major areas where science input is vital:*

- a) *collection and preliminary elaboration of basic data;*
- b) *assessment of present status and forecasting future status under diverse pre-defined scenarios;*
- c) *provision of scientific advice on the basis of the assessment results and within the framework of a mandate given by the managers;*
- d) *finally, the managers or decision-makers will certainly need scientific assistance to interpret and judge the advice received and to elaborate realistic terms of reference for the advisory body.*

*Given the transboundary nature of environmental issues, areas a) to c) require common procedures and databases and cooperative work, ideally within a single scientific institution.*

*From experience gained through several scientific advisory bodies and the way their advice is transformed into management decisions, one may conclude that the type of advice managers do not appreciate is advice that:*

- is based on speculation rather than on actual findings;
- ties the hands of the decision-maker: that consists of over-simplistic statements which propose drastic and unique solutions;
- is too vague, too blunt or threatening;
- is too complicated to understand and to explain to the public, even if it is sound and well founded.

*Managers need advice that:*

- is strongly founded on a scientific process and supported, if at all possible, by historic evidence;
- gives different options and associated consequences to the decision-makers, allowing them to do their work, which is to make a choice;
- is explicit, detailed, and objective;
- is understandable by an informed reader and explainable in simple terms to the public.

## **4 What ICES is providing and what it can provide**

### **4.1 Summary of Presentation by Hein Rune Skjoldal**

Hein Rune Skjoldal, Chair, ICES Advisory Committee on the Marine Environment, presented an overview of the types of environmental advice that ICES provides to its Member Countries and partner Commissions. His presentation is summarised below.

*The scientific advice provided by ICES addresses three different types of questions:*

#### *1. How to ....?*

*How to design a study or monitoring programme, how to sample, how to analyse samples and data, how to assess data quality and environmental quality, etc.*

#### *2. What is the current state of ...?*

*What is the current state of ocean climate, plankton populations, fish disease prevalence, contamination, pollution, environmental quality, etc.*

#### *3. What action should be taken?*

*The first two types of questions relate to scientific investigations and assessments. The third type is management advice based on scientific studies and assessments.*

*Marine ecosystems are open systems. Ocean currents flow through them carrying plankton and chemical*

*substances. Fish and other organisms can have extensive migrations across any defined ecosystem boundaries. Climate variability is a major driving force for ecosystem variability, affecting in particular fish recruitment and population size. The biological components are interlinked through more or less tight trophic or other couplings. A number of human activities such as pollution, eutrophication, fishing, etc., impact not only the same ecosystem but to a considerable extent, directly or indirectly, the same components of the marine ecosystem.*

*The biological couplings and the multiple human impacts in open marine ecosystems are the main reasons why we need a holistic and integrated approach to our studies and management of marine ecosystems. The integration involves two different aspects or levels. The first level is the ecosystem, where we need to take into full account the integrated nature of marine ecosystems with their biological couplings and climatic driving forces. The second level is the management system where there is need for integration through close cooperation between the various sectorial management branches. These two levels of integration are the main principles and pillars of an Ecosystem Approach.*

*Terminology is important. The ACME has proposed the following definition for an Ecosystem Approach to Ocean Management:*

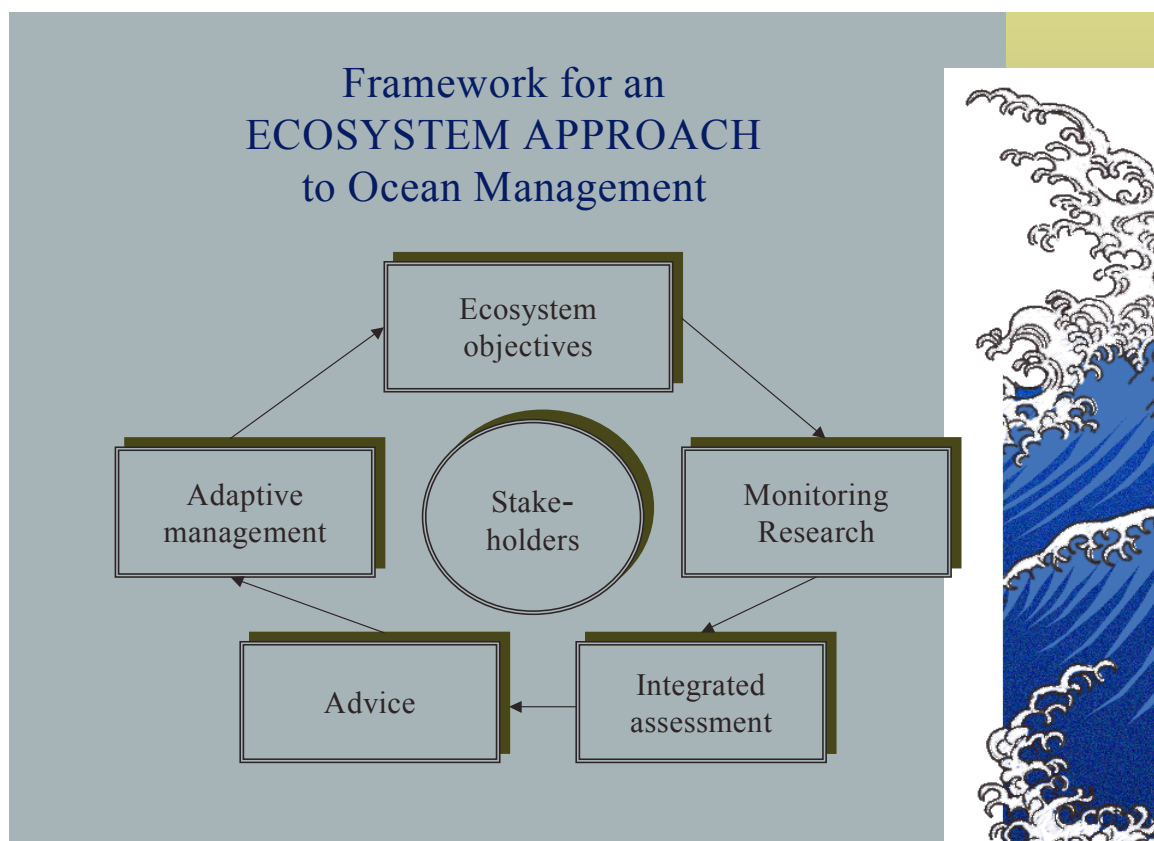
*“Integrated management of human activities based on knowledge of ecosystem dynamics to achieve sustainable use of ecosystem goods and services, and maintenance of ecosystem integrity.”*

*The ACME has also proposed a general framework for an Ecosystem Approach (Figure 1, below). This identifies five modules in repetitive sequence in a management process. ICES has been, and continues to be, involved in a number of activities relevant to the various elements of the Ecosystem Approach framework.*

*Ecological quality objectives (EcoQOs) are under development for the North Sea, and OSPAR has requested ICES to consider possible EcoQOs for two of the issues: sea mammals and seabirds.*

*Monitoring and research need to be closely related for a number of reasons. Monitoring provides data and information on long-term and large-scale patterns of change, which is a major source of research into the mechanisms behind such patterns. Monitoring provides also a background and historic reference for short-term process-oriented research. Research, on the other hand, provides insight, which facilitates interpretation of monitoring results. It also contributes to improved methods and techniques for monitoring. With regard to environmental assessments, data from research activities contribute substantially as a supplement to monitoring results in describing the status and trends in the environmental situation.*

**Figure 1.** General framework for an ecosystem approach to ocean management.



*ICES has for many years been involved in environmental monitoring, most notably through providing general advice and guidelines on monitoring strategy, sampling design, procedures and protocols for measurements, and statistical treatment of results. ICES also holds a large environmental database with oceanographic and contaminant data and is currently enlarging this with biological community data. ICES serves as a data centre for OSPAR and HELCOM.*

*ICES has actively supported the development of GOOS (Global Ocean Observing System). A joint ICES/IOC Steering Group has been established to promote the further cooperation and development of the GOOS programme, particularly for the Living Marine Resources component. The ICES International Bottom Trawl Survey (IBTS) in the North Sea has been accepted as one of the core activities of the initial GOOS programme. In 1998, the ACME considered the issue of operational fisheries oceanography with regard to how to integrate environmental information to improve fish stock assessments and predictions.*

*ICES considers gaps in knowledge and identifies research needs within the whole range of its activities, and with regard to marine ecosystems ICES has been an active co-sponsor of the GLOBEC (Global Ecosystem Dynamics) Programme. ICES has a joint working group with IOC on Harmful Algal Bloom Dynamics, and is supporting the development of the international GEOHAB Programme.*

*The large common element in data and information needs for environmental assessment of impacts of different human activities is a strong argument for better coordinated and integrated ecosystem monitoring and assessment.*

*The present sectors of fisheries management, environmental management, and maritime operational services have, to a considerable degree, the same requirements for data and information although on different time scales. Ocean climate variability is a driving force affecting both commercial living marine resources as well as non-commercial biota, which themselves interact and are being impacted by fishing activities. There is a need to take into account the ocean climate variability and interactions with non-commercial biota in the resource assessment and prediction used as a basis for fisheries management. While the operational services require the data in real or near-real time, resource assessment may require the data within weeks or months. Environmental assessments may have an even longer delay between the time period for which the environmental conditions are being assessed and the production of the assessment report. The mere fact that there is a shared need for temporally resolved data on ocean climate variability, commercial living marine resources, and non-commercial biota, should have us move towards a goal of coordinated ecosystem monitoring and assessment programmes for the various large marine ecosystems as part of the Ecosystem Approach.*

*An environmental assessment is a comprehensive analysis and statement of the status and trends in the environment and the extent of impact by a range of human activities. There are two main challenges in conducting an environmental assessment:*

- 1) Any influence of human activities must be distinguished from the background of large natural variability.*
- 2) Effects from different human activities must be distinguished from each other.*

*For example, it may be difficult to conclude whether observed changes in benthic communities are due to natural variability or anthropogenic factors, and in the latter case, it may be difficult to distinguish between effects from fishing, eutrophication, and possible other human activities.*

*ICES has been involved in environmental assessments in various ways. Prior to the work on a quality status report (QSR) for the North Sea, ICES provided general advice on the structure and content of an environmental assessment report. The North Sea Task Force, which prepared the 1993 North Sea QSR, was jointly established by ICES and OSPAR. For the recent environmental assessments carried out by OSPAR and HELCOM for the Northeast Atlantic and the Baltic Sea, respectively, ICES has contributed to contaminant data assessments, provided thematic assessments of impacts of fisheries and mariculture, and provided "peer review" for the OSPAR QSR 2000.*

*Ecosystem assessment is seen as a key activity underpinning advice in the ecosystem approach framework. A central question for ICES and its partner organizations and Member Countries is to what extent ICES should carry out ecosystem assessment as a routine activity. ICES has the broad competence spanning fisheries and environmental expertise to do this with high quality. ICES also puts great emphasis on its independent role in providing objective scientific advice, as a basis for considering the efficiency of management measures and the need for any new measures.*

## **4.2 Discussion**

The Chair opened the floor for discussion of the above presentations.

In connection with studies in the Northwest Atlantic compared with those in the Northeast Atlantic, it was pointed out that, in the preparation of the OSPAR Quality Status Reports (QSRs), one of the gaps of concern identified was the great difficulty of obtaining information on inputs from the western part of the Atlantic to the Northeast Atlantic. These data were not readily available for use in the QSRs. In response, it was pointed out that work is being done, but this information

may not be available in ICES. There is undoubtedly room for improvement in the provision of data to ICES.

In further discussion of the QSRs, it was stressed that the QSRs are consensus reports: the success of the QSRs is that they represent a common position approved by the fifteen countries of the OSPAR Commission, and are not simply the opinion of individual scientists. Nonetheless, there are problems in relation to the fact that different interpretations were given to the same levels of contaminants found in different regional QSRs.

The comment was made that it is possible to understand what could be an ecosystem approach to the management of fisheries and also to management of the coastal zone, but the development of an ecosystem approach for management of the marine environment as a whole was more difficult. The identification of the body or organisation that should be responsible for this management would also be problematic. In further discussion, it was felt that fisheries management should be part of ecosystem management and not a separate system.

In discussion of the issue of whether it is necessary to separate the effects of human activity from natural variability, one opinion was expressed that, for fisheries management, in many cases, regardless of whether a fish stock is lower owing to natural variability or to overfishing, the response may be similar. Thus, it might be best to identify undesirable ecosystem states, regardless of cause, and to avoid trying to identify the cause before attempting to manage the problem. An opposite opinion was expressed on the basis that, for the credibility of the regulation, the cause of the problem should be known so that the manner of regulation can be justified and explained. It was further acknowledged that it may be more difficult to attribute ecosystem changes to specific contaminants.

It was pointed out that, on the environmental side, there are a number of other scientific bodies that provide scientific advice and information. Thus, it was queried whether ICES is the main advisory body or whether it shares this role with other organisations in the North Atlantic. This was felt to be a difficult question. ICES has provided a great deal of information on how to monitor conditions in the marine environment and how to treat the data collected. However, on certain issues, such as eutrophication, OSPAR has developed its own mechanism for reviewing the information and utilising it. ICES has probably not exploited its full potential in providing relevant advice to OSPAR on this topic.

It was pointed out that if integrated advice is desired on contaminants, fisheries, or eutrophication, quantitative values are required. At present, this is easier for fisheries. For contaminants, there is currently no quantitative means of developing advice because there are no clear criteria concerning the level of effect of contaminants on marine organisms, e.g., regarding the effects of PCBs on marine mammals at the population level. The effect of

by-catches of marine mammals is quantitative, but not the effects of contaminants. However, it was pointed out that the single-species approach to fish stock management does not take the ecosystem effects of fishing into account, so even fisheries management has a long way to go.

In support of the problem of assessing contaminant levels, the experience of AMAP in conducting an environmental assessment was noted. Scientists from the eight Arctic countries conducted an assessment of the Arctic area and identified the problems. This showed that the only contaminant that can be assessed on the basis of a population-level effect is radioactivity. For all other contaminants, we lack the knowledge to evaluate the effects on a population level. In the Arctic, however, given the large consumption of fish, even small concentrations of contaminants can create a problem, and this has been shown for several contaminants. This assessment was conducted solely by AMAP scientists, with no scientific involvement of ICES.

It was considered useful for ICES to develop criteria for identifying the limits of the system so that we can determine when negative changes may occur. This would include identifying when fish stocks have a potential to fall rather than after they have fallen, so that ameliorating measures can be taken in good time when fish stocks begin to drop. For the ecosystem approach, we need to develop quantitative models for understanding influence on ecosystems, but as it will take many years to develop reliable models, we will need to rely on expert judgement for the time being.

Finally, it was stated that managers want advice to be provided in such a way that they can weigh the costs of different options against each other, to determine the best course of action.

## **5 Workshops**

Each Workshop had two introductory speakers whose function was to deliver brief but constructively challenging presentations, which stimulated the flow of ideas among the participants, allowing each Workshop to collectively develop coherent and practical proposals for actions necessary to address each Workshop topic.

### **5.1 Workshop 1: Scientific Advice: What is needed? What should ICES provide?**

This Workshop was chaired by Niels-Peter Rühl (Deputy Director, Bundesamt für Seeschifffahrt und Hydrographie, Germany). Theresa Crossley (Head of Marine Policy Branch, Ministry of Environment, United Kingdom; Vice-Chair of the Environmental Assessment and Monitoring Committee (ASMO) of OSPAR) served as rapporteur. The Workshop topic was introduced by

Georges Pichot (Head of Department, Management Unit of the North Sea Mathematical Models, (MUMM), Brussels) and Jens Brøgger Jensen (Danish Environmental Protection Agency, Copenhagen).

### **Workshop Aims**

The aims of the workshop were to:

- identify the questions where the Member Countries or the ICES Partner Commissions need additional advice;
- consider whether ICES was the appropriate body to advise on these questions;
- consider how to improve the cooperation between ICES, its Member Countries and Partner Commissions.

### **Summary of Presentations**

In his presentation, Georges Pichot stated that ICES is an intergovernmental organization that has no function beyond that which the Member Countries wish it to have. Member Countries choose to put their manpower and resources where they think they would be most effective. Sometimes this is in ICES, at other times it might be in another body, e.g., OSPAR.

Georges Pichot used the example of the OSPAR trend assessment of contaminants in biota (where, despite the collection of 1200 time series, only 11% of the data showed a statistically significant trend) to illustrate the need to improve the balance between the effort involved and the outcome achieved. Quality assurance of data must be improved.

During discussion, it was pointed out that there had already been some improvements in this field, although there was still more progress to be made. ICES also needed help with optimising its monitoring programmes from the Partner Commissions and Member Countries. In particular, Commissions should be more specific about what information they require.

Participants agreed that ICES should consider further:

- 1) the need for greater development of statistical tools for the better evaluation of data;
- 2) the continued improvement of monitoring programmes to make them more cost efficient and more responsive to the questions asked by Ministers and the public;
- 3) the further development of criteria for better assessment of monitoring data;
- 4) the development of tools for producing cost-efficient data, including methods for monitoring the highly variable ecosystems found in the marine environment.

In his presentation, Jens Brøgger Jensen set out what OSPAR and the North Sea Conference process hoped to achieve for the marine environment. In particular, he drew attention to the new hazardous substances being introduced onto the OSPAR Priority Action List. The approach to monitoring had to be more flexible, if these new substances were to be effectively monitored. If the emphasis continues to be on concentrations, the task will be impossible. The environmental effects of substances are likely to become increasingly important indicators of the success of measures to reduce hazardous substances in the marine environment.

However, there was little information on what actually happens in the marine environment. Most criteria and cut-off values have either been developed in the laboratory, or have been adapted from what is known about the conditions in fresh water or estuaries.

### **Discussion**

In discussion, the following points were made:

- 1) There is an urgent need to develop assessment tools specifically for the marine environment. In particular, quality objectives should be reliable and practicable.
- 2) The proposed monitoring programmes for new hazardous substances should be carefully evaluated before they are fully implemented, to ensure that they are providing value for money and are capable of delivering the required information.
- 3) The selection criteria for new hazardous substances should be improved.

### Investigations into Ongoing Ecological Changes

ICES should bring together available advice on ongoing ecological changes in the marine environment and on aspects of biodiversity. For example, changes in ocean climate have been shown to affect fish stocks. ICES should also be doing more to integrate environmental advice into fisheries management. The results of regular monitoring should assist in fisheries management issues, and can be relevant to agencies dealing with food safety.

### Improving Cooperation between ICES and Partner Commissions

It was agreed that ICES needed to be quicker and clearer in providing advice. This should be helped by the provision of more specific requests for advice from the Commissions and by longer-term planning, such as that recently begun in OSPAR. However, it was noted that there would always be the need to provide immediate advice on some unexpected issues, such as Brent Spar, and ICES should consider how to handle this.

It was suggested that some of those persons who attend both OSPAR/HELCOM and ICES meetings should be encouraged to report back to one body on discussions in the other and thereby help to bridge the gap between them.

Participants agreed that the Dialogue Meetings should continue, perhaps to consider specific issues in greater detail. It was suggested that these meetings should not be restricted to either “environmental” or “fisheries” dialogue, but should be open to all.

## **5.2 Workshop 2: How to Improve the Efficiency of Information Flow**

This Workshop was chaired by Michel Joanny (Project Leader, Coastal Environment Research, IFREMER, Centre de Brest, France); Kris Cooreman (Department for Fisheries Research, CLO-Ghent, Ostende, Belgium) served as rapporteur. The Workshop topic was introduced by Juha-Markku Leppänen (Institute of Marine Research, Helsinki; Chair of the Monitoring and Assessment Group (MONAS) of HELCOM) and Anita Künitzer (Project Manager, Marine and Coastal Environment, European Environment Agency, Copenhagen).

### **Summary of Presentations**

Juha-Markku Leppänen presented the way ICES and HELCOM collaborate for the monitoring and assessment of the Baltic Sea marine environment, highlighting difficulties and making proposals for improvements. In general, the procedure from the request to the answer takes a long time, owing to the many steps to be taken, and the added value is not always satisfactory. The request should be focused only on scientifically challenging questions, and the procedure simplified. The position of “Member Countries” and “Contracting Parties” should be clarified. A new assessment procedure was proposed, as follows:

- institutes collect data;
- submission of relevant data sets only;
- data analysis by agreed centres;
- indicator reports;
- HELCOM assessments in cooperation with ICES and EEA.

Within this framework, ICES should focus on:

- development of indicators, statistical methods, and assessment tools;
- storage of long-term data sets.

Anita Künitzer presented the EEA approach on data flow management.

The requirements to be met were established by the Århus Convention to ensure a good transparency and accessibility of the data sets and include public participation in decision-making and an efficient data flow.

Member countries of international organisations such as OECD, EUROSTAT, ICES, HELCOM, OSPAR, EC, and EEA are facing an uncoordinated reporting burden to these organisations, which often request the same or similar marine data in different forms and on different time scales. This information flow needs to be harmonised to reduce the reporting burden for national authorities. The ideal situation would be that countries provide the data in a harmonised format via the Internet, and that international organisations can download this information for their own assessments. The EEA has provided its present eighteen member countries and ten PHARE countries with EIONET servers for this purpose.

Since this approach for an ideal and harmonized data flow is in the process of development, the present procedure is still that member countries report to international data centres like ICES. Internet access to these databases is necessary to fulfill the requirements of the Århus Convention on public access to information in databases. EEA is currently developing this Internet access via visualization tools for its databases, giving access to aggregated data.

The databases for water (WATERBASE) and air (AIRBASE) are operational and a third database on marine data (MARINEBASE) is under development.

The main problems that the EEA encounters are data availability and the existing moratoria on the use of the data. In any case, it was decided that research data should not be stored in the EEA databases.

## Discussion

The discussions on the improvements of the information flows focused on two main items:

- 1) the data flow and the flow of scientific advice;
- 2) problems related to the currently existing information flows within ICES.

The schedules of the Commissions are very tightly framed and the ICES schedule has to fit into the Commissions' schedules. This process has important implications on the performance of the ICES Working Groups. The current tasks of the Working Group members, who are nominated by their countries, were to answer the requests of the customers and to review sound scientific information that is relevant to the customers, and which is part of the ongoing work within ICES (e.g., on the development of monitoring tools, the development of guidelines, the interpretation of data, the development of data submission formats, etc.). This requires Working Group members to consult their national experts to

obtain the most sound information and advice. This feedback is usually not possible within the time constraints of the ICES machinery. An extra workload is created by the different schedules of the Commissions. These problems compromise the good functioning of the Working Groups and have consequences on the functioning of the ACME.

A cause for delays is also the limited amount of time allocated by their countries to the members of the Working Groups to work intersessionally on the ICES requests.

It was noted that delays related to QA problems have occurred during the circulation of the data between producers and assessment groups.

It was also mentioned that some people from the European scientific community were not aware of the scientific activity of ICES and considered ICES to be just an organisation for managers.

Possible solutions are:

- 1) A "quick response" procedure to answer specific questions could be established within ICES by consulting or convening a small group of experts or by the use of e-mail conferences.
- 2) The formulation of the questions should be clarified by a better definition of the field of competence and the respective roles of ICES and of the Commissions.
- 3) The constraints imposed by the data ownership are different for scientific information and monitoring information. Moratoria imposed on the use of data in the ICES database are, e.g., incompatible with the time frame of the EEA.
- 4) ICES has the capacity to answer "standard questions" on a year-to-year basis and scientific questions within a longer time-frame.

ICES could have a coordination role in optimising international monitoring efforts. There is a specific need for a long-term harmonised schedule for monitoring and assessment between the Commissions, EEA, and ICES. This could also help to resolve problems with the timely availability of data and the problem of moratoria.

## Recommendations

ICES should advise its customers to establish a harmonised general schedule of monitoring and assessment requirements as part of a long-term programme (a decade).

ICES should facilitate the formalities for participation in its Working Group meetings in order to improve the competence by broadening the expertise.

### 5.3 Workshop 3: How to Develop an Integrated Approach to Advice

This Workshop was chaired by Pamela Mace (US National Marine Fisheries Service) and Chris Reid (Sir Alistair Hardy Foundation, UK) served as rapporteur. The Workshop topic was introduced by Mike Heath (Programme Manager for Marine Ecosystems, Marine Laboratory, Aberdeen) and Lars-Otto Reiersen (Executive Secretary, Arctic Monitoring and Assessment Programme (AMAP)).

#### Summary of Presentations

In his presentation, Mike Heath asked the questions listed below:

*How can we develop an integrated approach to environmental advice?*

- In what way is advice currently dis-aggregated, and why?
- Why is integrated advice required? Is policy to become more integrated?
- How far is it feasible, or desirable, to integrate the various aspects of advice and policy?

*What sort of integrated advice might ICES aim to provide?*

Explain: a) the relative impacts of climate and human activities; b) contemporary events in the context of long-term variability.

Advise: a) on the possible effects of change on business or society; b) on changes in economic or social practices that would help business or society to adapt to, or alleviate the effects of, environmental changes.

Incorporate: a recognition of the likelihood of trends due to climate change and cumulative anthropogenic activity into the assessment systems.

Predict: in general terms the consequences of human intervention given different atmospheric and oceanographic scenarios.

*What criteria could be applied to determine when integrated advice is required?*

- What pathways could result in a proposed action leading to an unacceptable burden of risk on the activities of other stakeholders, or pose a risk to wildlife?
- How “distant” are the cause and effect along each pathway?

- How much do we know about the physics, chemistry and biology of the processes along each pathway?

Lars-Otto Reiersen noted in his presentation that, over the past decades, ICES has been one of the key international organisations linked to the exploration and exploitation of marine resources of the Northeast Atlantic. It has also played a major part in providing scientific advice to organisations responsible for the prevention of marine pollution threats within the region. Over the years, ICES has continued to develop its structures to encourage involvement of the member countries. It has also placed a high priority on maintaining and enhancing the quality of its work, in particular with respect to data handling activities. Both of these aspects are vitally important, and are aspects that, in certain other international fora, have unfortunately not received the same attention. However, the development of the ICES structure as it exists today has also created some bureaucratic procedures that restrict the possibilities for external bodies to use ICES as a forum for providing answers to questions on marine science and policy. A key issue here is the time required to process such questions and deliver an appropriate response within the increasingly short turn-around times that are currently expected.

In today’s situation, where the environment, use of resources, pollution, etc., have a high focus in the media, journalists, politicians, and the public want answers to their questions immediately. In the event of accidents or emergency situations, such as oil spills, the need for reliable data on which to base decisions is vital. Under this type of situation, ICES may find itself characterised as a slow-working body, and consequently not the organisation that will be contacted and used, although it has the potential to offer a great deal of information, e.g., through its expert network and data resources.

Many organisational structures exist today that are involved in assessing the environment and resource exploitation, etc., both at the request of governments and of others. One focus for future ICES development should be to see if it can serve a wider spectrum of these organisations in a more effective way. AMAP, which operates under a time frame set by Arctic Ministerial meetings every second year, and high level Arctic Officials meetings twice a year, is required to answer requests in a manner that does not fit into the normal “rhythm” of ICES – that is, present a question, await the meeting of the relevant ICES working body, and review and approval of the response within the ICES system that may take a year or more. ICES has the potential to make a much greater contribution than it does today. It should be possible to establish a system under which ICES, as represented by its experts, can directly participate in assessment activities carried out under other organisations. From the Arctic perspective, the need for an active participation of ICES in the pollution and climate assessments that AMAP has been established to perform is clear; the mechanisms for this involvement are, however, less clear.

New systems of communication allow a much faster means of working across borders and over long distances. These systems should be fully exploited. Meetings of experts are still needed, however, a great deal of work and decision-making that previously required a “physical presence” can today be achieved by Internet communication and video/phone conferencing, etc. Such opportunities should be considered by ICES as a means to improve its service to the wider community, without reducing the quality of its work.

Following the presentations by Mike Heath and Lars-Otto Reiersen, the Chair outlined three topics to be discussed during the Workshop:

- 1) What is integrated advice (in the context of this Workshop)?
- 2) The adequacy of present arrangements for collecting data and how these can be improved.
- 3) ICES processes of evaluating multi-disciplinary information to formulate advice.

## Discussion

### *1. What is integrated advice (in the context of this Workshop)?*

It is important to differentiate “integrated advice” from “advice needed to support an integrated ecosystem approach”. We need to recognise that we are in a transition phase where we are mostly going to be developing advice on specific issues embedded in an ecosystem context rather than adopting a full ecosystem approach. The need for integration will vary on a case-by-case basis and must be defined within a specific framework. It is also important to keep in mind the priorities and the needs of the users of the information and advice. There are many dimensions of the concept of integration, such as temporal and geographic scales (including a catchment approach), and the type of advice that is appropriate will vary within these dimensions. The scope of the disciplines to be included also requires consideration (e.g., to what extent should ICES address and provide advice on socio-economics in an integrated context). In some cases, integrated advice may not be appropriate or needed.

### *2. The adequacy of present arrangements for collecting data and how these can be improved*

This heading merges the following two items that the Workshop was asked to discuss:

- the adequacy of present institutional arrangements for the collection of data;
- other methods of collecting the information required for integrated advice.

The discussion centred on three sub areas:

- sampling issues;
- data compilation;
- data and information exchange.

### Sampling issues

The importance of the baseline monitoring of biological, chemical, and physical components of marine systems as a prerequisite for ecosystem approaches was recognised by the Workshop. Trend data, including the maintenance of existing long-term monitoring programmes, are essential.

However, it was also recognised that it is impossible to monitor everything. Priorities and indicator variables, including biological effects techniques, need to be defined on the basis of the issues of concern. Monitoring programmes and key variables selected for monitoring should also be designed to have predictive capability (e.g., variables that may be early indicators of regime shifts). Since new key variables are likely to be identified in the future, it is also necessary to have periodic evaluations of the utility of those variables. ICES should develop criteria and guidelines for standard approaches to monitoring so that data collected by different groups are compatible.

### Data compilation

ICES should serve as an integrator of all relevant environmental data collected that are also relevant to the ICES area. This should be in a standard and readily accessible GIS format. Possibilities of making data freely available, in an interactive form, on the World Wide Web should be investigated.

### Data and information exchange

It is widely recognised that the amount and extent of existing data greatly exceed the information available in ICES databases. More emphasis needs to be placed on the acquisition of known data from ROSCOP forms, with the assistance of national delegations. The timeliness of data submission should be improved. It was suggested that a workshop should be conducted to address the issue of acquisition of other environmental data currently not submitted to ICES (e.g., from academia and oil companies). It was felt that ICES does not have an adequate process to evaluate multidisciplinary information. While the structural framework exists, an appropriate scientific framework does not. The need to bring together experts from a wide variety of disciplines to evaluate these data in multidisciplinary workshops was emphasised. One of the strengths of ICES should be its ability to draw together expertise from other organisations. Free exchange of data should be promoted within the context of an appropriate data policy.

### *3. ICES processes of evaluating multi-disciplinary information to formulate advice*

Some participants in the Workshop expressed concern that the proposed formation of an Advisory Committee on Ecosystems (ACE) might lead to greater fragmentation rather than greater integration of advice. Others perceived it as a step in the transition towards a more fully integrated system as the appropriate science develops. The advantage of creating ACE at present is that it sends out a message that ICES is moving towards an ecosystem-based approach. This new Committee might also address the problem that decisions still need to be made even in the absence of a fully developed scientific basis for ecosystem approaches. The Workshop also agreed that proper communication of advice is essential. Advice must be clear and relevant to the issues of concern raised by customers.

On the other hand, ICES also has a role to play in advising customers on the formulation of the questions they submit and to alert managers and politicians about emerging issues and the research that needs to be funded to address these emerging issues.

Managers are already phrasing questions in an ecosystem context. In this respect, ICES should attempt to define and communicate a set of “realistic expectations” for the type of data and advice that is likely to be able to be provided both now and in the near future. Demands on the science need to be aligned with realistic expectations. The issue of whether it is better to give weakly-supported advice, or admit that the data are inadequate to provide a foundation for advice, warrants further discussion in ICES.

## Recommendations

The Workshop recommends that ICES follow up on this Environmental Dialogue Meeting with a series of Workshops, Study Groups or *ad hoc* Committees to further examine specific issues, for example:

- to address the issue of additional sources and types of data that could potentially be incorporated into ICES databases;
- to conduct multidisciplinary workshops to evaluate the potential for using multidisciplinary information to formulate integrated advice (initially such workshops might be conducted separately for fisheries issues and environmental issues);
- to provide timely responses to urgent customer requests;
- to elaborate a set of “realistic expectations” for the type of data and advice that ICES is likely to be able to provide in the near future in support of an ecosystem approach.

## 6 Presentation of the Results of the Workshops

This session was chaired by Pentti Mälkki and Janet Pawlak acted as rapporteur.

The Chairs of the three Workshops each made a short presentation of the findings of their Workshop. In the discussion that followed, there were a number of clarifying questions. The topics discussed in Plenum are reported below.

### 6.1 Workshop 1: Scientific Advice: What is Needed? What should ICES Provide?

The Chair of Workshop 1 summarised the discussion in this Workshop, as reported in Section 5.1, above.

In addition, ICES should bring together available advice on ecological change and biodiversity, e.g., on alien species and their effects, or on the effect on the Baltic Sea of increased precipitation in Scandinavia. The issue of food safety in terms of fish consumption was also discussed, without clear conclusions.

ICES also needs to take further steps to integrate environmental advice into fisheries management.

The Workshop felt that ICES needs to be faster and clearer in providing advice. Longer term planning could help to overcome this problem. However, Commissions also need to be more specific in their requests, including the development of long-term plans. Furthermore, there should be more mutual reporting between OSPAR, HELCOM, and ICES, to help bridge the gap between these organisations.

Finally, Dialogue Meetings should continue, and perhaps be more broadly based.

### 6.2 Workshop 2: How to Improve the Efficiency of Information Flow

The Chair of Workshop 2 reported on the outcome of this Workshop, as reported in Section 5.2, above. He drew attention to three difficulties arising from:

- a) procedural constraints imposed by different schedules in the organisations involved;
- b) an unclear formulation of the questions;
- c) constraints imposed by issues of data “ownership”.

In regard to HELCOM-ICES interactions, the Workshop proposed that a new assessment procedure should be established based on the EEA approach developed under the EIONET (European Environment Information and Observation Network), as it was felt that the new activities prepared by EEA will drive the assessments by HELCOM and OSPAR, and thus also affect ICES.

In terms of the information flow within ICES, the schedules of ICES must fit those of the Commissions, even though this will create an extra workload in the ICES data centres. Possible solutions include:

- establishing a “quick response” procedure within ICES, not utilising the normal machinery;
- clarifying the questions and improving the definition of fields of competence and respective roles of ICES and the Commissions.

Regarding data ownership, the moratoria presently requested by data originators and Commissions block the use of the data for long periods. There are two potential solutions, either refuse the moratorium or refuse the data. Thus, probably only long-term data sets will be stored in the ICES databases, covering the “standard” types of data.

It was pointed out, however, that finding a solution may not be so straightforward. It was felt that the needs of EEA were very important in this regard, as they are requesting access to the Commissions’ data. A harmonised schedule could be useful to ameliorate this problem, but EEA should also be included in this context.

The somewhat complicated path of the Commissions requesting advice from ICES, while the countries and scientists involved are generally the same between the Commissions and ICES, was considered to be both confusing and circuitous.

### 6.3 Workshop 3: How to Develop an Integrated Approach to Advice

The Chair of Workshop 3 summarised the discussion in this Workshop, as reported in Section 5.3, above.

The discussion of the adequacy of present arrangements for collecting data covered:

- a) sampling issues;
- b) data compilation;
- c) data and information exchange.

In terms of sampling issues, the following was agreed in the Workshop:

- 1) Baseline monitoring data are important, especially trend data and continued support of existing long-term data series are needed;
- 2) Priorities and indicator variables need to be defined;
- 3) Monitoring programmes should be designed to have predictive capability;
- 4) ICES should develop criteria and guidelines for standard approaches to monitoring.

Regarding data compilation, ICES should compile all relevant environmental data for the ICES area and make them available.

Concerning data and information exchange, the Workshop proposed that:

- a) ICES should acquire known data identified by ROSCOP forms;
- b) Data originators should improve timeliness of data submissions;
- c) ICES should hold a workshop regarding other environmental data.

One of the strengths of ICES should be its ability to draw together expertise from other organisations to evaluate multidisciplinary data.

In terms of ICES processes of evaluating multidisciplinary information to formulate advice, the Workshop proposed that:

- 1) advice should be clear and relevant to the issues of concern;
- 2) ICES should advise managers on the appropriateness of questions and alert them about emerging issues and related research that requires funding;
- 3) ICES should define and communicate a set of “realistic expectations” on the type and extent of the advice that is likely to be able to be provided now and in the near future. Demands on science need to be aligned with realistic expectations.

The recommendations of the Workshop included the following:

- a) ICES should follow up on this environmental dialogue with a series of workshops on specific issues;
- b) ICES should explore and incorporate additional sources of data into ICES databases;
- c) ICES should conduct multidisciplinary workshops to evaluate the potential for using multidisciplinary data for integrated advice;

- d) *ad hoc* Committees could be formed to provide timely responses to urgent customer requests.

In the discussion of the report of this Workshop, a suggestion was made that all relevant data should be included in the ICES databases, as there is a need for many different types of data for integrated assessments and it would be better to have these data in distributed databases. Furthermore, we do not need simply data but rather “useful data” and ICES could have a role in defining what data are actually useful and of good quality. Finally, given the amount of time needed for submitting data from monitoring programmes, these types of data are not useful in early warning systems. The comment was made that the term “useful data” is not clear; if it means quality assured data, that is acceptable. However, it is impossible to define at this stage what will be considered useful data in the future.

It was felt that ICES should define a comprehensive framework for an ecosystem approach to fisheries and environmental management.

## 6.4 Discussion

The following comments were made in the discussion:

- 1) There has been a very strong emphasis on the development of ecosystem advice and an integrated approach to the development of advice. It was felt that a key recommendation should relate to the role of ICES in the development of ecosystem advice. The questions of ecosystem advice should have a greater focus in the conclusions of this meeting.  
  
ICES should work with the Commissions to draft the questions more precisely and to provide a response as soon as possible.
- 2) The concerns and needs of the Member Countries on the Northwest Atlantic should also be better taken into account in the ecosystem advisory process and other activities of ICES; this should include the recognition of the ability of these countries to request advice from ICES.
- 3) ICES should develop a much stronger capability in ecosystem issues so that ICES can develop an ability to describe ongoing ecological changes as they are unfolding. This has been begun in the Annual Ocean Climate Summary, prepared by the Oceanography Committee, and should be expanded to cover many other issues as well. This has implications for data exchange and handling.
- 4) In terms of new topics, e.g., marine biodiversity, ICES does not have the scientific working groups to handle these topics and may want to set up new working group(s) to handle them. In this context, ICES may wish to review older working groups that may no longer be useful.

- 5) A fundamental problem is that the amount of time allocated by ICES Member Countries to work on ICES environmental working groups is very small and often non-existent. Commissions pay ICES to prepare advice, but the Member Countries do not always allocate sufficient scientific staff time to work on the preparation of the material needed to formulate this advice.
- 6) Scientists and others associated with ICES should work to make ICES and its capabilities better known.
- 7) Concerning data, Member Countries should take steps to submit as many of their relevant data as possible, taking into account the resources available to the Secretariat. Data formats should be reviewed to ensure that this submission process will be facilitated as much as possible.

## 7 Overall Conclusions and Recommendations for Future Actions

The President of ICES, Dr Scott Parsons reviewed the overall conclusions deriving from the discussion earlier in the morning (see Section 6.4, above).

He commented that the development of ecosystem advice, that has been mentioned repeatedly during this Dialogue Meeting, is very important. There have been discussions in the ICES Council on this issue, and the Council established a Bureau Working Group on the Advisory Process in September 1999 to examine ways in which ICES could deal more effectively with these types of questions, as it was felt that existing procedures were not adequate. This Bureau Working Group had met several times and had prepared a set of recommendations for changing the advisory structure to establish a process for tasking advisory committees with making progress on ecosystem issues. This would also require a link into the ICES Science Committees that consider many areas of marine science.

Regarding the issue of ICES preparing environmental advice only in response to questions from regulatory Commissions, he stated that clearly there has been an evolution in ICES on this issue. The agenda of ICES has been dominated by fisheries issues for many years, but the profile of ICES has been less well developed on the environmental side. However, there is nothing that presently constrains Member Countries from developing requests to ICES on environmental matters.

The work of ICES is mainly conducted by scientists in its Member Countries, so ICES can only thrive depending on the level of commitment of the Member Countries. ICES is a collection of Committees and Working Groups that can only function by virtue of the participation of scientists and experts from its Member

Countries. Fortunately, there are many who are committed to conducting work for these groups. But Delegates also have a responsibility to ensure that resources are available to address the priority issues.

Concerning data handling and data policy, ICES has recognised that this issue needs to be addressed. However, ICES cannot deal with these issues in isolation, and we must have cooperation with OSPAR, HELCOM, and other organisations that use ICES data handling services. The Council has discussed the Secretariat role in data handling for the past few years and has supported several developments to enhance its capability.

Biodiversity and other newer issues have been discussed within ICES over the past years and the requirements for possible new working groups will be addressed by the appropriate mechanisms.

Concerning the need for follow-up of this Dialogue Meeting, Scott Parsons stated that ICES is committed to such action in appropriate ways. He said “if we are to make progress on the issues identified here, we will also need cooperation with the main environmental regulatory Commissions, that unfortunately were not formally represented at this meeting”.

In considering the value of the present meeting, he felt that it had been successful in bringing a number of people together with common perspectives, who may not have known each other before and who have had a chance to meet each other and discuss matters of

common interest. In terms of a future Dialogue Meeting, the Council would discuss a range of options and develop a plan of action.

Scott Parsons thanked the organisers of the meeting for preparing a programme with a diversity of Chairs and speakers. He also thanked the Chair of the meeting, Pentti Mälkki, for his work.

## **8 Final Remarks and Close of the Dialogue Meeting**

The Chair thanked the host for the excellent facilities and the good service provided, as well as for the excellent hospitality. He expressed his appreciation to the Chairs of the Workshops, the rapporteurs, and the speakers for their excellent efforts. He thanked the participants for their work. Finally, he thanked the Secretariat for their organisation and assistance.

He stated that this meeting has provided further guidance for the final development of the ICES Strategic Plan, that will be reviewed later in the month in association with the ICES Annual Science Conference.

On behalf of the host Ministry, Thomas Borchers thanked the participants for attending this First Environmental Dialogue Meeting and the ICES Secretariat for their good cooperation. He wished the participants a safe return home.

## ANNEX 1

### Programme ICES Environmental Dialogue Meeting Bonn, Germany, 7–8 September 2000

#### PLENARY SESSION 1 (7 September)

Chair: Pentti MÄLKKI *(First Vice-President of ICES; Director of the Institute of Marine Research, Helsinki)*

Rapporteur: Janet PAWLAK *(ICES Environment Adviser)*

#### 09:00–09.20 Introduction

Speakers: Scott PARSONS *(President of ICES; Chief Scientist, International Marine Science, Department of Fisheries and Oceans, Canada)*  
Dietrich RUCHAY *(Director-General, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)*

#### 09:20–11.00 The need for scientific assessment and advice on environmental/ecosystem issues

Speakers: Jean PIUZE *(Regional Director, Department of Fisheries and Oceans, Canada; member of ICES Advisory Committee on the Marine Environment)*  
Steinar HERMANSEN *(Deputy Director-General, Ministry of the Environment, Norway)*  
Ton IJLSTRA *(Ministry of Agriculture, Fisheries and Nature Management, Netherlands)*  
Roland SALCHOW *(Bundesamt für Seeschifffahrt und Hydrographie, Germany; Chair of the Environmental Assessment and Monitoring Committee of OSPAR)*  
Armando ASTUDILLO *(Senior Administrator, DG-Environment, European Commission)*

11:00–11.30 Coffee

#### 11.30–11.50 What ICES is providing and what it can provide

This presentation will discuss the need for ecosystem advice and why it is ICES, rather than national governments or environmental Commissions, that gives this advice. This session will show where ICES and the partner Commissions are active at present.

Speaker: Hein-Rune SKJOLDAL *(Chair, ICES Advisory Committee on the Marine Environment)*

11.50–12.30 Discussion

LUNCH

14:00–17:00 **SIMULTANEOUS WORKSHOPS**  
(Coffee 15.30-16.00)

### **Workshop 1: Scientific Advice: What is needed? What should ICES provide?**

Workshop 1 will take forward the preceding presentation on current activities. It will examine:

- the new requirements of ICES Partner Commissions and Member Countries;
- how these requirements might be met by ICES.

Chair: Niels-Peter RUHL (*Deputy Director, Bundesamt für Seeschifffahrt und Hydrographie, Germany; Former Chair of the Environment Committee of HELCOM*)

Rapporteur: Theresa CROSSLEY (*Head of Marine Policy Branch, Ministry of Environment, United Kingdom; Vice-Chair of the Environmental Assessment and Monitoring Committee of OSPAR*)

Speakers: Georges PICHOT (*Head of Department, Management Unit of the North Sea Mathematical Models, MUMM, Brussels*)

Jens BRØGGER JENSEN (*Danish Environmental Protection Agency, Copenhagen*)

### **Workshop 2: How to improve the efficiency of information flow**

Workshop 2 will address current operational problems. It will identify difficulties that arise from:

- procedural constraints imposed by different schedules in the organisations involved
- the formulation of the questions;
- constraints imposed by issues of data “ownership”.

Chair: Michel JOANNY (*Project leader, Coastal Environment Research, IFREMER, Centre de Brest, France*)

Rapporteur: Willem-Jan GOOSSEN\* (*International Water Policy Division, Water Directorate of the Ministry of Transport, Public Works and Water Management, Netherlands*)

Speakers: Juha-Markku LEPPÄNEN (*Institute of Marine Research, Helsinki; Chair of the Monitoring and Assessment Group of HELCOM*)

Anita KÜNITZER (*Project Manager, Marine and Coastal Environment, European Environment Agency, Copenhagen*)

### **Workshop 3: How to develop an integrated approach to advice**

This Workshop will address the longer-term aspects of developing integrated advice: what can be done in the future, and by whom? In this context, the session will review:

- the adequacy of present institutional arrangements for the collection of data;
- other methods of collecting the information required for integrated advice;
- ICES processes of evaluating multi-disciplinary information to formulate advice.

Chair: Pamela MACE (*US National Marine Fisheries Service*)

Rapporteur: Chris REID (*Sir Alistair Hardy Foundation, UK*)

Speakers: Mike HEATH (*Programme Manager for Marine Ecosystems, Marine Laboratory, Aberdeen*)

Lars-Otto REIERSEN (*Executive Secretary, Arctic Monitoring and Assessment Programme*)

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\* Unfortunately Mr Goossen was unable to participate in the Conference owing to illness. Kris Cooreman kindly agreed to be the rapporteur.

## **PLENARY SESSION 2** (8 September)

Chair:	Pentti MÄLKKI	<i>(First Vice-President of ICES, Director of the Institute of Marine Research, Helsinki)</i>
Rapporteur:	Janet PAWLAK	<i>(ICES Environment Adviser)</i>
09.30-10.30	Presentation of results of the Workshops	
10.30-11.00	Discussion	
11.00-11.30	Coffee	
11.45-12.15	Development of overall conclusions and recommendations for future actions	
12.15	Final remarks and closing of the Dialogue Meeting.	

## ANNEX 2

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### ANNEX 3

#### OPENING REMARKS BY SCOTT PARSONS

President of ICES

Good morning, colleagues,

I would like to welcome you to this first Environmental Dialogue Meeting sponsored by ICES. We are very happy that the German Federal Ministry for the Environment has kindly offered to host this Environmental Dialogue Meeting here in Bonn. We hope that this meeting will help us to improve the dialogue on marine environmental issues between scientists and managers. One of my major objectives as President has been to strengthen the relations between ICES and its partners and clients. I am very pleased that we have a broad representation of managers and scientists here today from the Member Countries of ICES, and representatives of the partner Commissions which request and use scientific information and advice from ICES. Welcome.

ICES is now nearly one hundred years old. It will celebrate its Centenary in 2002. In fact, the Centenary events began at last year's meeting in Stockholm, where one hundred years previously the first meeting which led to the establishment of ICES was held.

As ICES approaches its second century, it is re-examining and re-evaluating the way it does business. It has made substantial changes to its internal structure over the past several years to improve the design and implementation of scientific research programmes and its Annual Science Conference, and to improve international collaboration and cooperation. It has also developed new Memoranda of Understanding with our partner Commissions, both fisheries and environmental.

ICES is also in the process of developing a Strategic Plan for the coming decades. An Open Forum to obtain feedback on the initial Plan will be held later this month in Brugge, Belgium. We hope to see many of you there as well.

As part of our review of the way we do business and address the challenges of the coming years, it is necessary that we examine the way we develop and communicate scientific information, understanding, and advice on marine environmental issues. In particular, we face new demands for integrated advice on ecosystems and broader issues which transcend the traditional boundary between fisheries and the environmental issues.

Although this is the first Dialogue Meeting (now the twelfth in the series) focused solely on environmental issues, ICES has a long-standing involvement in the promotion and coordination of environmentally related scientific programmes. This began with work on physical, chemical, and biological oceanography in the early years of the 1900s. From the late 1960s, ICES has had a growing involvement in studies of contaminants in the marine environment and their biological effects. In 1972, ICES began providing scientific advice on marine pollution and related issues to its Member Countries and the new Commissions that were being established to regulate pollution in the Northeast Atlantic and the Baltic Sea. Many of the early studies were based on single scientific disciplines, as the laboratories built up their expertise in measuring and monitoring the various properties of the marine environment. As the capability to measure grew, so also grew the need to integrate the information from the individual scientific disciplines to form a more holistic picture of marine ecosystems and human impact on them from various sources.

Thus, ICES, its Member Countries, and its partner Commissions are now in the early stages of the development of an ecosystem-based approach to marine environmental assessment and management. This is a complex task owing to the complexity of the marine environment and the many gaps in our understanding of marine processes and human influences on them. In 1992, ICES created the Advisory Committee on the Marine Environment (ACME), and more recently OSPAR and HELCOM negotiated new Conventions containing provisions for the preservation of marine habitats and marine biodiversity.

A comprehensive approach to ecosystem-based environmental management requires an understanding of the "unimpacted" population levels and species and community diversities of organisms at many levels, from plankton and benthos through fish to top predators including seabirds and marine mammals, as well as their natural variability. There are many monitoring and research programmes in ICES Member Countries that collect relevant data. These data must be compiled and processed in a way that permits an integrated assessment of the state of the ecosystems and potential human impacts on them. This requires a definition and framework for an ecosystem approach. The ICES ACME is presently developing a proposed framework for an ecosystem approach, that builds on the work of several ICES Working Groups and recent international workshops that ICES has co-sponsored or participated in.

Particular attention is presently being given to the potential use of Ecological Quality Objectives (EcoQOs) as a management tool. This is a challenge that OSPAR and the North Sea Conferences are embarking on. For 2001, OSPAR has requested ICES to prepare EcoQOs for marine mammals and seabirds in the North Sea. ICES will need to develop scientific criteria to serve as a framework for the preparation of possible EcoQOs and the evaluation of their validity. This will need to include identification of appropriate measures of quality and data sets to illustrate these measures.

The collection, compilation, and analysis of data play a central role in integrated environmental assessments. Thus, the databases held by ICES on environmental, oceanographic, and fisheries data have a very important function in this work. Large amounts of money are spent in the collection of these data, so it is vital that the data are compiled and utilized in a way that the best use can be made of them. This is a matter of growing concern in ICES Member Countries and the Commissions that it serves. Clearer guidance must be developed for the use of these data by the various organizations that would like access to them. In addition, greater cooperation among relevant organizations, including ICES, OSPAR, HELCOM, AMAP, and the EEA, in the collection, handling, and assessment of environmental data could lead to a greater synergy in the development of a clearer understanding of marine ecosystems and management measures required to reduce environmental impacts. Overall objective scientific assessments are required to serve as the basis for sound policy and management decisions. How can we better work together to achieve this?

The purpose of this meeting is to foster a frank and practical dialogue. This morning we will hear presentations on the need for scientific assessment and advice on environmental/ecosystem issues. The real dialogue will commence this afternoon in the three Workshops on “Scientific Advice: What is needed? What should ICES provide?”, “How to improve the efficiency of information flow”, and “How to develop an integrated approach to advice”. That is where we hope to see the frank and practical dialogue occur. Tomorrow we will discuss the results of these Workshops and see whether there are conclusions and recommendations. Meanwhile, I look forward to meeting as many of you as possible and to hearing your views and suggestions on how we may work better together to achieve our mutual objectives.

This meeting should be the beginning, not the end, of a process of dialogue. What we need is a regular ongoing dialogue. This meeting should be the start of such a process.

Best wishes for a successful meeting.

## ANNEX 4

### WELCOME ADDRESS BY DR DIETRICH RUCHAY

Director General  
Water Management, Soil Conservation, Management of Contaminated Sites  
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Mr President, distinguished Delegates, Ladies and Gentlemen,

On behalf of the Minister for the Environment, I warmly welcome you to the ICES Dialogue Meeting which, for the first time, takes place in Germany. Bonn, this year's meeting place, is in the catchment area of the North Sea via the river Rhine but otherwise quite some distance from the coast. But often enough a look from some distance may allow a better focus on matters under consideration.

I see your meeting as a forum where different worlds meet, try to understand each other and benefit from each other—and what can be more different than the world of administrators on the one hand, and the world of scientists on the other.

ICES has been dealing with marine science and fisheries ever since its inception in 1902. Much later, aspects of marine pollution also came into focus. In recent years the focus has been shifted again, this time towards an integrative approach to all matters related to the marine environment.

The Rio Declaration states that human beings are at the centre of concerns for sustainable development and are entitled to a healthy and productive life in harmony with nature (Principle 1). And environmental protection shall constitute an integral part of the development process in order to achieve sustainable development (Principle 4).

With that in mind, the protection of the marine environment needs to be much better integrated into other policy areas than it has been until recently. Sustainable development needs to reconcile economy, social welfare, and environmental protection. With regard to pollution of the marine environment, considerable progress has been made. The Quality Status Report 2000 (QSR) for the North-East Atlantic states that worsening trends in the pollution of that area have been reversed. And I understand that the QSR was peer-reviewed by ICES. Despite such positive news, the OSPAR Commission regards the North-East Atlantic as still under threat and indicated that the sustainable management of fish stocks, the continuing impact of some fisheries on fragile ecosystems, and the elimination of inputs of hazardous substances were the main fields where action is needed.

In the 1980s, some scientists still advocated to make use of the assimilative capacities of the oceans. With increasing pollution, and pollution meaning harmful effects on the sea, however, perceptions changed. Hazardous organohalogenes have been found in pristine ocean areas thousands of miles away from their sources, and are teaching us frightening lessons about man's capacity to destroy the planet Earth not by means of overkill devices such as atomic bombs, but simply by day-to-day production and use of chemicals. Some lessons have been learnt and the discharges, emissions, and losses of a number of hazardous chemicals or even non-hazardous substances, such as nutrients, are being controlled in order to protect the marine environment. But despite the first successes mentioned, much remains to be done. There is need for systematically and radically preventing hazardous substances from getting into the environment, and ICES will certainly also be involved when we check where we stand concerning the goal of achieving, by 2002, concentrations of hazardous substances in the marine environment to near natural backgrounds, or close to zero in the case of man-made substances.

Measures to prevent hazardous substances from getting into the sea were triggered not least by fear of poisoning man's own food resources such as fish and other food from the sea. Despite improvements, these very food resources are still threatened by man-made pollution of the sea and are threatened by overexploitation. The recent assessment of the North-East Atlantic indicates that with regard to fisheries we are far away from taking a precautionary approach, as called for in Principle 15 of the Rio Declaration. In this particular context, the Fourth International Conference on the Protection of the North Sea (Esbjerg, 1995) and, in its wake, the Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues (Bergen, 1997) have named the questions to be answered, speeded up associated research and development, and promoted tools such as the FAO Code of Conduct for Responsible Fisheries and the UN Agreement on Straddling and Highly Migratory Fish Stocks. Moving towards sustainable fisheries requires a bundle of measures from the reduction of man-made pollution, fishing effort, the improvement of the selectivity of fishing gear to improvements in stock assessments and predictions. Commercial fish do not live in isolation, nor are they captured in isolation. There is collateral damage going along with fisheries, and to the fisheries themselves. Such damage may, for

example, extend to the very food sources of the exploited fish itself, to other fish species that happen to be taken as by-catch, and to predatory fish species and to birds and mammals that prey on exploited fish species. A single-species approach in fisheries science may have been regarded as adequate at lower exploitation rates. In order to safeguard a sustainable use of marine resources and to prevent damage to ecosystems, today's exploitation rates require that advice for fisheries management draws upon the development and application of an ecosystem approach. We therefore encourage ICES to further develop and apply the multi-species approach as important steps on that way.

Whilst this focuses on information in the context of exploitation, other environmental developments are opening a demand for new advice and predictive information. There is little doubt that our climate is changing. But what does that mean in relation to ocean circulation patterns? And what are the likely consequences with regard to living marine resources?

Management decisions have become more and more complex in view of increasing responsibilities with regard to preserving a healthy marine environment and allowing its sustainable use. Sound management decisions can only be made on the basis of sound scientific advice. Pollution of the seas, overexploitation of their living resources, effects of a changing climate on the seas, the problems are manifold and, as a consequence, so are the expectations of ICES advice. As in the past, administrators are looking for advice from the ICES' scientific community. As in the past, such advice needs to respond flexibly to changing needs.

Establishing the changing needs and how ICES can respond to such changing needs is one of the purposes of the present Dialogue Meeting, for which I wish you every success.