

Report on

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**DEEP SEA 2003, AN INTERNATIONAL CONFERENCE ON  
GOVERNANCE AND MANAGEMENT OF DEEP-SEA FISHERIES**

**Queenstown, New Zealand, 1–5 December 2003**



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## PREFACE

The motivation for DEEP SEA 2003, An International Conference on the Governance and Management of Deep-seas Fisheries, was the realization by a number of States, intergovernmental organizations, industry groups and civil society organizations that, as a result of technological development and market demand, deepwater fisheries are being exploited at increasingly unsustainable levels. In tandem with this was the recognition that existing regulatory regimes, based primarily on the 1982 Law of the Sea agreement<sup>1</sup>, are proving incapable of effectively regulating these fisheries, many of which occur exclusively as high-seas stocks and others as transboundary resources.

The idea for the conference was first mooted among participants to a preparatory meeting for a Southwest Indian Ocean Fisheries Commission held in Reunion in February 2001, most notably, participants from the FAO and the Ministry of Fisheries in New Zealand. During the following two years discussions were held in Wellington, Canberra and Rome and the concept for the Conference was brought to the floor of the twenty-fifth session of the FAO Committee on Fisheries (COFI) in February 2003, by the delegations of New Zealand and Australia. The COFI supported the concept of the Conference, which was to have as primary sponsors the Ministry of Fisheries, New Zealand, the Department of Agriculture, Fisheries and Forestry, Australia with funding support from the Fisheries Research and Development Corporation, Canberra and the technical cooperation of the Fisheries Department of the FAO, Rome. The COFI requested that the Conference organizers report the outcome of the Conference to the twenty-sixth session of COFI, to be held in 2005.

An underlying objective of DEEP SEA 2003 was to embrace all disciplines and interests involved in deep-sea fishing – those of the industry, governments and international regulators, marine legal scholars, fisheries scientists, national and international environmental groups as well as staff employed by regional fisheries management and intergovernmental organizations. This, the conference achieved, through a programme of structured theme sessions within a framework of formal reporting and ultimately a synthesis in the form of a report back to the Conference that provided the prognoses of a carefully selected group of thinkers from government, academia and industry.

The conference participants, representing individuals from 36 countries, indeed presented a broad cross section of expertise. It was the hope of the Steering Committee that those attending the Conference would do so in a personal capacity so as to minimize any constraints on the free exchange of views and ideas, unrestricted by the need to remain within the bounds of institutional policies or ideologies. In this context it was gratifying to the Conference Programme and Steering Committees to see the successful fusion of ideas and experiences, views and counterviews, which emphasized the complexity of what had been undertaken by the meeting.

It had been recognized that with the four and a half days scheduled for the conference, discussions and treatment of topics, issues and problems would necessarily be synoptic and thus it would be difficult to address problems in detail. Thus, it was decided to take advantage of the presence of so many specialists with interests related to deep-sea fisheries to hold several workshops to address topics of specific relevance to the Conference theme. Four such workshops were organized and held concurrently just prior to DEEP SEA 2003 in Dunedin at the University of Otago, from 27 to 29 November, so allowing a day at the end for most participants to arrive in Queenstown, 3 hours distant by coach.

This report attempts first to summarize the presentations and discussions of DEEP SEA 2003 and to identify where the Conference thought future action, both at the national and international level, was needed to address problems that characterize the management of existing, and future, deep-sea fisheries. Thus, our objectives were to address all aspects of the problems of the fisheries – those relating to ecosystem biology and habitat issues; the protection of biodiversity and conservation of

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<sup>1</sup> The United Nations Convention on the Law of the Sea. Signed at Montego Bay, Jamaica, 10 December 1982, it entered into force on 16 November 1994.

deepwater fauna and their habitats; knowledge of the population and fisheries biology of deepwater and slope fisheries resources; resource management including the improvement and evaluation of stock assessment techniques and harvesting strategies; the technology and fishing tactics of deepwater fisheries; national, regional and international strategies and policies for governance of the deep seas; management protocols including the need for development of new international arrangements and means of facilitating their implementation; and the identification of programmes for the implementation of the required strategies

The Steering and Programme Committees put considerable effort into developing a programme that specifically considered the needs of coordination and synergy of research and management efforts targeted at deep-sea fisheries. We concluded that the Conference greatly succeeded in providing a constructive debate that has made a significant contribution towards mapping the future directions required for successful governance and management of the world's deepwater fisheries.

The advent of DEEP SEA 2003 was possible only through the generous support of a number of sponsors, who provided either direct financial support to the activities of DEEP SEA 2003 or made available staff whose work in Conference organization was essential to the Conference's success. In this regard, the New Zealand Seafood Council deserves particular recognition for agreeing to allow Dr Kevin Stokes to participate as a Steering Committee member and Programme Committee Convenor, and for Ms Sandra Diesveld to ably serve as the central support to the Conference Secretariat. The activities of these stalwarts were held together by the enormous efforts of Ms Eidre Sharp-Brewer through her responsibilities as Conference Director. A complete list of the Conference sponsors and members of the Steering and Programme Committees is given in Appendix I.

We are most grateful to Mr Jonathan Peacey, Ministry of Fisheries, Wellington, for preparing the foundation draft of this report.

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FAO.

Report on DEEP SEA 2003, an International Conference on Governance and Management of Deep-Sea Fisheries. Queenstown, New Zealand 1–5 December 2003.

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### ABSTRACT

The report describes (a) the reasons for the undertaking of DEEP SEA 2003, An International Conference on Governance and Management of Deep-Sea Fisheries, that was held in Queenstown, New Zealand from 30 November to 5 December 2003, (b) its agenda and structure, (c) the main conclusions of the Conference and (d), a prognoses for the future of deep-sea fisheries as seen by a selected group of expert participants. The report also documents a number of actions that the Conference participants, in general, believed needed to be addressed, many of them on an urgent basis, as a means to develop a global programme of future activities to address the problems associated with the management of deep-sea fisheries that had been identified and discussed.

DEEP SEA 2003, as a conference, embraced all disciplines and interests involved in deep-sea fishing – those of industry, governments, marine legal scholars, fisheries scientists, national and international environmental groups, academia and staff of regional fishery management and intergovernmental organizations. As such, the conference participants, representing individuals from 36 countries, represented a broad cross section of expertise and experience.

The Conference addressed issues relating to ecosystem biology; the protection of bio-diversity and conservation of deepwater fauna and their habitats; current knowledge of the population and fishery biology of the deepwater and slope fisheries resources; the needs of resource management including development of stock assessment techniques and evaluation of harvesting strategies; the technology and fishing tactics of deepwater fisheries; national, regional and international strategies and policies for governance of the deep seas; management protocols including the need for development of new international protocols and means of facilitating their implementation; and the identification of programmes for the implementation of the required strategies.

In addition to reporting on the events and outcomes of DEEP SEA 2003, this report describes the activities and discussions of four workshops that addressed topics of relevance to the Conference theme. These were held in Dunedin at the University of Otago, from 27 to 29 November, just prior to DEEP SEA 2003. These workshops addressed the following topics:

- Assessment and Management of Deepwater Fisheries
- Conservation and Management of Deepwater Chondrichthyan Fishes
- Management of Small-Scale Deepwater Fisheries and
- Marine Bioprospecting.

The first and third of these workshops were undertaken by the Fisheries Department of the FAO; the second Workshop was jointly undertaken by the Department for Environment, Food and Rural Affairs, UK, the IUCN and the FAO. The Workshop on Bioprospecting was held under the aegis of the Institute of Antarctic and Southern Ocean Studies, the Antarctic Climate and Ecosystem Cooperative Research Centre and the Centre for Law and Genetics, of the University of Tasmania. The outcomes of these workshops were reported to the DEEP SEA 2003 Conference as part of the summary proceedings.

This report will be complemented by a publication of the proceedings of the Conference in the FAO Fisheries Proceeding series.



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**LIST OF ABBREVIATIONS**

AFMA	Australian Fisheries Management Authorities
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COFI	FAO Committee on Fisheries
CPUE	catch per unit effort
CSIRO	Commonwealth Scientific and Industrial Research Organization
EEZ	exclusive economic zone
ICES	International Council for the Exploration of the Sea
IUCN	The World Conservation Union. Former denomination: International Union for Conservation of Nature and Natural Resources
IUU	illegal, unreported and unregulated fishing
NIWA	National Institute of Water and Atmospheric Research
NOAA	National Oceanic and Atmospheric Administration
RFB	Regional fishery bodies or arrangements
RFMO	Regional fisheries management organizations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Conference on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
UNGA	General Assembly of the United Nations
VMS	vessel monitoring systems

## 1. GENESIS OF CONFERENCE

The deep sea is the largest habitat on earth. The area over 4 000 m in depth covers 53 percent of the sea's surface, which in turn covers 71 percent of the world's surface! The continental slopes alone occupy 8.8 percent of the world's surface compared to 7.5 percent for the continental shelves and shallow seas.

Major commercial fisheries have developed on the continental slope and deep sea over the last 30 years as inshore fisheries have become fully, or overexploited, and global market demand for fish has continued to strengthen. Deep-sea fishes that have become targets for fisheries have been as varied as orange roughy, oreos, alfonsinos, Patagonian toothfish, pelagic armourhead, redfish, hoki, and macrourids. Many of these species have developed particularly valuable market niches. Other deep-sea species that have been more traditionally fished include sablefish, blue ling, black scabbard fish, Greenland halibut, morids, cusk eels and hakes.

The particular characteristic of the most recent phase of deepwater fisheries development has been the great rate at which these fisheries have developed as advances in technical capacity have overcome the difficulties that, in the past, protected these regions – the last marine frontier – from fisheries exploitation. Even in areas of traditional deep-sea fisheries, heavy, if not unsustainable, fishing mortality and damage to deep-sea habitat have become a threat, if not the reality. This rapid development has, in many instances, overcome the mechanisms for governance and resource management relating to the high seas, mechanisms that in most cases were the legacy of the 1982 agreement of the Law of the Sea, a convention that barely anticipated the challenges that deep-sea fisheries would bring. The rapid development of deepwater fisheries has also sorely challenged the limits of existing knowledge that is needed to manage these resources sustainably, the ability of decision makers to reconcile the constraints of existing information with commercial pressures to develop fisheries, the ability of resource managers to establish rational harvesting strategies and the more-usual-than-not, inability to impose regulatory decisions on vessels operating on the high seas in the absence of necessary national legislation that would enable States to control their own flagged vessels when prosecuting these fisheries. These were among the imperatives that drove the convening of DEEP SEA 2003.

### *The scientific and management challenges*

The sustainable management of deep-sea fisheries poses a number of scientific challenges. It is believed that recruitment of successful year classes of many deep-sea species may be intermittent and the fecundity of such deepwater species is often low and their age at first maturity high. Many deep-sea species may spawn only periodically over the years and grow slowly. The determination of their age remains difficult and for some species age determination remains contentious. Because of these biological characteristics, such species have low productivity and are potentially vulnerable to overexploitation with long stock recovery times when their biomasses are depleted. However, it was also recognized that there is a suite of deepwater species whose productivity is similar to that of many shallow-water species. Here, the scientific issues are more easily addressed and the management challenges reflect most of those that arise in the administration of demersal fisheries found on the continental shelves.

The great depths at which these species live pose additional scientific and technical challenges in estimating abundance compounded by the high levels of temporal and spatial variability exhibited by some species, and the difficulties in knowing important biological parameters (e.g. the backscattering cross section and species composition of fish assessed by acoustic surveys). These scientific and technical difficulties translate directly into management challenges for regulating the development and continuing prosecution of deep-sea fisheries in a sustainable manner.

Because deep-sea species often aggregate at predictable locations and in high densities, they are especially commercially attractive as this enables fishers to attain high, and thus profitable, initial catch rates. As large catches can be taken in a short time, the stocks may be rapidly depleted, often

before catch data can be collated and the necessary scientific analyses undertaken to enable effective management actions to be implemented.

#### *The challenges of technology*

The advance of deepwater fishing is a story of success in facing the technical challenge of fishing off-shelf resources that inhabit regions of the sea ranging as deep 2 000 m. These technological developments have not been restricted to vessel and gear design. Of equal, if not greater, importance have been developments in underwater acoustic telemetry that has enabled aimed-trawling of fish aggregations, global positioning systems to locate seamounts and other seafloor features associated with commercially exploitable deepwater fish concentrations and acoustic detection of fish aggregations. These developments which, on the one hand provided the means of developing the deepwater fisheries, on the other, also provided the techniques for stock assessment, mapping of species' distributional ranges and habitat mapping. These too, were issues that were identified as important for DEEP SEA 2003 to address.

#### *The challenges of governance*

While it was recognized that management failures to ensure the sustainability of many deep-sea fishery resources arose from lack of adequate scientific knowledge it was also recognized that in many cases, even if this lack of necessary information had been addressed, the abilities of existing management regimes and the competencies of existing legal and institutional arrangements have proved insufficient to provide a successful and effective basis for management of deepwater fisheries resources, the majority of which are found in high-seas situations. This lack of effective governance structures has compounded the scientific and management failures and provided, in their own way, to the rapid depletion of many high-seas deep-sea fisheries in recent times.

#### *Addressing the need for the Conference*

The first planning for DEEP SEA 2003 began informally in Réunion, February 2001 among a small group of fisheries administrators and scientists and lead to an agreement to explore the possibility of the Ministry of Fisheries, New Zealand and the Department of Agriculture, Fisheries, Forestry – Australia co-sponsoring an international conference to address issues of governance and management of deep-sea fisheries. These countries subsequently noted their intention to convene this Conference at the 25th Session Committee on Fisheries in Rome, February 2003, and subsequently it was agreed that the Conference would be convened with the technical cooperation of the FAO.

Once the decision to proceed had been confirmed by the principal proponents a Steering Committee was formed<sup>3</sup> and, following financial backing by the Fisheries Research and Development Corporation, Australia, a Programme Committee was also formed. The Programme Committee recognized that appropriate consideration of many issues would be essential if the requirements for identifying, addressing, and subsequently addressing, the problems of the governance of these fisheries were to be achieved.

It was against this background that the organizers sought to organize a meeting of scientists, managers, industry, and other individuals with an interest in the sustainable management of deep-sea fisheries to address two major objectives:

- i. Inform participants about current objectives, constraints, and future influences on management and conservation of these resources, and identify and develop future directions for the governances and management of deep-sea fisheries.
- ii. Identify and evaluate the need for, and nature of, future consultations to further deal with issues that are important for ensuring the protection of the habitats of fishes that support deep-sea fisheries and for ensuring the sustainability of these fisheries.

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<sup>3</sup> See Appendix I for a list of the DEEP SEA 2003 Steering and Programme Committee members.

The Programme Committee recognized that much of the information needed to manage the deepwater ecosystems and their fisheries as sustainable resources had yet to be gathered. Further, the choice of the best management models and most appropriate management strategies were characterized by uncertainty. In terms of regulation, many of the deep-sea resources, particularly those of the high seas, had been further constrained by the still-emerging international protocols for regulation of high-seas fisheries.

Thus it was the view of the Programme Committee that to achieve these objectives the Conference would need to balance the role of science, national and international policy, and the politics required for the sustainable management of deepwater fisheries. As such a number of subjects were identified to be in need of consideration. This was to be done in the form of a number of conference themes. These themes were to address:

- environment, ecosystem biology, habitat and biodiversity issues
- oceanography of deep-sea and slope waters
- population biology and resource assessment techniques
- conservation strategies and resource management including development of harvesting strategies for single and multi-species deepwater resources
- technology requirements for science, management and resource users
- monitoring and compliance needs for deep-sea resource management
- existing national, regional and international policies and instruments for management of the deep-sea fisheries
- future governance and management issues including the need for development of new international protocols and means of facilitating their implementation and
- identification of programmes for the implementation of new international protocols and charting the Way Ahead.

It was agreed that the Conference should provide a forum for those with an interest, or business, involved in deep-sea fisheries including:

- fisheries industry representatives
- scientists
- fisheries managers
- researchers
- inter-governmental and regional seas organizations
- environmental organizations
- ocean science students and
- policy makers and decision-makers in government.

## **2. CONFERENCE STRUCTURE**

### **2.1 Stretched to the limit**

Given the capacity of the meeting venue, it was agreed that a plenary-type approach was preferred for presentation of the Theme Sessions. However, given the interest in presenting papers to the Conference it was soon realized that the activities of the main Conference would have to be supplemented and it was agreed to do this through a poster session. The posters were accommodated in an adjacent meeting room. The Steering Committee also recognized that the convergence of a large number of international experts provided an ideal opportunity for them to meet in specialist groups to discuss and explore technical issues in depth. The number and nature of these meetings, which were held independently to DEEP SEA 2003, was governed by the availability of funding and the specific interest of participants. The outcomes of the four workshops noted above are given in Section 2.4.

## 2.2 The Plenary Conference

The Agenda for DEEP SEA 2003 is given in Appendix I. The main programme elements were as follows.

### *Theme 1: Environment, Ecosystem Biology, Habitat and Diversity and Oceanography*

**Chair – Dr Andy Rosenberg** – University of New Hampshire, USA

**Keynote – Dr John Gordon** – Environmental and biological aspects of deep-water demersal fishes.

Presentations in this section reviewed the nature and characteristics of the continental slope and deep-sea environment, their fauna and ecosystems.

### *Theme 2: Population Biology and Resource Assessment*

**Chair – Dr John McKoy** – National Institute of Water and Atmospheric Research, New Zealand

**Keynote – Dr Andre Punt** – The challenges of, and future prospects for, assessing deep-water marine: experiences from Australia, New Zealand, South Africa and the US.

This section reviewed the challenges to assessment of the deepwater fishery resources posed by the logistical requirements of working in deepwaters and the special characteristics of many of the fishes living in deepwater habitats.

### *Theme 3: Harvesting and Conservation Strategies for Resource Management*

**Chair – Dr Keith Sainsbury** – Commonwealth Scientific and Industrial Research Organisation, Australia

**Keynote – Dr Andy Rosenberg** – Between the devil and the deep blue sea – the challenges of managing deep sea living marine resources.

### *Theme 4: Technology Requirements*

**Chair – Mr Ian Knuckey** – Fishwell Consulting Ltd, Australia

**Keynote – Dr Amos Barkai** – Use and abuse of data in fishery management.

This section considered the technological developments that have driven the development of deepwater demersal fisheries and requirements posed by fishing in such extreme depths. Included in these treatments were presentations addressing the revolutionary advances in seafloor mapping and other aides to aimed trawling, without which the development of deepwater fishing, would not have occurred in the manner it has.

### *Theme 5: Monitoring, Compliance and Control*

**Chair – Mr Dave Wood** – New Zealand Ministry of Fisheries

**Keynote – Mr Stephen Stuart** – Creating and implementing an effective deterrent.

Presentations in this section examined how advances in technology were enabling offshore surveillance and control of fishing vessel activity, with a particular emphasis on providing data of sufficient quality that it can support successful legal charges. Related developments are enabling vessel activities to be monitored and are facilitating the discharge of the responsibilities of flag and port States in relation to their international obligations.

### *Theme 6: Review of Existing Policies and Instruments*

**Chair – Dr Marcus Haward** – University of Tasmania, Australia

**Keynote – Dr Douglas Johnston** – Towards a high seas management regime: Vision and reality.

This section reflected on the developments in legal and institutional instruments governing the deepwater and high-sea fisheries, especially the obligations of States in the absence of appropriate fisheries management bodies. Particular notice was given to evaluation of the results of agreements

such as the United Nations Fish Stocks Agreement and the development of ‘soft law’ initiatives including the FAO’s Code of Conduct for Responsible Fisheries and the related International Plans of Action.

#### **Theme 7: Governance and Management**

**Chair – Mr Grant Bryden** – New Zealand Ministry of Foreign Affairs and Trade

**Keynote – Dr Moritaka Hayashi** – Governing Deep-Sea Fisheries: Future Options and Challenges.

#### **Panel Session: The Way Ahead and Summing Up**

**Chair - Dr Ross Shotton** – Food and Agriculture Organization, Rome.

The members of this panel were:

##### *Administrator’s perspectives*

Dr M. Sissenwine, NOAA, USA. The Way Ahead: Important Science and Governance Issues.

Dr Carlos Verona, DALTEC, Argentina. The Way Ahead – The Administrator’s Perspective

Dr Geoff Richardson, AFMA, Australia. Issues for Governments

Dr Denzil Miller, CCAMLR, Australia. The View from a Regional Fishery Body.

##### *Global and international perspectives*

Mr Michael Lodge, ISA, Jamaica. Objectives, Principles and Strategy

Ms Kristina Gjerde, IUCN, Switzerland. The Way Forward for Deep Sea Fisheries: A Global Perspective

Mr Mori Hayashi, Waseda University, Japan. International Legal Considerations and Practicalities

##### *Industry perspectives*

Mr Martin Exel, Austral Fisheries Pty. Ltd, – Australia

Mr Dave Sharp, New Zealand Seafood Industry Council, New Zealand – New Zealand.

##### *Synthesis – The future*

Dr John Annala, Ministry of Fisheries, New Zealand and Conference Convener.

### **2.3 The Poster Session**

A total of 62 posters were presented. By a popular vote, the presentation by Drs Wohler, Martinez and Verazay of the Instituto Nacional de Investigación y Desarrollo Pesquero, Mar del Plata, Argentina titled “A new approach to control and management of the Argentine fishery for Patagonian toothfish” was awarded the prize for the best poster<sup>4</sup>.

### **2.4 Technical workshops**

The technical Workshops were convened Thursday–Saturday, 27–29 November 2003, Three Workshops were convened at Otago University, Dunedin and the forth, on deepwater chondrichthyans, at the Marine Biology Station at nearby Portobello, Port Chalmers. These workshops addressed the following topics:

- i. Assessment and Management of Deepwater Fisheries (Appendix III)
- ii. Conservation and Management of Deepwater Chondrichthyan Fishes (Appendix IV)
- iii. Management of Small-Scale Deepwater Fisheries (Appendix V) and
- iv. Marine Bioprospecting (Appendix VI).

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<sup>4</sup> FAO 2005. Proceedings of DEEP SEA 2003. FAO Fisheries Conf. Proc. 3. In print.

The first and third of these workshops were undertaken by the Fisheries Department of the FAO; the second Workshop was jointly undertaken by the Department for Environment, Food and Rural Affairs, U.K., the IUCN and the FAO. The Workshop on Bioprospecting was held under the aegis of the Institute of Antarctic & Southern Ocean Studies, the Antarctic Climate & Ecosystem Cooperative Research Centre and the Centre for Law & Genetics, of the University of Tasmania. The outcomes of these workshops were reported to the DEEP SEA 2003 conference in Queenstown as part of the summary proceedings.

### **3. CONFERENCE RESULTS – SYNTHESIS OF ISSUES**

There was general recognition by the Conference participants that the national and international track record in managing deep-sea fisheries is, in many cases, poor. This is the consequence of the significant deficiencies in the knowledge of the biology of deep-sea fish species and functioning of deep-sea ecosystems, and even the knowledge of the amounts of catch, locations of fish harvesting and amounts of fishing effort. It was also apparent that complementing these inadequacies in the knowledge base are deficiencies in decision-making, governance, implementation of management and conservation measures, and compliance with requirements for sustainable and responsible fisheries. However, it was recognized that rapid action may enable remaining deep-sea fishery resources to be harvested in a sustainable manner and enable protection of deep-sea biodiversity. To do this, it was agreed that the lessons that are evident from past mistakes must be taken and current management approaches changed.

#### *Can't manage without data*

It was recognized that the available information on deep-sea fisheries and the deep-sea environment is poor but is improving. And, it has become apparent that there is more variability in deep-sea species and the deep-sea environment than has widely been assumed. But, it was rapidly apparent that developing technologies for obtaining and managing information now offer new opportunities to obtain data and for extracting essential information. However, acquiring good information on, and from, the deep sea remains costly and this is a particular challenge for developing countries. The distinction was also made between the ability of fishing operators to provide data – of this there was little doubt – and the mechanisms of providing data, which are well established, though not sufficiently well used. It was agreed that the obligation to provide data for management purposes must be accepted as non-negotiable on both the part of governments of the flag States and the industry themselves. Governments must provide moral and legal support to ensure that the data needed for management *are* provided and undertake the necessary coordination to ensure this happens.

Thus, it is essential that researchers ensure that the right information is collected and those in the research community should enhance collaboration with the fishery industry and those in non-fishery disciplines in gathering such information. It was agreed that the technique of meta-analysis appears to be useful in using information from relatively data-rich fisheries to inform those responsible for management of data-poor fisheries in a cost-effective manner.

#### *Full documentation of fishery activity and national requirements for confidentiality of data*

Fisheries managers and assessment scientists noted that the basis for successful resource management is the complete documentation of fishing activities – catch success (species and catch volumes), knowledge of the location of fishing activities such that catches can be attributed to appropriate management units, or fish stocks and information on the general level of fishing effort. However, it was noted that interpretation of effort data in many deepwater fisheries, especially those centred on seamounts, was far from straight forward. Because of the limited areal scale of the stocks targeted by many deepwater fisheries, many are prosecuted by only a few vessels, and perhaps only one or two from a single country. This complicates the provision of detailed data and, at a minimum, requires mechanisms of governance that industry members can trust to safeguard their commercial competitiveness – a challenge that has not always been met.

*Different fisheries – Many of the same problems*

As with other fisheries, deep-sea fisheries occur both within areas of national jurisdiction, as transboundary and straddling resources and in high-seas areas. In this context, it was recognized that the problems posed by the management of deep-sea fisheries are not as different from other fisheries as has often been assumed, and indeed many of the problems that arise in the management of deepwater fisheries also plague the effective management of many shallow-water and coastal fisheries. Not least among these is, commonly, the absence of reliable catch, effort and related data in sufficient detail to allow effective resource management.

But, there remain significant differences that influence the ability to manage fisheries at great depths. One fundamental difference is the high proportion in deepwater fisheries of long-lived species that have an inherent low biological productivity, which makes them vulnerable to overfishing. A second fundamental difference arises from the locations in which these fisheries are prosecuted (i.e. deepwaters and usually high-seas conditions), so that obtaining the information needed for their management is expensive. The Conference noted that a further problem, common not only to deepwater fisheries, is that irrespective of the ability to ensure compliance with management regulations, harvesting rules usually did not exist outside of the most general terms of the UNCLOS.

*Harvest optimism versus management precaution*

There was common agreement that assessments of the potentially available yields from deep-sea fisheries, characteristically, have turned out to be too high. As such, this indicated a systemic failure in the assessment procedures of deepwater fisheries resources that has gone beyond justifiable optimism. In some fisheries, there have been attempts to apply a precautionary approach to the regulation of the fisheries but, in many cases, the results that followed showed that the degree of risk aversion was not enough. Many actions were going to be necessary to address these failures. Use of meta-analyses in situations where data were meagre and insufficient to demonstrate an appropriate management action would enable the database to be broadened and the benefit of information from other similar fisheries to be used. There was common agreement that the consideration and testing of hypotheses must be broadened to include a range of different resource status possibilities, and results of analyses should be referenced to external and better known situations so as to provide better indications of how to address these issues in future.

There was some confidence that based on our experience of managing deep-sea fisheries and with the application of high levels of caution, it should be possible to manage larger deep-sea fisheries in a sustainable manner. However, without a significant increase in the level of information, there is little confidence that relatively small fisheries for low productivity species can be managed sustainably. Deep-sea sharks are good examples of such species and there was a strong view that the disposition of fishing effort should be directed so that these species are avoided.

There is considerable concern about the adverse effects of fishing on the deep-sea environment. The effects of fishing have been observed in some instances and, in some habitats, are severe. However, the difficulty and cost of obtaining information on the effects of fishing in deep-sea environments means that we have only a poor understanding of the extent and importance of such adverse effects. It was apparent that much deep-sea fishing is directed at fish locations that have been detected after searching operations and which occur in restricted areas. While the effects of such fishing upon benthic fauna may be severe, it also appears to occur in relatively restricted areas. Less information is available on the extent of 'extensive' deepwater bottom trawling where long tows are undertaken that are not particularly directed at fish aggregations that are first located before shooting the gear. More information is required to define and delimit this problem so that the proposals to restrict, or, ban deepwater trawling can be better assessed given that there are strong views that at least some areas should be protected from the effects of fishing, irrespective the degree of understanding of the impacts of fishing.

There are examples of inadequate management and decision-making and attempts to redress these in respect of deep-sea fisheries. Within national jurisdictions some authorities have acted too

slowly to collect and analyse data, and to protect deep-sea fisheries and the deep-sea environment from the adverse effects of rapidly developing fisheries. In other jurisdictions, e.g. in the Tasman Sea, after initially mixed success, several states have converged on what now appear to be satisfactory management procedures and harvesting strategies, but the long term results remain unclear.

#### *Gaps in coverage*

Many presentations noted the conservation problems arising in areas where there was no formal mechanism for management of deepwater resources. The UNCLOS provides only a general basis for conservation and management of all marine living resources and requires that states cooperate in managing high seas fisheries. The 1995 UN Fish Stocks Agreement, an implementing agreement for UNCLOS, provides sound general principles that reflect an ecosystem approach and endorses a precautionary approach to fisheries management. It covers deepsea fisheries insofar as they are straddling stocks, of which there are a number. It leaves a gap, however, with respect to deep-sea fisheries that exploit stocks that are neither straddling nor highly migratory, such as discrete stocks associated with seamounts. The UNFSA is itself implemented through regional fisheries management organizations RFMOs and other regional arrangements. While some of these have a mandate to cover deep-sea fisheries, others do not. Further, there are significant geographic gaps in RFMO coverage of these fisheries.

Because the deepwater resources in areas where there is no formal management mechanism have often been heavily fished, continuing interest in remaining in the fishery has usually declined and often there were few remaining participants. While the result – few participants – would facilitate coming to an agreement on a management mechanism, the total value of such fisheries has also been much reduced so that the ratio of management costs to the value of the fishery has become high.

It was agreed that it was important to identify and document all areas of deepwater fishing activity so as to identify those deepwater resources that are not subject to any management regime. This would provide a basis for determining the urgency of addressing this problem and the potential costs from failure to do so.

#### *Failure of States to implement their high-seas obligations – IUU fishing*

A reoccurring theme through out DEEP SEA 2003 was the failure of so many vessels to provide information adequate for the purpose of successful resource management. Where management protocols existed, the Conference heard of the various programmes that were addressing this issue and the general basis for optimism that the size of this problem was being diminished. However, the weaknesses of the existing UNCLOS mechanism were raised on many occasions. And, in the cases where there were no management agreements, it was agreed that such fishing is more appropriately referred to as LUU, legal, unreported and regulated fishing. Such observations underlined the need to review the coverage of existing agreements to identify those stocks most vulnerable to depletion because of the absence of a management agreement.

#### *Who is to pay for management?*

The Conference noted that management of deepwater fishery resources requires undertaking all of the conventional administrative activities involved in fisheries management. Data on fishery operations must be collected, reviewed, put into databases and analyzed, all on a timely basis. As many deepwater fisheries occur on the high-seas, appropriate governance institutions are required and agreements must be reached on satisfactory funding mechanisms. Several new deepwater fisheries have been characterized by large, but transient, fishing fleets, though subsequent fishing activity may be undertaken by only a few vessels flagged to a relatively small group of countries. Such 'boutique' fisheries have relatively high management costs given the full suite of management activities that are required

Reaching agreement on how management will be funded, and how much, takes time, often much longer than the initial high-catch period of the fishery lasts. Further, as the Conference heard on several occasions, the UNCLOS, the major existing agreement on management of deepwater

resources, does not bind fishing countries to effective implementation of the agreement if their governments choose not to ratify relevant agreements. Participants at the Conference regularly returned to the need for inclusive international agreements to address this requirement, both for funding requirements to be satisfied and to achieve management objectives.

#### *Duty to cooperate*

A major issue discussed by the Conference dealt with the requirement of the UNCLOS that states prosecuting deepwater fisheries on the high seas have a duty to cooperate in the management of the fisheries. As has been noted, the Conference was confronted with the issue of how this could be best done, e.g. through existing regional fisheries management organizations or through the creation of new management bodies in areas where no agreements existed for management of deepwater resources and where such fishing might be anticipated if it was not already taking place. To the extent that the existing UNCLOS agreement was considered insufficient to ensure implementation of effective management practices, some participants were of the view that entirely new agreements and conventions were required, while others at DEEP SEA 2003 noted the length of time that had been involved in reaching accord on the present agreements and were of the view that it would be better to revise and build on the existing conventions. There was also discussion of extending the UNFSA to cover all high-seas fish stocks, including discrete stocks so that its principles and the precautionary approach could guide establishment of more specific management arrangements for particular deepsea stocks.

A particular concern was how to create systems of incentives that would best ensure that fishing countries would support necessary management arrangements and, at a minimum, not undermine the intent of those that already exist. The views of participants were divided as to what could be achieved with voluntary agreements, especially in the face of the incentives to 'free-ride' on those operators who choose to, or were required by their flag State to fish responsibly and accurately report their fishing operations data, etc.

## **4. CONFERENCE THEME REPORTS**

### **4.1 Theme 1: Environment, ecosystem biology, habitat and diversity, oceanography**

#### *Issues and problems*

Talks and posters on this theme covered a wide range of topics including physical oceanography, oceanographic variability, habitat mapping, canyon productivity and deepwater biodiversity research. The presentations covered a wide range of geographical areas and taxa.

The effects of a range of oceanographic factors on fisheries were highlighted. An important factor that was identified is the variability of deep-sea fisheries habitats, which appear greater than has typically been assumed. The currents, ultimately driven by the weather, interact with the seabed to form a variable and dynamic deepwater fisheries habitat. Thus, deep-sea habitat variability occurs on a range of scales and affects the distribution and biology of deep-sea fish species.

Many important biological characteristics of deep-sea species and deep-sea ecosystems were noted. Deepwater fishes exhibit a wide variety of life history strategies including adaptations for long-lives and slow growth, but much variability among species is apparent. Thus, it was stressed, the productivity and vulnerability of different deepwater species to overfishing will vary. Vertical migration of mesopelagic fishes is an important means of energy transport from surface, photic waters to deeper levels, which reduced the impact of low *in situ* productivity on resident fish populations. Despite this, low food availability limits deep-sea productivity.

Advances in fishing technologies and efficiency mean that deep-sea species now have few refuges from fishing. However, the increased precision of fishing operations may also hold potential for sustainable management of deep-sea fisheries. Fish that escape from fishing nets and discards are

unlikely to survive and, therefore, the effects from fishing on target and non-target species are not represented solely by the catch that is retained.

One of the characteristics noted that distinguishes many deepwater species was the importance of spatial scale. Deepwater fisheries often targeted highly localized aggregations so that prosecution of the fishery proceeded, at first, as a progression of highly targeted aimed trawls, perhaps of a few minutes duration, resulting in a series of serial stock depletions followed by a period of extensive trawling of low density fish populations. Estimates of population sizes based on raising small areas that are sampled as a fraction of the total habitat area are susceptible to scaling errors. However, if data of depletion studies were carefully collected, the results may be applicable to other areas to provide estimates of abundance.

### ***Needs for moving ahead***

It was noted that administrators must recognize the variability of deep-sea fisheries habitats, despite the scale and long-term nature of some of these changes that makes them so difficult manage. Appropriate scales should be used in decision making for different aspects of management and it is important to adopt an ecosystem approach to address environmental effects on deep-sea fisheries and especially the effects of deep-sea fishing on the environment. This approach should address trophic linkages and energy flows, bycatch and fishing impacts on the benthos, the importance of spatial scale to ecological and oceanographic processes, distributions of habitats and species, and production processes.

Innovative uses of technology – including *in situ* analytical, and laboratory studies – can reveal much about deep-sea species and ecosystems, which are generally difficult to study. Appropriate use of this technology will allow evaluation of the effects of environmental variability and its changes on fisheries. Though collecting detailed information over large areas of the deep seas is costly, there are opportunities for fisheries managers to work with the fishing industry and others to collect the required information and it was clear from their representatives at DEEP SEA 2003 that the fishing industry was willing to collaborate with resource analysts and facilitate such data collection. There was agreement that a synthesis and review of current information gathering programmes and projects on a global basis would assist those who are involved in trying to provide a coherent and integrated source of information. One such programme was the Census on Marine Life.

## **4.2 Theme 2: Population biology and resource assessment**

### ***Issues and problems***

Presentations during this theme session drew from a range of deep-sea fisheries examples to highlight current issues and developments in the understanding of population biology and resource assessments. From the presentations during this theme it was possible to identify essential information requirements for undertaking assessments of deep-sea fish resources. Among the sorts of information needed were:

- clear articulation of management objectives and identification of the information required by management to achieve their objectives
- accurate and timely catch data, provided by, e.g. logbook and marine observer programmes
- time series of abundance indices based on a variety of methods
- species' stock structures and related distributional information
- life history information needed for resource management – maximum age, fecundity, growth rates, age and size at maturity, etc.
- population age-frequency information and
- knowledge of density-dependent processes – recruitment, growth, maturity, etc.

Presentations noted that many of the functional requirements for management of deepwater resources were similar to, or identical, with those of traditionally exploited species in shallower habitats. However, the usual problems that are encountered tend to be more extreme and thus more

difficult to resolve, not least because of the often great depth ranges involved which, e.g. exacerbates the difficulties involved in doing resource surveys, or the extreme ages of some deepwater and other fish population biology characteristics.

### *Needs for moving ahead*

The papers presented during this theme session highlighted a number of directions for future biological investigations and avenues for development of resource assessment techniques for deep-sea species. Stock resource assessments need to avail themselves of a range of technologies and analytical methods. The results from such surveys should explicitly consider uncertainties and alternative interpretations of information. However, it was stressed that modelling is not a substitute for analyses based on good quality and sufficient amounts of data, collected following acceptable scientific procedures.

It was noted that more information on predator-prey interactions and energy flows is needed to understand the dynamics of deepwater fish stocks and improve their management. For example, are deepwater species “sustained” by advected organic material and if so, to what extent? There is also a need in management to consider mixed-species fishery assemblages rather than focusing on single-species perspectives and assessments. And, information must be obtained on a wide range of species – even those that are not currently subject to exploitation. It was agreed that there is considerable potential for the improvement of data collection through collaboration between fishery resource analysts and the fishing industry. Such cooperation would be important for ensuring the credibility, with industry, of data that are used in assessments and setting of TACs. Where possible, verification of operations data by marine observers should be encouraged.

Participants were informed that there is potential to use methods of meta-analysis for data-poor and developing fisheries. Use of this technique may help to show how to avoid repeating the same mistakes that were made in harvesting decisions in the early years of other deepwater fisheries. Examples include predicting abundance and distribution from physical oceanographic characteristics and inferring productivity from life-history parameters. Meta-analyses may also help in better evaluation of management options such as using deep-sea marine protected areas (MPAs) as a means of conservation. Of particular importance is the issue of what to do when there is insufficient data to provide confident scientific advice on which to base management decisions. The question of what managers and decision-makers should do in such situations was left unanswered.

The Conference agreed that future research will need to support the move toward ecosystem-based management, application of the precautionary approach and multi-species management. Increased collaboration between scientists will also be important if the data needed for management is to be obtained in a cost-effective manner.

## **4.3 Theme 3: Harvesting and conservation strategies for resource management**

### *Issues and problems*

Papers in this theme described experiences in managing a variety of deepwater fisheries. A number of issues and problems were identified.

Experience has shown that it is easy to over-estimate the productivity of deep-sea fisheries – as demonstrated by many situations of excessive initial harvesting rates despite managers trying to be precautionary in some cases. This was partly a result of the lack of information about the productivity of deep-sea fish stocks and may, in part, also result from the “delusional optimism” of scientists, managers and decision-makers. Institutional inertia may result in retention of existing management measures despite their poor performance and the need for change. An example of a weak information situation is that of the difficulty of distinguishing the effects of fishing down of a stock from those of the fishing down of intermittent fish aggregations, fish dispersal or other behavioural effects.

Critical to management of deepwater fisheries is the development of a strategy that covers all aspects of the fishery, from the science through to selection of policy choices and including a framework for implementation and governance. It was noted that there are successful and functional examples of all of these management components as well as many cases of non-functional programmes that fail to achieve their requirements. Implementation of a management strategy requires appropriate governance – something that is lacking in most deep-sea fisheries in high seas areas. Without an effective governing agency it will be difficult to increase management capacity, implement the precautionary approach, develop effective science programmes and protect marine areas. One commonly neglected component of implementing a management strategy that was noted was the assessment of environmental risks posed by a deep-sea fishery.

The importance for management strategies to incorporate both ecosystem and precautionary approaches was stressed and while a number of fishery management agencies have adopted the precautionary approach, few of them have implemented it in a comprehensive manner. The CCAMLR provides a good example of practical implementation of the precautionary approach although it was noted that this has taken 20 years and is still a work in progress. An important element of the precautionary approach is to ensure that fisheries are developed in a phased, controlled manner. Development stages can include setting management and conservation principles for reviewing and experimenting in the exploration and establishing of new commercial fisheries. There exist a number of examples of such strategies for developing fisheries.

Evaluation of management strategies gives the opportunity to test tactics prior to implementation of a fishery or a harvesting protocol. Such approaches involve agreeing on objectives and goals, setting evaluation criteria and comparing different strategies on a quantitative basis using, if necessary, simulation techniques. Importantly, such approaches allow stakeholders to consider the various management trade-offs in an explicit and quantifiable manner.

### ***Suggestions for the Way Ahead***

The examples presented to the Conference clearly showed the need for the immediate development of strong management frameworks to be widely applied to deep-sea fisheries. They should include a strategy evaluation, external input from experts, risk assessment, and national and international governance frameworks for resource management. New tools that enable better strategy assessment should be applied and these should include phased fishery development strategies, ecological risk assessment, management strategy evaluation, and use of external references.

## **4.4 Theme 4: Technology requirements**

### ***Issues and problems***

Deep-sea science is largely technology driven – mostly from developments for geophysical and military applications. The deepwater fishery management community needs to look at technologies from all other sectors for use in fisheries. Fisheries and biological applications are often under-funded and in many cases there is insufficient and unreliable data to support decision making. The focus of future efforts must be to provide the information necessary for management. Four main areas were identified where new technology can help management of deep-sea fisheries.

- i. In respect of data, technological advances enable catch data to be made available almost instantly. Such technology also allows more precise information describing fish abundance – both relatively and absolutely and provides additional information on species distribution (including environmental “hot spots”), and benthic habitats. Fish metric information is important for management of deep-sea fisheries but modellers often do not effectively use all such available information.
- ii. There are particular opportunities for collection of oceanographic information by collaboration with the geophysics sector.

- iii. The major development of stock assessment models, computer capability, and modelling wizardry has significantly changed the nature of stock assessments over the last 20 years.
- iv. There have been significant developments in the nature of scientific platforms available for fisheries research. Examples include:
  - instrumented commercial fishing vessels (management authorities are only just starting to use this opportunity)
  - autonomous underwater vehicles and remote-operated vehicles, which are being used more extensively and, though still expensive, their costs are falling
  - manned submersibles
  - landers and floaters
  - instrumented moorings for geophysics-oceanography and
  - satellites.

Technological developments have allowed major advances in scientific methods and surveillance of fisheries. Participants were told that advances in geo-location have changed all types of marine-related research. There have been major advances in multi-frequency and broadband technology acoustics and in reducing associated problems such as measurement of fishes' backscattering cross sections, bottom-echo related shadow zones and improved species identification. Multi-beam mapping is becoming common and improvements in underwater camera and video technology are changing the way all think about deep-sea habitats. Advances in capture technology (e.g., smart, instrumented nets and habitat-friendly fishing equipment) are opening the way for significantly reducing the environmental effects of fishing. Electronic tagging of fish and vessels provides opportunities for new research, and satellite monitoring of vessel positions has enhanced the extent of fisheries compliance.

#### ***Suggestions for the Way Ahead***

The session concluded that deep-ocean science must become more collaborative among all stakeholders and across all borders, among institutions and between disciplines and commercial activities. It is necessary to be innovative to lower costs of data collection and analysis. New technology, if used correctly, would facilitate stakeholder involvement in data collection such as the use of acoustic fish-resource surveys by commercial vessels during or between fishing operations. However, managers, it was stressed, should be wary of relying entirely on virtual data in making management decisions.

### **4.5 Theme 5: Monitoring, compliance and controls**

#### ***Issues and problems***

Achieving acceptable levels of compliance with fishery regulations is an essential component of any effective management regime. Therefore, fisheries management regimes must include strategies to achieve individual, industry and state compliance. Without the necessary incentives to comply, enforcement will be expensive and, or, problematic. Experience shows that fishers' compliance is best achieved through maximizing voluntary compliance together with imposing an effective deterrent - "the big stick". Further, compliance must comprise more than just enforcement; rather it must be an inherent part of all components of the management system.

Vessel monitoring systems (VMSs) can be used to both detect and deter offending. Until recently, it was unclear if VMS evidence alone was sufficient to support a prosecution. The Conference heard that in a recent case in the USA the court found VMS data to be accurate and reliable. This did not prove that illegal fishing has occurred but it did provide a precedent for the acceptance of the reliability and accuracy of VMS information as an evidentiary tool. It was noted that there is a wide range of surveillance tools, types of vessels and technology available to detect and deter offending and ensuring the inter-operability of these systems is an important consideration since this reduces costs.

The ability to detect and prosecute fishery offenders retrospectively offers additional opportunities to detect and deter offending. However, this approach requires specialist skills and expertise and thus training. However, real time monitoring is still needed to detect activities by fishers operating without legal authority and those whose vessels do not carry VMSs. It was noted that the opportunity for legal fishing operators to report on possible illegal, unreported and unregulated fishing (IUU) operations may prove a cost-effective contribution to surveillance, especially in remote areas such as the Southern Indian Ocean.

Compliance and enforcement was noted to be growing increasingly complex and sophisticated as the nature of fisheries crime is such that it evolves to continue to evade detection. As a result, specialist multi-disciplinary teams are being employed. To ensure effective investigations, compliance and enforcement officers need to work cooperatively with researchers and fisheries managers. Consideration must be given to the incentives and penalties associated with management regimes since these have an important effect on compliance. The importance of educating the judiciary on the necessity of enforcing fishery regulations and the consequences of the environmental effects should this not be done was also noted as a means of encouraging them to impose adequately deterrent, though justifiable, penalties.

Inconsistency in sentencing was noted as a major impediment to deterrence, as it turns the court experience into a lottery rather than a certainty. One example of such inconsistency is whether the environmental impacts of illegal fishing are appropriately taken into account by the judiciary when the resulting levels of sentencing are lenient.

### ***Suggestions for the Way Ahead***

In respect of compliance by fishers, there is a need to ensure appropriate expertise is available to enforcement agencies. It is also important to educate the judiciary on the significance of the environmental and fishery impacts to encourage the setting of sufficiently deterrent penalties. Issues that were identified as involved were:

- the principle of State self-interest
- the principle of perceived merit and
- the principle of capacity to comply.

It was stressed that it is important to aim at achieving a regime that remains equitable and fair over time.

## **4.6 Theme 6: Review of existing policies and instruments**

### ***Issues and problems***

Descriptions of management approaches for deep-sea fisheries by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), and the European Community, and orange roughy fisheries in Namibia, New Zealand, and the South Tasman Rise were presented. In all cases, management problems were found to exist though there were success stories too.

The CCAMLR has been working for many years on management measures for deepwater fisheries that embody ecosystem and precautionary approaches. The Commission has developed practical mechanisms to apply these approaches and this work is continuing. In contrast, the European Community has only recently attempted to manage fisheries in particularly deepwaters despite earlier scientific recommendations from the International Council for the Exploration of the Sea (ICES).

The South Tasman Rise orange roughy fishery management agreement between Australia and New Zealand, which was described, contains an innovative decision rule that recognizes alternative resource status hypotheses that allow for the assumption that there maybe intermittent aggregations of the fish. The default harvesting rule is to set the total allowable catch based on the worst-case

scenario. This allows for increases in catch levels should a more optimistic hypothesis be shown to be correct.

Management of Namibian orange roughy was designed from the start of the fishery to incorporate a precautionary approach. Catch limits were area-specific, an areal spread of fishing effort was required, and harvest decision ‘triggers’ were established to respond to when new aggregations of fish were found. However, catches and catch per unit effort (CPUE) declined and, over time, it was realized that even the precautionary catch limits were too high. Two of the three fisheries were closed for a period. The lesson here was that extreme caution is required when using initial estimates of biomass based on little information. However, the future management of these fisheries looks promising.

Major changes in estimates of abundance of New Zealand orange roughy fisheries were reported due to changes in assumptions used in the assessment methods, the data collection methods used, and changes in the methods of analysis during the development of these fisheries. This led to questions about the credibility of the assessments because of new data and the availability of new analytical techniques for what were the world’s first major orange roughy fisheries. Reliable biomass estimates were not available until the 1990s, at which time appropriate management measures were implemented. As with Namibia, despite the best intentions, permitted catch levels was set too high causing a reduction in biomasses to undesirable levels of a number of stocks.

Experience is showing that it should be possible to manage larger orange roughy stocks sustainably, but for smaller stocks this may prove more difficult. Meta-analyses of seamount fisheries were proving useful for setting initial guidelines for new fisheries. It was noted that information on the impact of fishing on recruitment would not be available for at least 20-30 years. Concerns were raised whether the property-rights approach in New Zealand was appropriate for orange roughy fisheries due to absence of considerations of wider environmental values and the propensity to “mine” the resource due to its low production rates and thus low rates of sustainable yield.

### ***Suggestions for the way ahead***

Experience shows that high levels of precaution are required to manage deep-sea fisheries if sustainable fisheries are to be achieved. Advice needs to properly reflect the known uncertainties in the data and allow for potential unknown uncertainties. Several participants noted that deep-sea marine protected areas may prove a valuable tool in protecting deep-sea biodiversity in the areas of these fisheries.

## **4.7 Theme 7: Governance and management**

### ***Issues and problems***

While there was general agreement of the need to improve multi-lateral governance of deepwater resources, varying views were expressed as to the “what?”, “where?”, and “how?” in making such improvements. In relation to “what?”, a decision must be made on whether changes in methods of governance should focus on deep-sea fisheries alone or on all activities that may affect the deep sea - especially its biodiversity. In this regard it was noted that a wide range of anthropogenic activities might affect the conservation of deep-sea biodiversity. In relation to “where?” the views of the participants ranged from an exclusive focus on the high seas, to that of including the continental margins and national EEZs. However, it was noted that conservation concerns will apply to both the high seas and EEZs, especially where straddling deepwater stocks are present. In relation to “how?” there was a convergence of views that it should be done within the framework of the UNCLOS but a variety of legal mechanisms were suggested. Options that were identified included (a) new binding treaties, (b) new soft law agreements, (c) amendment of the LOS from 2004 and (d), implementation of new agreements.

Each option has advantages and disadvantages including the length of time taken to achieve an outcome, the enforceability of agreements and the likely level of support by States. It is possible that

pursuing a number of options simultaneously would allow the most progress to be made. There may also be a need for interim and longer-term solutions.

A number of suggestions were made concerning improving the performance of regional fisheries management organizations (RFMOs). These included different forms of peer review of RFMOs, and to make an organization (e.g. the COFI, or the Meeting of Regional Fishery Bodies, which meets in association with COFI), accountable for coordinating RFMOs and facilitating cooperation between them on this issue.

Many noted that too few countries have signed the United Nations Fish Stocks Agreement<sup>5</sup> and the FAO Compliance Agreement<sup>6</sup> to be confident that they will be implemented though it was agreed that broader ratification and implementation would go a long way to improving governance of high-seas fishing areas. It was noted that IUU fishing on the high seas is not in fact illegal if the respective flag states have not signed the relevant regional agreement. Therefore, it may be difficult to exclude non-party fishing operators from these fisheries. Further, the ability to coerce non-party States by trade sanctions may be limited. It was agreed that States should look for points of leverage to deal with flag of convenience States. It was also suggested that the value of high-seas deep-sea trawl fisheries may not be as high as generally portrayed and that deep-sea catches make only a small contribution to the world's food security. Therefore, the consequences of restricting such fishing may be relatively small overall, although for particular countries it may be significant.

In order to secure cooperation from non-party states it will be important to address the allocation of fishing rights and benefits – especially among developing countries. Currently there is no global oversight to determine, or regulate the priority of access to harvests and to ensure that benefits are shared equitably.

It was also further noted that among the wide range of issues affecting the world's marine fisheries, concerns about the management of deep-sea fisheries has been relatively recent and the issues to be addressed in this regard are not the most crucial. However, there was agreement that fishing pressure on deepwater stocks would continue to grow and that it was generally easier to implement effective management regimes before the emergence of crises over the sustainability of resources and the need for emergency management and regulatory actions.

#### **4.8 Synthesis and the way ahead**

The purpose of this, the last panel session of DEEP SEA 2003, was to provide a range of syntheses of the Conference presentations anchored from three of four general perspectives. The first three panellists presented their views as active administrators of fisheries, one of the panellists works in a national department of fisheries, the second in a regional marine-orientated ecological consortium and the third as the chief administrator of a regional fisheries body. Their presentations were followed of those by three lawyers, staff at respectively at an intergovernmental marine organization, a global conservation and biodiversity body and a university renowned in the field of marine law. Last, and certainly not least, two fishing company executives, one the chairman of a major national fishing industry group, both widely known as leading advocates of enlightened approaches by the industry to matters of fisheries management, provided the perspective of those who must “meet a payroll”.

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<sup>5</sup> *The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks* (in force as from 11 December 2001).

<sup>6</sup> *The FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas*. The agreement entered into force on 24 April 2003 with the acceptance by Republic of Korea as the 25<sup>th</sup> depositor of the instrument. As of 14 October 2004, the total number of instruments of acceptance, including one international organization, stood at 29.

To provide focus to the Way Ahead and Wrap-up Sessions the moderator asked the speakers to specifically address:

- what needs to be done
- how we might go about doing it
- informing decision makers
- how we may attract and secure funding for programmes
- identifying the international and regional scope of what is to be addressed and
- what must be done to identify, articulate and document the future process?

Because these presentations did not form part of the formal proceedings of the Conference and will not be in the Conference proceedings, their presentations have been given particular emphasis in this Report.

***An Administrator's View I: – Dr M Sissenwine, National Marine Fisheries Service, USA***  
*Important Science and Governance Issues*

Dr Sissenwine's perspective posed the question, based on the few decades experience, are deep-water fisheries just beginning, or are they coming to an end – a sunset or sunrise? He noted (a) the opportunity that deep seas provided of economic benefits, food and employment, (b) the risk, of overcapacity and economic loss from stock failures, damaged ecosystem and lost public confidence in the relevant management agencies and (c), the challenge of economic viability for fisheries should management costs be internalized.

In this context he concluded that certain deepwater fisheries have been profitable and sustainable – so far and, certain other fisheries have been sustained, though little is known about their profitability. Some of the fisheries are unregulated, but where there has been regulation, it does not assure sustainability or profitability.

He noted the long-lived nature of deep-sea species, thus allowing them to sustain only low rates of fishing mortality. He also noted that, as demersal fisheries, they are often associated with a three-dimensional habitat that is susceptible to degradation when impacted by fishing gear.

His presentation also noted that many assertions were commonly accepted but that it was uncertain what confidence one could have as to their truth, e.g. that the deepwater stocks were vulnerable, that their fisheries were characterized by high degrees of biodiversity and endemism and that deepwater fisheries pose a particular threat to the functionality of their associated ecosystems. The distinction was made between *inappropriate fisheries management* and *inadequate fisheries management*. Also, there was a need for clarity in considerations of the effectiveness of marine protected areas between that of providing for habitat protection, maintenance of biodiversity and the needs of fisheries management.

In his presentation he recognized that management had often failed or functioned poorly: Fisheries often started without appropriate authorization so that information on fishing activities was not collected and control were not implemented, even where this might have been possible. Where it was, assumptions about stock productivity were optimistic resulting in the need for subsequent reductions in fishing activity. In the absence of necessary data, stock assessments were, at times, inconsistent and, for whatever reason, had a strong single-species orientation.

In looking ahead, it was stressed that progress in improving the science in support of the management of deepwater stocks and their governance must move in parallel and at several scales – national, regional and global. The science must better address issues of spatial scales, the dynamics of fish aggregations, their ranges and stock structures. Lack of knowledge about these topics was largely responsible for uncertainty about the validity of common assertions about deepwater fisheries. For example, how can we know that deepwater stocks are vulnerable to overfishing without knowing the relationship between aggregations that are fished and their stocks? In terms of management science,

the challenge is to develop strategies that are robust uncertainty and that complement appropriate operational procedures and management evaluation procedures. On a global institutional basis, this will require embracing existing initiatives such as the FAO Strategy for Improving Information on Status and Trends of Capture Fisheries, and global scientific programmes such as the Census of Marine Life whose scope goes far beyond that of only fisheries. This challenge can profit from existing organizations on which they can build and, indeed, it may be time to consider a new era of international deep-sea expeditions.

In terms of the challenges for governance Dr Sissenwine noted that many critical initiatives are in play, e.g. implementing the FAO Agreement on Compliance, embracing the Ministerial initiative on “IUU” fishing, finding acceptable dispute resolution mechanisms and preparation of technical guidelines for the management of deep-sea fisheries. Existing protocols too, need to be given effect, e.g. the FAO Code of Conduct and the Precautionary Approach in national EEZs, by RFMOs and on the high seas. States and RFMOs need to find ways of regulating deep-sea fishing so that it occurs only when authorized and is subject to ecological risk assessment and precautionary development plans. Means must be identified to require all vessels fishing on the high seas to be equipped with vessel monitoring systems. And, independent audits of the performance of RFMOs will help identify substandard practices, but here a question left by Dr Sissenwine was, will governments find the political will?

In terms of protocols, the Conference identified the question of the sufficiency of existing arrangements and whether the UNCLOS, the UNFSA, and existing RFMOs provided the necessary basis to successfully address the challenge? Or, Dr Sissenwine asked, must the UNFSA be extended, or new RFMOs created, or should there be a UN resolution call for a moratorium on highseas deepwater fishing? If marine protected areas are to be part of the way forward, then a new arrangement may be called for by which they can be implemented. He went so far as to raise a question about the viability of freedom of the high seas when it comes to responsible governance of high seas fisheries.

The way forward, in Dr Sissenwines view, could be an FAO Technical Consultation on deep-sea fisheries to appropriately address these issues and to define how important deep-sea fisheries are and whether resolving the management problems of these fisheries can avoid the legacy of the freedom of the high seas.

***The Way Ahead: An Administrator’s Perspective II – Dr Carlos Verona, DALTEC, Argentina***

Dr Verona noted the Sisyphean<sup>7</sup> task faced by those attempting to manage fisheries resources and those especially those found in deep waters. This metaphor he complemented with a quotation from Shakespeare – “*Being unprepared, our will became the servant to defect...*”<sup>8</sup>. His summary stressed the importance of the effective integration of all the elements of a fishery – the activity of fishing, the characteristics of the fishing grounds, interpretation of the events and results of fishing, the processing of information, the gaining of intelligence complemented by management that was effective, responsible and accountable. Further, these activities, he noted, were also involved a reverse integration with subsequent elements recursing in their effects on those that were earlier.

He endorsed discussions by Conference participants that the RFMOs should be provided all means to strengthen their activities. This might be done using such tools of strategic planning as:

- SWOT Analysis
- vision and mission articulation

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<sup>7</sup> Sisyphus, according to tradition, betrayed the secrets of the gods and chained the god of death so the deceased could not reach the underworld. He was punished by the gods who condemned him to ceaselessly rolling a rock to the top of a mountain, whence the stone would fall back. They thought this futile and hopeless labour to be the worst punishment.

<sup>8</sup> Macbeth. Act II. First Scene. Shakespeare, 1623.

- strategies assessment
- time horizons' analyses and
- analysis of legal compliance, client satisfaction, conformity with internal quality standards and continuous improvement.

In this context, Dr Verona noted that the International Standards Organization had prepared a standard (ISO 9000:2000<sup>9</sup>) that specifies requirements for a quality management system where an organization:

- i. needs to demonstrate its ability to consistently provide products that meet customer and applicable regulatory requirements and
- ii. aims at enhancing customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customers and application of regulatory requirements.

He extended his presentation by noting the interplay of prophecy, perceptions, the need for mental models and their interpretations, the need for action and the likely effects and consequences.

#### ***CCAMLR – Quo Vadis: View from a RFMO – Dr Denzil Miller***

Dr Miller focused his perspective of future governance issues on one of the most pressing issues confronting the members of the CCAMLR – the development of IUU fishing in the CCAMLR area, the challenges it posed and the solutions the Commission had identified to pursue. In describing these issues he drew on his experience as the Executive Secretary for the Commission, an organization of 23 member countries<sup>10</sup>.

In this task, he noted that the CCAMLR, as a regional fishery body, faced a variety of institutional issues. These he summarized as follows.

- *Loss of interest; complacency among some important stakeholders; erosion of priorities in the face of other global issues*

In the face of the persistence of many other global problems it was proving difficult to maintain interest and commitment to resolving the problems that the CCAMLR confronted. New emergencies and crises had arisen and diverted attention from finding solutions to those that had not already been resolved. An example has been the global attention given to the consequences of the "War on Terror". An effective response to this challenge required continuing emphasis on 'Service Delivery' by the Commission and the allocation of resources to promote public and political awareness of the need to resolve existing problems.

- *Status threat*

Many of the issues that confront the CCAMLR within its mandate fall, at least partially, within the mandate of other regional fishery organizations, United Nations agencies and inter-governmental and non-governmental organizations. This can result in an erosion of the perceived ability, or mandate, of CCAMLR to address issues that fall within its range of competency and which are also the objective of such organizations. One such example was the role of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in listing species whose

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<sup>9</sup>All requirements of this International Standard are generic and are intended to be applicable to all organizations, regardless of type, size and product provided. Where any requirement(s) of the Standard cannot be applied due to the nature of an organization and its product, they can be considered for exclusion. Where exclusions are made, claims of conformity to this International Standard are not acceptable unless exclusions are limited to requirements within Clause 7, and such exclusions do not affect the organization's ability, or responsibility, to provide product that meets customer and applicable regulatory requirements.

<sup>10</sup> Brazil, Chile, European Community, France, Germany, India, Italy, Japan, Korea, Norway, Poland, Russia, South Africa, Spain, Sweden, Ukraine, U.K, USA and Uruguay. Bulgaria, Canada, Finland, Greece, Netherlands, Peru and Vanuatu are parties to the Commission.

management falls within the purview of CCAMLR. Issues such as these require that CCAMLR members and its staff make a sustained effort to inform decision-making by relevant parties and assist in appropriate self-promotion by CCAMLR of its role. They also participate in the activities of related organizations to ensure CCAMLR's competencies are recognized and its mandate is well understood.

- *“Internal friction”*

CCAMLR consists of a fairly large number of members and one perception is that some members tolerate IUU fishing. This issue must be addressed through moral persuasion, the building of consensus among the Commission's members and by promoting support for penalties, such as the loss of landing and product discharge rights by those shown to have acted illegally or who have dishonestly reported their fishing activities. Related issues have been those of increasing compliance with regulations and the corresponding political will of members to do so – a function of the priority they assign to supporting the Commission's activities.

- *Shared mandate*

The CCAMLR is not the only organization that has international competencies in its mandated region and thus, in certain cases, it must consider its activities in relation to the activities of others. One such situation arises from *The Protocol on Environmental Protection to the Antarctic Treaty* (the Madrid Protocol). The CCAMLR's different approach to similar issues and problems may arise from its philosophy that reflects the Commission's particular emphasis and view, but it remains cognizant of the competition for limited resources from others and the need to consider their perspectives. The response of CCAMLR has been to promote and participate in dialogue where needed and to exchange staff and officer holders with corresponding organizations, e.g. the Chairman of CCAMLR's Scientific Committee has participated in the work of the Committee on Environmental Protection of the Antarctic Treaty programme.

- *Funding Constraints*

The increasing demands of the CCAMLR to service an expanding repertoire of problems face the constraints of limited funds. One consequence is an increasing shortage of new workers to address both existing and new problems and programmes. The response to this situation has been to implement a programme of education and outreach to improve dissemination of information. To mitigate this problem, the Commission has been endeavouring to source special funds and the possibility to have access to the proceeds of successful prosecutions for fishing infractions in its region of competence.

- *Transparency of the CCAMLR Process*

Because of the long-time commitment and involvement of most participants in the CCAMLR process there was been a view that the Commission acts as a 'Closed Shop' with a consequential perception that there is a lack of transparency as to how the Organization operates and how decisions are made. Again, the Commission's response has been to implement a programme of outreach, self-promotion, education and dissemination of information through an explicitly designed communications policy.

The Commission also faces a number of practical challenges. Among these is inadequate enforcement of regulations, though this has been mitigated by improved co-operation between members, notably Australia, South Africa and the United Kingdom. While such developments have been welcome, there is awareness that for many important fish stocks that have been depleted, this action has been too little and too late. Other issues that the CCAMLR faces, not unlike many other fisheries bodies, is the role of consensus in coming to agreement on important policy and operation decisions and the unavoidable complexity of many of the regulatory requirements. Two such initiatives are the Catch Documentation Scheme for Patagonian toothfish and the introduction of precautionary catch limits in management decisions.

It was noted that more effort must be addressed to improve the knowledge base for decision making in what are commonly situations of considerable complexity. This includes the fields of technology, science and the management of uncertainty. In tandem with the expansion of factors being considered has been increased expectations of delivery of concrete results by the Commission and the need to expand considerations to include that of economic values and intangibles such as heritage value. This in turn has led to the need to address the categorization of benefits. Other concerns in relation to governance have included the issues of member's self-interest, the capacity of the Commission to fulfil its mandate and means of assessing its performance through appropriate methods of appraisal.

***Governance and International Institutions – Mr Michael Lodge, International Seabed Authority, Jamaica***<sup>11</sup>

Mr Lodge, by way of his wrap-up presentation reviewed the mandate and concerns of the International Tribunal for the Law of the Sea. He noted that this institution was a specialist tribunal established to deal with disputes arising out of the interpretation and application of the 1982 Convention on the Law of the Sea.

Mr Lodge provided a succinct review of the current **Objectives of High-Seas Fisheries Governance**, which he saw as embracing the following critical points.

- International management of currently unregulated high-seas fisheries – many such fisheries remained unmanaged, not least because there was no current management regime or operational agreement by which harvesting of these fishery resources could be regulated.
- Conservation of high seas biodiversity – as many at the Conference had noted, there was an urgent need to implement means of protecting high-seas flora and fauna, especially where threatened by regulated and unregulated fishing operations.
- Promotion of marine science – it had been repeated several times at DEEP SEA 2003 that in many cases the knowledge required to confidently manage human activities on the high seas was weak or lacking and this situation required a new global initiative of ocean exploration, which would require greater commitment and more resources.
- Appropriate regulation of activities related to “bio-discovery” – exploration and commercialization of the unusual physiological and genetic heritage of the deep seas was raising legal issues that remained to be resolved.
- The legal regime applicable to the “Area”- the high seas, EEZ, continental shelf and continental margin – each of these areas, which may contain stocks of similar species, is subject to different legal conditions and may require their own particular approach.

What was needed, Mr Lodge noted, was an appropriate **Methodology**, which might be achieved through a Resolution on a Declaration of Principles. Such a Declaration should require:

- a universal application of the UNFSA principles to all high-seas fish stocks
- the prohibition of destructive fishing methods and, or, gear types pending an agreement on the international regulation of deep-sea fisheries on the high seas
- a commitment to a broad-based international programme of marine science that would benefit all with an interest in high-seas marine affairs and
- the establishment of an international process to consider options for the regimes that would regulate high-seas fisheries and marine scientific research, and design and implementation of mechanisms for the protection of high seas biodiversity.

For this what was required was a particular **Strategy for Governance of Fisheries**. This would involve:

- expanding the FAO Code of Conduct to cover deep-sea fisheries

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<sup>11</sup> Current address: Ministerial Task Force on IUU Fishing, OECD, Paris, France.

- expanding the coverage of regional fisheries management organizations so that their mandate covers the regulation of deep-sea fisheries in accordance with UNFSA model
- undertaking a performance audit of such regional management organizations to identify where management performance is deficient and why
- undertaking a global review of the accountability of regional fisheries management organizations, perhaps by the FAO or the United Nations and
- reviewing the mandate and the potential of the International Seabed Authority to determine if this organization might have a role in which it might contribute.

He noted that the 1955 Rome **Technical Conference on the Conservation of the Living Resources of the Sea** had addressed many relevant issues in the context of ocean exploration and in addressing high-seas fisheries issues. Many important issues were debated and in particular it was agreed that conservation and management of high-seas fisheries resources should only be done through international cooperation in research and regulation. Further, the best way of achieving this would be through establishing regional conventions based on the geographical and biological distributions of the marine fish populations concerned.

In terms of a **Strategy for Ocean Exploration**, Mr Lodge informed of the need to ensure that:

- the collection of samples for scientific and commercial purposes and associated activities should be sustainable and subject to environmental impact assessments
- a consistent approach at both the regional and global level to conditions for access and sharing of benefits should be followed and
- there should be access to the data, scientific knowledge and information obtained from high-seas ocean exploration regarding intrinsic scientific values in lieu of sharing of economic benefits.

In terms of a strategy for high-seas biodiversity, he felt it important that high-seas areas of particular scientific interest be identified for intensive international study and conservation, possibly using the International Seabed Authority as a mechanism for regulating such activities. In addition, the results should be used as the basis for global regulation to prevent and, or, minimize the loss of high-seas marine biodiversity.

***A Global Perspective – Ms Kristina Gjerde, Environmental Lawyer and High Seas Policy Advisor, IUCN Global Marine Program***

In establishing a framework for her presentation, Ms Gjerde noted the comprehensive structure of international agreements, governance mechanisms and declarations that were relevant to deep seas fishing activities beyond national jurisdiction. These institutions and agreements reflect global commitments to protect living marine resources and preserve the marine environment based on ecosystem-based and precautionary approaches. These include:

- the *United Nations Convention on the Law of the Sea (UNCLOS)*
- Agenda 21, Chapter 17 and the *Rio Declaration on the Environment and Development* adopted at the United Nations Conference on Environment and Development (UNCED) in 1992
- the *Convention of Biological Diversity*, created at the same Conference
- the *FAO Code of Conduct for Responsible Fisheries*
- the United Nations '*Fish Stocks Agreement*' relating to highly migratory fish stocks and straddling fish stocks
- the World Summit on Sustainable Development of 2002 and
- various United Nations General Assembly resolutions.

In this context, the *Convention on Biological Diversity* has particular relevance to the discussions of the Conference in the context of protecting the deepwater benthos beyond national

jurisdiction. Article 3 of the convention requires Parties “to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of national jurisdiction.”

For its part, the *United Nations Fish Stocks Agreement* requires Parties to:

- i. prevent overfishing
- ii. minimize the impact of fishing on non-target, associated and dependent species and ecosystems
- iii. protect habitats of special concern
- iv. apply the precautionary approach and
- v. protect biodiversity in the marine environment.

Despite this framework of responsibility for protecting habitats and biodiversity beyond national jurisdiction from fishing and other activities, the United Nations General Assembly has noted with increasing concern the need to improve the management of risks to deep sea biodiversity. In 2003, in Resolution 58, Paragraph 51 the UNGA “.....reiterates its call for urgent consideration of ways to integrate and improve, on a scientific basis, the management of risks to the marine biodiversity of seamounts, cold water coral reefs and certain other underwater features...” Thus, Ms Gejerde noted, there was clearly a need for urgent action to address the impacts of high seas bottom trawling on vulnerable deep sea environments, particularly seamounts and cold water corals.

However, before deep sea bottom trawling on the high seas can be effectively and sustainably regulated, there were several ‘gaps’ that require attention in (a) the field of fisheries biology, (b) institutions of governance, (c) enforcement of regulations, (d) participation by those with a stake in this issue and (e), application of current understanding of deep-seas ecosystems and biodiversity to deep-sea fisheries.

In terms of the science that is required, previous sessions of this Conference have demonstrated that fisheries biologists are only beginning to understand what they do not know. Information is lacking on what fish stocks are targeted and where; what their biomass- recruitment relations are; the extent and importance of bycatch (which is known to include particularly vulnerable and rare deepwater sharks and rays); knowledge of the deepwater fisheries habitat and how it is affected by fishing; and the nature of these ecosystems and their associated biodiversity. There is clearly a need for a comprehensive assessment of deep-sea ecosystems, biodiversity, affected species and their resilience to human impacts. It is also essential to better understand the relationships between deepwater ecosystems and pelagic species and ecosystems

In terms of the gaps in governance, Ms Gjerde noted that large parts of the oceans lacked a competent authority to regulate bottom fisheries, and in other areas, the authority had not yet been exercised. The level of commitment required to address unsustainable fishing levels and destructive fishing practices appeared to be lacking, other than perhaps in the Southern Ocean under the CCAMLR. There was also a record of poor compliance by fishing operators on the high seas accompanied by an inability of institutions to enforce regulations in such situations. Gaps in enforcement could arise from inadequate flag-State control over ships under their jurisdiction compounded by the inability of other states to enforce conservation measures on the high seas.

Another “gap” was that of effective participation by relevant stakeholders. There is a need to involve all relevant stakeholders, including non-users, but few mechanisms exist to ensure their effective participation. Thus scientists and others are forced to resort to ‘Statements of concern’ issued to the United Nations General Assembly. A recent example of this was a statement of alarm over the impacts on high-seas bottom trawling on cold-water corals and seamounts signed by over 100 scientists attending two expert symposiums on deep-sea biology and cold-water corals earlier in 2003.

Compounding this was the “gap” in scientific expertise, well noted in discussions at the Conference itself on the impact of deep-sea bottom trawling on seamounts. Despite a scarcity of seamount research and a poor understanding of benthic ecology, a great deal was already known that should be taken into account. The OASIS project (Oceanic Seamounts: An Integrated Study - a project funded by the European Commission) has documented seamounts as important breeding and feeding grounds for pelagic and demersal fish. Results of this and other programmes have shown that the deep-sea floor hosts vast numbers of benthic animals (e.g., hard, soft and horny corals, sponges, sea lilies, sea squirts) and provides habitat and food for many other animals. Many seamounts show high levels of species endemism and others may enable species to spread across ocean basins by facilitating dispersion. They may also provide refuges for relict species. An example of the prolific species diversity of seamounts is shown by one study of the deep-sea fauna off New Caledonia. More than 2000 species have so far been recorded, of which more than half were previously undescribed. This should have been a major topic of discussion at the conference, but there were no plenary presentations – only one poster in the foyer.

Ms Gjerde noted that advancing conservation and sustainable use of deepwater fauna beyond national jurisdiction will require action in the short, medium and long term. In the short term, leadership could be provided by the few states involved in deepwater fishing (only 11 or 12). They should:

- consider declaring a freeze on this fishing practice
- seriously consider their duty and capacity to conduct sustainable fisheries in these regions and how to conserve deep-sea biodiversity
- establish precautionary measures for new and existing fisheries and
- establish MPAs and representative networks of MPAs in national waters and on the high seas

Coastal states could provide leadership by seeking to protect the sedentary resources of their outer continental shelf (where this extended beyond the 200 nm exclusive economic zone) from the impact of high seas bottom trawling. They could, for example, take a case to the International Tribunal for the Law of the Sea. Concerned States could also support UNGA resolutions on conservation of biodiversity, equity and sustainability of high seas bottom fisheries. Campaigns to inform the public could be complemented by education of consumers.

In the medium term, the UNGA should act to establish global conservation and management measures for unregulated fisheries emphasizing the duty of States to conserve and cooperate in the management of high-seas bottom fisheries. The UNGA should also better define and improve the conditions for control of what are now unregulated fisheries. This could be done by ensuring the rapid establishment of “arrangements” to regulate existing or emerging high seas bottom fisheries. There is also a need to document global catches and monitor trade in high-seas species. Full implementation of the 1993 FAO Compliance Agreement and FAO IPOA on IUU are essential. And, any unregulated fishing as defined by the FAO Plan of Action on Illegal, Unreported and Unregulated Fishing should be recognized as “piracy” and stopped.

A second suite of medium term actions should involve extension or application of the principles and provisions of the UNFSA to all high-seas fish stocks, including bottom fish stocks, and not just highly migratory fish stocks and straddling fish stocks. Together with the *FAO Code of Conduct for Responsible Fisheries*, it provides a strong basis for ecosystem based management, precaution (i.e. risk aversion), habitat protection (e.g. through area closures and marine protected areas (MPAs)), and imposition of gear restrictions to eliminate destructive fishing practices.

A third level of medium-terms actions would involve reforming and upgrading RFMOs to incorporate the ecosystem-based and precautionary management principles of the UN Fish Stocks Agreement and FAO Code of Conduct. This could be done through mechanisms such as a system of peer review of RFMO operations. Standards for review could be based on the provisions of the UN

Fish Stocks Agreement, the FAO Code of Conduct, FAO International Plans of Action (IPOAs), and the United Nations principles of Governance. It should be recognized that assistance or incentives may be needed to expedite this internal evaluation process. This could include a system of NGO scoring and/or a white list/black list approach based on how the RFMOs were performing.

In the long term, Parties to UNCLOS should consider establishing an implementing agreement or agreements for high-seas biodiversity conservation and institutions through which this could be achieved. These should ensure that modern governance and management principles and practices (e.g. precaution, conservation, sustainable use, equity in participation of stakeholders, transparency in methods of operations and accountability to those affected) apply equally to all high seas activities. Funding could be based on the “user pays” principle.

Such an implementing agreement could:

- coordinate and oversee existing institutions and agreements, e.g. those of the International Seabed Authority, the International Maritime Organization and regional fisheries management organizations
- regulate any remaining ‘orphan’ fisheries – those to which no regional regulatory regimes apply
- provide oversight for new and emerging uses of the deep seas
- develop codes of conduct and, or, regulations for activities capable of affecting high-seas biodiversity, e.g. cable laying and marine scientific research
- enable effective enforcement
- establish a framework for establishing high-seas marine protected areas and
- build institutional and national capacity for management and enforcement.

Long-term action is also needed to address the issue of public trust, or stewardship, of the high seas. This might take place through some form of council whose objectives would be to (a) preserve the natural capital, e.g. fish stocks or bio-diversity, (b) ‘save’ or invest the interest and (c), protect the interest of the beneficiaries – our children and our children’s children and the oceans upon which they depend.

In closing, Ms Gjerde stressed that given the lack of knowledge about deep-sea ecosystems, species and the long-term effects of fishing impacts, there is an urgent need to apply a precautionary approach to ensure sustainable use and conservation of deep-seas biodiversity and its environment. It will require all to work together towards these essential goals.

***An International Legal Perspective – Professor Moritaka Hayashi, Waseda University, Japan***

Professor Hayashi, in his prognosis of the way ahead, used an analogy that had been developed in an earlier presentation, that was whether progress in improving the institutions of governance of the deepwater fisheries of the high seas would be best done through the ‘front door’, ‘back door’ or ‘side door’.

A *Front Door* approach would be equivalent to that of a binding treaty and here there were various ideas as to how to proceed. One approach would be to expand the remit of existing regional fisheries management organizations, or, perhaps, to establish a Global Fisheries Organization. Here an important question would be whether to restrict the mandate of such an organization to fisheries only or to endow it with a mandate for governance of wider aspects of oceans use. He also noted that if ocean stakeholders wanted a mechanism or regime that could manage high-seas marine protected areas, then a new arrangement or agreement would be needed. In this case, one possibility was that of a Global Trust. This was not a new idea and 30 years ago there was much discussion along these lines

in terms of the *Common Heritage of Mankind*<sup>12</sup>. However, while this may be an ideal solution it could involve a long time to implement. Despite this, all these options are possible.

A *Back Door* approach would make use of the various mechanisms allowed by ‘soft law’. In this context, among various ideas that have been put forward is that of using the United Nations General Assembly to declare and, or, adopt principles of oceans use, though experience has shown that it has been notoriously difficult to get agreement on what are appropriate actions. Professor Hayashi thought this to be a useful approach, but also noted that achieving a moratorium on deepwater fishing through the United Nations would be unlikely as it would require a consensus on the part of the Assembly - something that was unlikely. In pursuing a soft law mode, the FAO could do much through development of guidelines and a new code of conduct that recognized the particular circumstances of high-seas deepwater fisheries.

A *Side Door* approach would be one that involved amending the UNCLOS. However, he stressed that he thought this approach to be particularly delicate (i.e. re-opening the various articles of the Convention for debate). Rather, he was of the view that we should continue to think about possible measures or arrangements of a practical nature to resolve the issues arising as a consequence of the gaps in the Law of the Sea Convention.

In looking ahead, Professor Hayashi thought it would be appropriate for the main sponsors of DEEP SEA 2003 to take the outcomes of Conference to the Committee on Fisheries of the FAO and appropriate forums at the United Nations. The FAO might commence a new series of consultations and expert meetings on issues that were within its remit. It was also felt that the importance of the regional fisheries management organizations must be recognized and deep-sea fisheries issues could be well addressed through their meeting in Rome at the FAO in March 2005.

***An Industry Perspective – I: Martin Exel, Austral Fisheries Pty. Ltd, Australia***

Mr Exel, drawing on his managerial experience in operating high-seas fisheries within the requirements of existing management regimes stressed three requirements for all those with a stake in responsible governance of deepwater fisheries:

- get real
- get frustrated and
- get together.

In coming to terms with the illegal, uncontrolled and irresponsible operators of many deep-sea fishing companies prosecuting Patagonian toothfish on the high seas, and within national EEZs when they could, the Coalition of Legal Toothfish Operators (COLTO) ‘got real’. The members of this voluntary industry coalition recognized that complaining to each other and to those struggling with the mandate to address these issues was not effectively confronting those fishing operators who were doing the wrong things – legally! COLTO stresses their view that their Governments must assert control over high-seas fisheries. In the case of conservation groups, it is essential that they too ‘get real’ and figure out which ways work effectively and which ways are counter-productive and work against stakeholders who share common objectives. And, all who share the concerns over IUU operators and suffer their consequences must work together, within their own sectors and with others in the other sectors – industry, conservation and government.

He acknowledged that the Industry needs to recognize that some of its activities are bad and that there are some crooks within its ranks. Mr Exel challenged all present to ‘get frustrated’ as

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<sup>12</sup> Proposed in 1967, this philosophical idea challenged the basis of existing regimes governing globally important resources and proposed major changes to the way the world applies the existing norms. As such, the concept of the Common Heritage of Mankind involved a critical re-examination of the well-established principles and doctrines of classical international law, such as acquisition of territory, sources of international law, sovereignty, equality, resource allocation and international personality.

stakeholders' passion is needed to resolve the problems that exist. Initiatives can be hard to sustain - ISOfish, an Australian NGO dedicated to saving the toothfish, worked well at first but then lost its passion and stopped.

Finally, Mr Exel stressed that those involved must 'get together'. No individual group of stakeholders has all the answers but together they can create a solution. And, while extremists do not produce solutions – they do provide passion. By combining these elements Mr Exel believes that all stakeholders can get results – together. Deepwater habitats can be protected, IUU fishing can be eliminated, and sustainable fisheries can be ensured for present and future generations.

***An Industry Perspective – II: Mr Dave Sharp, New Zealand Seafood Industry Council***

In his presentation Mr Sharp noted that New Zealand has much experience of all types with deep-sea fisheries and that the New Zealand experience was that most deepwater fisheries management regimes within EEZs have the opportunity to remedy past mistakes made by their management. In New Zealand, Industry has a growing high-seas deepwater fishery that is strictly controlled. All catch must be reported; all vessels must have vessel monitoring systems and carry marine observers if required. These fisheries are *Legal, Regulated and Reported!*

The New Zealand industry recognized, and stressed, that they want to contribute to the progress in the management and governance of deepwater fisheries and that they are eager to play their part. He further noted that those at the Conference had heard much about the negative consequences of the various deepwater fisheries, but he felt that there was a need to acknowledge the positive advances and contributions made by the industry as well. As such, while the Industry may be part of the problem it can also be part of the solution.

He identified a wide range of ways in which the industry can, and does, contribute to responsible management of deepwater fisheries. These included:

- assisting in accurately defining the problems – in this way all can assist in addressing them and
- making the industry available to collect scientific information.

The Industry recognizes the need for effective management of fisheries on the high seas and in the Southern Hemisphere fishing countries have been and are willing to work together. Mr Sharp also identified policies that the industry believed would promote good governance of these fisheries. He believed that, where possible, there was a need for explicit fishing rights as in these situations fishers respond well to the incentives they provide for responsible fishing behaviour. He was of the view that a moratorium on high-seas deepwater fishing would not resolve the management issues that remain to be addressed. But, the Industry was of the view that there was a need for an effective high-seas compliance regime – something that did not exist at present.

He noted that the problem of IUU operators remained but there was no excuse not to make a start in confronting the problems they pose and identifying and implementing the solutions needed to resolve this problem. In doing this, he noted that fishing industries around the world had seen the benefits of global industry cooperation and their experience was that peer pressure is effective in mitigating this problem. He also noted the need for the Industry to reach out and work cooperatively with governments, environmental groups and others in civil society. As such, the Industry was aware that they do not have all the answers to the problems they faced but he stressed that they are willing to listen and contribute to the solutions.

***An Administrator's View II: Mr Geoff Richardson, Australian Fisheries Management Authority***

In this summary, the point was stressed that many issues confront governments in their approach to administration of deepwater fisheries. Among these are the gaps in the international frameworks for regulation of high-seas fisheries, and the need for the government's own mechanisms

for monitoring deep-sea areas, both within EEZ and on the high seas, for fisheries and marine conservation.

The challenges are clear: in moving forward it was apparent that there is no single solution or ‘magic bullet’ – rather much frustration. The challenges to be confronted will require a suite of actions. Such actions will include:

- successful implementation of existing agreements
- further consideration of appropriate trade measures and port state controls
- development and implementation of guidelines to regulate new and exploratory fisheries
- addressing specific flag -state issues such as
  - ❖ definition of the criteria for defining a genuine link between states and owners of fishing boats and fishing enterprises
  - ❖ improving the nature of cooperation between States and RFMOs
  - ❖ addressing the capacity of developing countries to administer vessels under their flag when they operate in high-sea deepwater fisheries
- giving a greater emphasis to issues of monitoring, control and surveillance of high-seas fisheries
- giving more immediate attention to the protection of high-seas biodiversity including addressing the issues that are would be involved in the implementation of marine protected areas in high-sea areas
- discussing the issues of governance in appropriate governmental forums starting with the COFI in 2005
- ensuring that this issue is on the agenda of the COFI meeting and is discussed in appropriate forums at the United Nations
- anticipating the recommendations of the Ministerial Task Force and responding in an appropriate manner
- managing deepwater resources within national EEZs in a sustainable manner, i.e. leading by example and
- avoiding definitions of depth zones of the deep sea that create problems in terms of vertically straddling stocks.

## **5. END-OF-CONFERENCE PERSPECTIVES OF THE STEERING COMMITTEE**

### **5.1 Introduction**

As DEEP SEA 2003 proceeded, it became progressively clearer that the concerns of those at the Conference could be grouped into:

- i. issues of management and compliance that are common to all fisheries, inshore and offshore and
- ii. those that, if not unique to deepwater fisheries, were mainly the concern of this type of fishery.

#### *Common Issues and Problems*

- It was recognized that despite the difficulties in obtaining appropriately detailed information on the prosecution of the world’s deepwater fisheries resources, it was apparent that they were being subjected to intensive fishing effort and that in many cases, stock biomasses had been reduced to levels that could not sustain current rates of harvesting, if indeed they were still sustaining commercially viable fisheries.
- Coupled with concerns over the viability of many deepwater fisheries were concerns for the protection of the associated marine habitats. Bycatch recorded in deepwater fisheries sometimes includes long-lived benthic fauna.

- It was noted that existing arrangements for the governance of many deep-seas fisheries resources had failed to protect these resources and ensure that their potential benefits would be sustained. In this context, if future management mechanisms were to be effective in sustaining the deepwater fisheries, then the general view was that it was beyond the capacity of existing arrangements for governance to ensure the effective management of many deepwater fisheries and alternative approaches to their governance are necessary.
- Resolving existing deficiencies in governance of deepwater resources will require embracing a variety of new approaches, including those with long-term, short-term and medium-term perspectives. These approaches may be affected through more effective implementation of mechanism agreed to in existing accords on fisheries arrangements while other approaches may require further international negotiation and agreement. Many of the conservation organizations noted the need for a short-term interim prohibition on high seas bottom trawling until such arrangements were in place to serve as a spur to rapid action.

## **5.2 Future activities**

A continuing theme of discussions and presentations at DEEP SEA 2003 was to advance efforts at addressing the many weaknesses, if not failures, of management, governance and institutions that had been identified and discussed during the period of the Conference. A number of specific programmes were identified and these are summarized in Table 1 (Strategic Objectives and a way forward) and Table 2 (Operational Issues and a Time Frame for Addressing Deep-sea Fisheries Governance and Management Challenges) and are described in greater detail in the following section, "Programmes Recommended for Implementation". The proposals could generally be classified as those consisting of (a) reinforcing ongoing initiatives, (b) implementation of new measures but using existing instruments and (c), those that envisage the creation of new management regimes and protocols with particular emphasis on areas of the seas that are not currently subject to some form of *effective* management protocol. These proposals ranged from operational activities such as improving data collection, to considerations of strategic issues, e.g. how access to high-seas resources may be better addressed to common benefit and the need to revisit issues that time has shown were inadequately address at the Convention responsible for the current Law of the Sea agreement.

It was beyond the objectives and nature of the Conference to identify how these initiatives might be funded, but participants were aware that this was an issue that would need to be satisfactorily addressed.

## **5.3 Programmes recommended for implementation**

### **5.3.1 Background**

During DEEP SEA 2003, a number of possible initiatives that were in need of attention and that would advance the theme of the Conference were raised. Many of the suggested activities are listed in the following sections as much to stimulate continued discussions as to what may contribute to better governance and management of deepwater fisheries as to identify positive steps that may be taken in the near future. The actions proposed below do not reflect any formal conclusions of the Conference, but the Steering Committee believes that it is useful to list them as they ought to provide a sound basis to provide direction for planning future initiatives.

### **5.3.2 The need for information concerning past deepwater fisheries**

Many deepwater demersal fisheries were not sustainable and no longer support active fisheries. Many of these fisheries occurred when there was neither little international obligation to collect information with the detail that is needed for effective resource management purposes nor a well developed understanding of the importance of doing this. Further, in times past, many countries had neither the national legal basis, nor the interest, in insisting that their vessels operating on the high seas, and which were often based offshore and landed their catch into distant ports, provide more than the minimum catch and effort data required by the port authority at the point of discharge. However, such information is essential if resource analysts are to understand the reasons for the current status of deepwater stocks. Thus, a globally-coordinated effort is needed to document past deep-sea fishing

**Table 1**

**DEEP SEA 2003: Strategic objectives – the way forward**

Key objectives	Strategy	Methodology
International management of currently unregulated high seas fisheries	<ul style="list-style-type: none"> <li>• Interested States currently fishing responsibly to take initiative to establish high seas fishing arrangement (2004)</li> <li>• Amend the UN Fish Stocks Agreement to extend coverage to high seas discrete fish stocks</li> <li>• Expansion of the FAO Code of Conduct to cover specific requirements for managing deep-sea fish stocks (e.g. an FAO Technical Consultation leading to COFI 2005)</li> <li>• Expand RFMO coverage to currently unregulated deep-sea fisheries in accordance with UNFSA model</li> <li>• Undertake audits of RFMOs' performance.</li> <li>• Increase global accountability of RFMOs, through biennial meeting of RFBs, FAO and UN.</li> <li>• UNLOS action.</li> </ul>	<ul style="list-style-type: none"> <li>• Arrangement between interested States to elaborate voluntary conservation and management measures</li> <li>• Declarations of Principles (UNGA) 2004</li> <li>• Universal application of UNFSA</li> <li>• Application of UNFSA principles to all high seas stocks</li> <li>• Prohibit destructive fishing methods/gear pending agreement on international regulation of discrete high seas fisheries</li> <li>• Development and ratification of a high-seas fishing Protocol by negotiation of a formal protocol, annex to the UNFSA applicable to discrete high-seas fish stocks, or other arrangement</li> </ul>
Promotion of marine science (ocean exploration), not just fisheries science	<ul style="list-style-type: none"> <li>• Direction of funds to areas identified as particularly deficient in the knowledge base needed for effective management</li> </ul>	<ul style="list-style-type: none"> <li>• Commitment to broad-based programme of ocean exploration with open access to results</li> </ul>
Mechanism for conservation of high-seas biodiversity	<ul style="list-style-type: none"> <li>• Process to identify high seas areas of particular scientific interest for intensive international study and conservation (possible mechanism through ISA)</li> <li>• States to identify 10–20 deep-sea areas as regions for protection.</li> <li>• Use results of ocean exploration and study as a basis for global regulation to prevent / minimize loss of biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Establishment of time-limited international process to consider implementation of the regime for high seas fisheries, MSR and mechanisms for protection of biodiversity on the high seas.</li> </ul>

Key objectives	Strategy	Methodology
Appropriate regulation of activities related to “bio-discovery”	<ul style="list-style-type: none"> <li>• Sample collection and associated activities to be sustainable and subject to EIA in every case.</li> <li>• Consistent regional and global approach to conditions for access and benefit-sharing.</li> <li>• Access to data, scientific knowledge and intrinsic values to be considered in lieu of economic benefit-sharing</li> </ul>	<ul style="list-style-type: none"> <li>• To be developed</li> </ul>
Regime applicable to the “Area”, high seas, EEZ, continental shelf and continental margin.	<ul style="list-style-type: none"> <li>• negotiating a new agreement to implement the provisions of the Law of the Sea Part VII, Section 2: Conservation and Management of the Living Resources of the High Seas</li> </ul>	<ul style="list-style-type: none"> <li>• Process may lead to LOSC amendment, UNFSA Protocol, implementation agreement, GA Resolution or other legal options, but important not to pre-empt outcome pending detailed consideration of options. Opportunity to feed into LOS/UNFSA review process.</li> </ul>
Creation of new management regimes covering ungoverned high-seas areas	<ul style="list-style-type: none"> <li>• Create a new Global Fisheries Management Organisation</li> <li>• Create a new UN oceans organization – The World Oceans Organization (WOO)?</li> </ul>	<ul style="list-style-type: none"> <li>• A new organization, apart from a technical mandate, might also manage entitlements based on a model trust as consistent with the concept of the <i>Common Heritage of Mankind</i>.</li> </ul>

**Table 2**

**Operational issues and a time frame for addressing deep-sea fisheries governance and management challenges**

	State		International	
	<i>Action</i>	<i>Outcome</i>	<i>Action</i>	<i>Outcome</i>
<b>Short Term: 1 – 3 years</b>	Within EEZs: Implement existing protocols for conservation and reporting of fishing operations for deepwater species (e.g. VMSs, marine observer programmes, participation in log book programmes, active cooperation with other fishing States)	<ul style="list-style-type: none"> <li>• Protection of currently vulnerable benthic ecosystems</li> <li>• Implementation of voluntary management agreements</li> <li>• Develop networks of VMSs – extending them where necessary</li> </ul>	Provision of support to RFMOs to implement/strengthen their existing mandates – through funding of expert consultations, peer reviews, studies, etc.	Strengthened regional capacity to manage deepwater fish stocks; development of consistent methods for stock assessment methods and setting TACs among regions; evaluation and selection of the best methods of management
	Develop and define consensus on flag State responsibilities for fisheries on the high seas in terms of data reporting, fishing practices, observance of protected areas, areas important for future fishery recruitment, etc.; collaboration in stock assessment activities	<ul style="list-style-type: none"> <li>• Evaluate effectiveness of protected or restricted fishing areas</li> </ul>	Appropriate UNGA declarations (perhaps) relating to high-seas demersal fishing practices with appropriate follow up by relevant agencies within the UN system	Application of pressure at an international level on fishing nations to adopt appropriate responsible fishing practices by raising awareness of costs of unsustainable methods and failure to act
	Develop and implement agreements to remove <u>all</u> subsidies that encourage fishing effort on the high seas	<ul style="list-style-type: none"> <li>• End of incentives that result in excess capacity of fishing fleets, wasteful distortions of socio-economic systems, and economic policies that exacerbate threats to sustainability of deepwater resources</li> </ul>	Support and direction from the UN Informal Consultation Process on the Law of the Sea: consultations, articulation of recommendations, etc.	

	<b>State</b>		<b>International</b>	
	<i>Action</i>	<i>Outcome</i>	<i>Action</i>	<i>Outcome</i>
	Undertake ‘peer’ reviews of national and RFMO management practices of deepwater fisheries; identify and document “best management practices”	<ul style="list-style-type: none"> <li>• Documentation and acceptance of best management practices</li> <li>• Provision of technical capacity as, and when, required to strengthen national/regional capacity</li> </ul>	Identification of jurisdictional gaps, legal and juridical reviews and development of appropriate legal protocols	Facilitation of redrafting of international governance mechanisms; facilitation and evaluation of appropriate juridical processes
	Develop industry consortia to supplement national efforts at implementing responsible deepwater fishing practices	<ul style="list-style-type: none"> <li>• Expansion and institutionalization of industry-organized peer groups to encourage responsible fishing practices, provision of support to implement consumer-acceptable fishing and harvesting practices</li> </ul>	<ul style="list-style-type: none"> <li>• Industry to address relevant issues through international associations</li> <li>• Further development of industry action groups to coerce unscrupulous operators by publicizing irresponsible policies that are ignored or cannot be addressed at State and international levels</li> </ul>	
	Further develop <i>Catch Documentation Schemes</i> for appropriate deepwater species	<ul style="list-style-type: none"> <li>• Government and industry-driven systems to control harvesting</li> </ul>		
	Undertake a determined effort to document past deepwater fishing activity at both national and global levels	Provision on knowledge bases to inform management actions	<ul style="list-style-type: none"> <li>• Documentation of past deepwater fishing activity by national vessels on the high seas and documentation of catch histories, if possible by fleet and stock units</li> <li>• Review of regional resource assessment activities</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to determine deepwater resource harvest potential; improved confidence in resource harvesting strategies and stock rebuilding tactics</li> <li>• Documentation of current management activities at a global level to provide a factual basis for evaluation of future harvesting policies</li> </ul>

	<b>State</b>		<b>International</b>	
	<i>Action</i>	<i>Outcome</i>	<i>Action</i>	<i>Outcome</i>
<i>Medium Term: ≥ 3 years</i>	Ministerial Task Force on IUU	Further development of government/industry driven MCS systems; cost savings from regional and global standardization of management practices, e.g. data recording and collection, enforcement and compliance	Technical consultations on: i. deepwater fisheries management issues ii. MCS issues for high-sea demersal fisheries iii. Development of governmental frameworks iv. through working groups addressing management protocols	Execution of consultations, to the general benefit, use of widespread expert input to inform and guide, at both a national and international level, desirable management practices for deepwater species.
			Development of 'standard' protocols and methodologies for rapid adoption by RFBs – a flexible tool kit for addressing management and governance deficiencies	Improved regional management
			Evaluation and review of potential protocols for management of harvesting entitlements, i.e. quotas or fishing rights, in high-seas fisheries situations	More effective management arrangements

activities. This would require determining the nature of past catches in terms of their species composition, the possible past age structure of the unfished resource, the fish-stock origins and an attempt at estimating the fishing effort that has been expended. The current status of deepwater fishing and fish stocks should also be determined on a global basis together with an estimate of the amount of fishing effort currently being expended. This information would be usefully collated in a single document or readily accessible database.

### **5.3.3 Securing and archiving information concerning extant deepwater fisheries**

While many states now legally require their flagged vessels to report full information on their high-seas fishing operations, this is not the case for all deepwater fishing countries. A range of reporting requirements exist, which at their minimum result in only summary operations data being provided to authorities at ports of product unloading. Further, this information is often ambiguous, e.g. many discharge manifests fail to distinguish between the different possible types of product – whole, H&G, fillets, etc., complicating interpretation of the data. Such problems further complicate, if not prevent, efforts to analyze the effects of fishing on deepwater fish stocks and to determine the resource status. Further, even when such information has been collected it must be rapidly made available in appropriate detail for stock assessments and provision of harvesting advice. Many national fisheries authorities fail to do this. Immediate efforts are required to ensure that data and related information on current high-seas deepwater demersal fisheries are recorded in appropriate formats and in sufficient detail, preferably by fully implementing existing agreements or through negotiation of new arrangements.

### **5.3.4 Evaluation and documentation of deepwater fishery resource management standards and practices**

Experiences described at DEEP SEA 2003 indicated much progress had been made in improving stock assessment methods and harvesting strategies in some regions, so as to improve the sustainability of deepwater fisheries. But, it was clear that much remained to be done. Further, it was recognized by the Conference that progress had been highly uneven among different management regimes. It was noted that a global review and evaluation of regional harvesting strategies that considered stock productivity, harvesting rates and included agreement on appropriate management of risk would be of considerable benefit, especially for new developing deepwater fisheries.

### **5.3.5 Bycatch issues**

Fishery bycatch occurs in many deepwater fisheries, including bycatch of long-lived benthic invertebrate fauna, but the extent of bycatch varies among fisheries and locations. Except when vessels carry marine observers, little information has been collected and made available for assessing the impact of deepwater fishing on such bycatch species. A coordinated global effort is needed to ensure that deepwater fishery bycatch data are collected, archived, analyzed and reported. Based on such information, improved assessments of the effects on bycatch of deepwater fisheries should be undertaken in a globally-coordinated manner so relevant knowledge becomes available, archived and shared among those involved.

### **5.3.6 Evaluation of status and threats to deepwater fisheries habitat**

Several Conference presentations and interventions emphasized the damage, past and present, that inappropriate bottom trawling can do to marine fish habitats and the potential harm this may cause to future recruitment of commercially-exploited deepwater species. Many instances of damage to benthic fauna have been documented and a broader assessment of this problem is needed together with an evaluation and implementation of mitigating measures. This would include development of environmentally safe and selective fishing gears as called for by the UNFSA and the FAO Code of Conduct and protected or areas closed to fishing or certain types of gear, and proposals for jurisdictional mechanisms to ensure compliance with any protective or remedial measures.

### **5.3.7 Review of the global coverage of management of deepwater fisheries**

No current inventory of deepwater stocks and their fisheries that remain unregulated by a fisheries management organization exists. Nor is there current information on a global basis of

deepwater resources that may be within the management jurisdiction of a regional fisheries body but which remain unmanaged and, or, unregulated. Such an inventory, if prepared, could complement an assessment of existing and, or, potential, concerns as to the sustainability of deepwater fisheries resources, fish habitat quality or issues relating to conservation of deepwater biodiversity.

### **5.3.8 Management of seamount fisheries**

The Conference was informed of the particular features of seamounts - isolated seabed features, often characterized by unique or rare benthic invertebrate and fish communities. It is believed that the current flows around and over seamounts result in increased localized productivity that enhances fish stock recruitment success. Thus, seamounts are of particular importance both for their fisheries and for their biodiversity. The number of seamounts in the world is unrecorded but may exceed 100 000 depending how such features are defined. Perhaps more than half of all seamounts occur in high-seas areas. Many seamount fisheries have been depleted while the sustainability of other seamount fisheries remains a concern. Considerable damage to the benthos by fishing gear has been recorded on many seamounts, though only a small number have been examined. Fisheries associated with seamounts may benefit from specialized attention that draws on existing expertise in countries already managing such fisheries. Such efforts could also identify means of mitigating the effects of demersal trawls on benthos and means of protecting vulnerable areas. Such an effort could also examine the potential benefits from selecting a number of seamounts to become protected marine areas. Should there be grounds for doing so, a global programme should be developed to implement such a proposal.

### **5.3.9 Strengthening the capacity of Regional Fishery Bodies to manage deepwater resources**

The importance of RFBs that have a mandate for management of deepwater fisheries is clear. However, the management of many such fisheries may not be addressed by such bodies. In some cases this may result from the lack of legal and, or, technical competence to do so. A global assessment of the role and mandate of existing regional fisheries bodies and, or, a performance audit would identify where assistance may benefit improving the regional governance of deepwater resources. This review should identify deepwater fisheries for which there are no management agreements or in management areas where there are no conservation measures to address damage caused by deepwater fishing. Such a review could include:

- identification and documentation of the problems relating to management of deepwater resources under the mandate of the respective fisheries organization
- analysis and documentation of the organization's institutional capabilities and
- documentation of the organization's capacity to undertake management action.

Such a peer review could determine where the need exists to expand the mandates of relevant RFBs to encompass ecosystem-based management of deepwater fisheries. Where new RFBs or arrangements are necessary, the benefits of preparing a handbook that addresses the specific management needs of deepwater fisheries, not least development of appropriate harvesting strategies and documenting relevant information and experiences of existing deepwater management situations. The review should also identify where potential overlap of mandates for management of deepwater resources occurs, either in terms of management areas and, or, of regulated species.

### **5.3.10 Review of the current legal regulatory framework for deepwater fisheries**

Many participants at DEEP SEA 2003 noted that existing arrangements for the governance of deepwater fisheries had often failed to protect the fish resources. Among reasons for this was (a) failure of the 1995 Fish Stocks Agreement to address the conservation and management of discrete high seas fish stocks, (b) the failure of States Party to the 1995 Fish Stocks Agreement to apply it to straddling deep seas fish stocks; (c) the poor implementation and non-specific nature of marine biodiversity obligations that apply on the high seas and (d), the incomplete regulation of deep-sea fisheries at global and regional levels. Thus, a review of the implications and potential for reform of the international legal regime for high seas fisheries was considered to be timely. It was thought that such discussion may offer guidance to States considering possible amendments under the procedure of

Article 312 for the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and for the 1995 United Nations Fish Stocks Agreement which is to be reviewed in 2006. Other, perhaps more complex, issues that were also identified as potentially benefiting from analysis and review were (a) means for establishing access rights to deepwater fisheries and how such entitlements may be defined, implemented and amended, (b) ensuring responsible flag state performance, (c) enhancing RFMO capacities to effectively manage deepwater resources and (d), improving enforcement capabilities.

#### **5.3.11 Development of a Code of Practice for management of deepwater fisheries**

Given the particular management requirements of deepwater fisheries, many Conference participants believed it would be useful to prepare a management code of conduct for such fisheries. The recommendations as to how these fisheries may be managed should build on the results of the other possible post-Conference activities mentioned above. Such a code may have to address the differing circumstances affecting governance protocols found within EEZs, those applying to shared stocks, those applying to straddling stocks and those applying to fish stocks found exclusively on the high seas. An issue directly associated with such concerns is the method of setting total allowable catches and procedures for formalizing the management of risk in these procedures. Such a Code should address the operationalizing of Precautionary Approaches to decision making regarding harvesting strategies and decisions in the context of deepwater fisheries