

Report of the

**FAO WORKSHOP ON THE IMPLEMENTATION OF THE FAO
INTERNATIONAL GUIDELINES FOR THE MANAGEMENT OF DEEP-
SEA FISHERIES IN THE HIGH SEAS – CHALLENGES AND WAYS
FORWARD**

Busan, Republic of Korea, 10–12 May 2010



Cover photo: Courtesy of Mr Jae Wan Shin, KOSAC Trading Co., LTD, Republic of Korea.

Copies of FAO publications can be requested from:

Sales and Marketing Group

Communication Division

FAO

Viale delle Terme di Caracalla

00153 Rome, Italy

E-mail: publications-sales@fao.org

Fax: +39 06 57053360

Web site: <http://www.fao.org>

Report of the

FAO WORKSHOP ON THE IMPLEMENTATION OF THE FAO INTERNATIONAL GUIDELINES FOR THE
MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS – CHALLENGES AND WAYS
FORWARD

Busan, Republic of Korea, 10–12 May 2010

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

ISBN 978-92-5-106826-7

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to:
Chief
Electronic Publishing Policy and Support Branch
Communication Division
FAO
Viale delle Terme di Caracalla, 00153 Rome, Italy
or by e-mail to:
copyright@fao.org

© FAO 2011

PREPARATION OF THIS DOCUMENT

This is the report of the FAO Workshop on the Implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas – Challenges and Ways Forward held in Busan, Republic of Korea, from 10 to 12 May 2010. This meeting was organized in response to the need to analyse the barriers to the implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas (FAO Deep-sea Guidelines). This Workshop identified specific programmes of work and activities that will be needed to advance implementation of the FAO Deep-sea Guidelines. The Workshop was organized by FAO and funded by the Government of the Republic of Korea and by the Government of Japan.

FAO.

Report of the FAO Workshop on the Implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas – Challenges and Ways Forward, Busan, Republic of Korea, 10–12 May 2010.

FAO Fisheries and Aquaculture Report. No. 948. Rome, FAO. 2011. 74p.

ABSTRACT

A Workshop to analyse the challenges and propose ways forward for the implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas (adopted in 2008) (FAO Deep-sea Guidelines) was held in Busan, Republic of Korea, from 10 to 12 May 2010. The meeting was attended by participants from a wide range of disciplines, experience and geographic areas. The report is divided in two parts. Part 1 provides the meeting summary and the main conclusions and recommendations with respect to general considerations, governance, support to developing countries, management issues, compliance and enforcement, vulnerable marine ecosystems (VMEs) and review and implementation processes. Part 2 contains the background documents on: (i) issues with respect to fisheries management in areas where there are regional fisheries management organizations/arrangements (RFMO/As); (ii) VMEs in areas where there are RFMO/As; and (iii) both topics in areas where there are no RFMO/As.

It was concluded that the current Workshop provided a good opportunity to establish an overall view of implementation and discuss challenges faced. However, given that many states and RFMO/As have only just begun to address many of the provisions in the FAO Deep-sea Guidelines and the United Nations General Assembly (UNGA) Resolutions for the purpose of their implementation it was suggested that additional meetings to evaluate the challenges and potential solutions in the implementation should be planned for the future. Additional evaluations of the implementation of the FAO Guidelines could also encourage relevant parties and stakeholders to continue their efforts on implementation. Specific programmes of work and activities that will be needed to advance implementation of the FAO Deep-sea Guidelines were also developed.

CONTENTS

PART 1: REPORT OF THE EXPERT WORKSHOP	1
OVERVIEW OF THE MEETING AND ARRANGEMENTS FOR THE SESSION	1
Session 1: Fisheries management in areas where a competent RFMO/A is in existence	1
Session 2: Identifying vulnerable marine ecosystems	2
Session 3: Fisheries management in areas where an RFMO/A is not in place	2
SPECIAL EVENT	2
Korean Bottom Fisheries in the High Seas: Status and Management Policy	2
Ploughing through waves onboard a fishing boat in the high seas: an old Korean fisherman speaks of the Korean bottom fishing industry on a learning curve	3
CONCLUSIONS AND RECOMMENDATIONS	4
General recommendations	4
Governance considerations and frameworks	5
Support for developing countries	7
Management issues	7
Management measures	12
Compliance and enforcement	14
Vulnerable marine ecosystems	15
Review and implementation	17
APPENDIXES OF PART 1	
Appendix 1: Agenda	19
Appendix 2: Matrix of issues	21
Appendix 3: List of participants	25
PART 2: EXPERT CONSULTATION BACKGROUND DOCUMENTS	27
CHALLENGES TO RFMOs IN APPLYING THE INTERNATIONAL GUIDELINES ON THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS (by Ross Shotton)	27
REVIEW OF PROGRESS ON IMPLEMENTATION OF THE INTERNATIONAL GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS – EXPERIENCE OF RFMO/As WITH IDENTIFYING AND PROTECTING VMEs (by Jake Rice)	44
WORKSHOP ON THE IMPLEMENTATION OF THE INTERNATIONAL GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS – IMPLEMENTATION OF THESE GUIDELINES IN AREAS WHERE NO COMPETENT RFMO/A IS IN PLACE (by Dave Japp)	62

ABBREVIATIONS AND ACRONYMS

ASCLME	Agulhas Somali Current Large Marine Ecosystem
BCC	Benguela Current Commission
CA	competent authority
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
COFI	FAO Committee on Fisheries
CPUE	catch per unit of effort
DCO	data collection officer
DSF	deep-sea fishery
DWFN	distant water fishing nation
EEZ	exclusive economic zone
ENGO	environmental non-governmental organization
FAO Deep-sea Guidelines	International Guidelines for the Management of Deep-sea Fisheries in the High Seas
FIRMS	Fishery Resources Monitoring System
GFCM	General Fisheries Commission for the Mediterranean
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
ICNAF	International Commission for Northwest Atlantic Fisheries
IGO	intergovernmental organization
IOC	Indian Ocean Commission
IOTC	Indian Ocean Tuna Commission
IPOA	international plan of action
ISA	International Seabed Authority
IT	information technology
IUU	illegal, unreported and unregulated
KCDP	Kenya Coastal Development Project
MACEMP	Marine and Coastal Management Coastal Environment Project
KOFA	Korea Overseas Fisheries Association (Republic of Korea)
MCS	monitoring, control and surveillance
MIFAFF	Ministry for Food, Agriculture, Forestry and Fisheries (Republic of Korea)
NAFO	Northwest Atlantic Fisheries Organization
NCEM	NAFO Conservation and Enforcement Measures
NEAFC	North East Atlantic Fisheries Commission
NFRDI	National Fisheries Research and Development Institute (Republic of Korea)
NGO	non-governmental organization
NMFS	National Marine Fisheries Service (the United States of America)
NOAA	National Oceanic and Atmospheric Administration (the United States of America)
RFMA	regional fisheries management arrangement
RFMO	regional fisheries management organization
SAI	significant adverse impact
SEAFO	South East Atlantic Fisheries Organisation
SIODFA	Southern Indian Ocean Deepwater Fishers' Association
SIOFA	Southern Indian Ocean Fisheries Agreement
SPRFMO	South Pacific Regional Fisheries Management Organisation
SWG	Scientific Working Group
SWIOFC	South West Indian Ocean Fishery Commission
SWIOFP	South West Indian Ocean Fishery Project
TAC	total allowable catch
TDA	transboundary diagnostic analysis

UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement)
UNGA	United Nations General Assembly
VME	vulnerable marine ecosystem
VMS	vessel monitoring system
WG	working group

PART 1: REPORT OF THE EXPERT WORKSHOP

OVERVIEW OF THE MEETING AND ARRANGEMENTS FOR THE SESSION

1. The Workshop was held in Busan, Republic of Korea, from 10 to 12 May 2010 and was attended by 27 participants from a wide range of disciplines, experience and geographic areas (see Appendix 3). The meeting was opened by Mr II Jeong Jeong, Director of International Fishery Organization Division of the Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF). He welcomed participants and encouraged effective discussion.

2. Mr Nomura Ichiro, Assistant Director General of the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations (FAO) welcomed participants and thanked the Republic of Korea for hosting the Workshop. He clarified that this meeting had been organized as a Workshop where participants will provide inputs according to their individual capacity in order to identify ways forward for the implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas (FAO Deep-sea Guidelines).

3. Mr Gwang Soo Lim, Deputy Minister for the Fisheries Policy Office in the Republic of Korea gave an opening address. He thanked FAO for preparing the Workshop and emphasized the increasing importance of progress in the management of deep-sea high seas fisheries.

4. Ms Jessica Sanders, Department of Fisheries and Aquaculture, FAO, provided a brief background of the FAO Deep-sea Guidelines. She highlighted key aspects of implementation, including that most areas of the high seas are now covered by existing or developing regional fisheries management organizations or arrangements (RFMO/As). She recalled the previous activities (technical consultations, Workshops) that took place during the development of the FAO Deep-sea Guidelines, and described recent FAO activities in support of the implementation of those guidelines.

5. Ms Merete Tandstad, Department of Fisheries and Aquaculture, FAO, presented the objective and structure of the Workshop, with three main sessions on: (i) fisheries management in areas where there are RFMO/As; (ii) vulnerable marine ecosystems (VMEs) in areas where there are RFMO/As; and (iii) both topics in areas where there are no RFMO/As. Workshop participants were to discuss fisheries management issues and protection of VMEs in both areas where RFMOs are in place and where they do not yet exist, analyse challenges for the implementation of the FAO Deep-sea Guidelines and identify ways forward. Participants were given the opportunity to comment on the agenda, after which the agenda was adopted (Appendix 1).

6. Each session was introduced by a presentation of the corresponding background paper that had been prepared for the meeting. The three background papers can be found in Part 2 of this report. In addition, a list of issues for each session was prepared in order to stimulate discussion (see Appendix 2).

Session 1: Fisheries management in areas where a competent RFMO/A is in existence

7. Mr Jake Rice, Fisheries and Oceans Canada, was nominated the Chairperson of Session 1. He started the session by emphasizing that the discussion and session should focus specifically on deep-sea fisheries (DSFs). He requested participants to concentrate on developing conclusions on what has changed as a result of the FAO Deep-sea Guidelines and actions to take for moving the implementation process forward. In addition, he requested that participants examine impediments to progress.

8. Mr Ross Shotton introduced the background paper "Challenges to RFMOs in applying the FAO Deep-sea Guidelines on the management of deep-sea fisheries in the high seas" (see Part 2). The main fisheries management issues in relation to FAO Deep-sea Guidelines, when a RFMO is present, were presented.

Session 2: Identifying vulnerable marine ecosystems

9. Ms Ilona Stobutzki, Fisheries and Marine Sciences Programme, Bureau of Rural Sciences, Department of Agriculture, Fisheries and Forestry of Australia, was nominated the Chairperson of Session 2. Discussion centred around information requirements and necessary tools for improving identification of VMEs, as well as on the move-on rule.

10. Mr Jake Rice introduced the background paper “Review of progress on implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas – Experience of RFMO/As with identifying and protecting VMEs” (see Part 2). Measures instituted for the protection of VMEs in relation to the FAO Deep-sea Guidelines were presented.

Session 3: Fisheries management in areas where an RFMO/A is not in place

11. Mr Dean Swanson, National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NMFS, NOAA), United States of America, was nominated Chairperson of Session 3. Although many of the issues that are relevant to both areas where RFMOs are in place and where they do not yet exist were discussed in previous sections, specific challenges in areas without functioning RFMO/As were discussed. Much of the discussion focused on ways to improve collaboration and use of existing tools, as well as improved assistance to developing countries.

12. Mr Dave Japp, CapFish, introduced the background paper “Workshop on the implementation of the International Guidelines for the Management of Deep-sea Fisheries in the High Seas – Implementation of these guidelines in areas where no competent RFMO/A is in place” (see Part 2). The main fisheries management issues in relation to the FAO Deep-sea Guidelines, when an RFMO is not present, were presented.

SPECIAL EVENT

13. The host country, the Republic of Korea, organized a special event in which Mr II Jeong Jeong, MIFAFF, presented the current deep-sea fisheries and policies of the Republic of Korea and Mr Jae Wan Shin, a former captain of a deep-sea fishing vessel, gave a presentation on these fisheries and his experiences. A lively discussion session followed the presentations. A summary of both presentations follows.

Korean Bottom Fisheries in the High Seas: Status and Management Policy (Mr II Jeong Jeong, Director of International Fishery Organization, MIFAFF)

14. Mr II Jeong Jeong presented the current status of the deep-sea fisheries and relevant management policies from the viewpoint of the Republic of Korea. The number of vessels participating in these fisheries has oscillated between 32 and 22 since 2004, but in 2009 the Republic of Korea had a total of 22 vessels in these fisheries primarily fishing in the southeast and southwest Atlantic mainly targeting shortfin squid.

15. The management and conservation framework includes the United Nations General Assembly (UNGA) Resolutions 61/105 and 64/72, the FAO Deep-sea Guidelines, and domestic legislation (the Distant Water Fisheries Act and the Regulation on Bottom Fisheries in the High Seas). The primary actors in managing these fisheries are: the MIFAFF which administers the management of bottom fisheries through establishment of fishery management plans, authorizing fishing, etc.; the National Fisheries Research and Development Institute (NFRDI), which provides scientific and technical assistance for bottom fisheries; and the Korea Overseas Fisheries Association (KOFA), which manages fishing companies and collects data.

16. In the high seas in areas where RFMO/As are in place, Article 13 of the Distant Water Fisheries Act stipulates that fisheries that operate in the high seas under the management of RFMO/As shall abide by the measures taken by those RFMO/As. The purpose of this article is to incorporate measures taken by RFMO/As into the Republic of Korea's domestic regulation. The Government of the Republic of Korea sees to it that Korea's pelagic fisheries comply with this regulation.

17. In areas where no competent RFMO/As are in place, the MIFAFF issued the *Administrative Directive for Implementing International Regulation regarding Bottom Fishing in the High Seas* in December 2008 to regulate bottom fishing activities (published in April 2009, revised in August 2009). This regulation establishes a system for licensing, reporting encounters with VMEs, measures to prevent significant adverse impacts on VMEs, a vessel monitoring system (VMS) and, catch reporting and an observer system.

18. Remaining issues to be dealt with in these fisheries include the shortage of appropriately trained observers, the need for greater details on the FAO criteria for VMEs, and managing these fisheries in areas where a competent RFMO is not in place. In these areas cooperation among coastal and fishing states might be needed to complete impact assessments and other management activities.

19. The Republic of Korea will continue to elaborate the application of the relevant UNGA resolutions, the FAO Deep-sea Guidelines, and improve the institutional frameworks (e.g. between the relevant ministries) for the management of these fisheries, as well as continue efforts to establish an RFMO in the southwest Atlantic. Further efforts to improve the management of these fisheries will also include supporting an increase in the number of capable observers, development of protocols and manuals, improvements in fishing gear to reduce impact on the environment, and the application of the FAO Deep-sea Guidelines within the exclusive economic zone (EEZ) of the Republic of Korea.

Ploughing through waves onboard a fishing boat in the high seas: an old Korean fisherman speaks of the Korean bottom fishing industry on a learning curve (Mr Jae Wan Shin, Korean Overseas Fisheries Association)¹

20. Mr Jae Wan Shin presented a viewpoint on DSFs from the deep-sea bottom fishing industry of the Republic of Korea. High seas deep-sea fishing has changed drastically in the last decade. He noted that from 2006 to 2009, the UNGA resolutions and the FAO Deep-sea Guidelines were introduced into management practices. Domestic legislation of the Republic of Korea now incorporates regulations on bottom fishing and VMEs. The industry is now working to implement management measures for bottom fisheries, protection of VMEs and is agreeable to these measures when incorporated gradually. However, one of the largest changes has been in the overall fleet, capacity that has been greatly reduced, for a number of reasons.

21. Bottom fishing operators of the Republic of Korea are now required to report encounters of VMEs, collect as much information from the fishing operations as possible, and move off one nautical mile from the encounter site. These procedures are subject to continual change and improvement. There is now 100 percent observer coverage on vessels of the Republic of Korea operating in the southern Ocean and the northwest Pacific, and 20 percent observer coverage in the southwest Atlantic, which is likely to change as domestic legislation changes.

22. Bottom fishing operators are currently working on educating fishers onboard to increase awareness and improve understanding of new regulations and requirements. They also plan to gradually increase observer coverage in areas with limited coverage and participate more fully in cooperative arrangements with government institutions and research institutes. Experimental fishing is also being undertaken in some cases to determine if mid-water fishing can be done instead of bottom fishing.

¹ This presentation is based on the personal experience of a head of a fisheries company of Republic of Korea. The opinions expressed and arguments employed herein do not reflect the official views of the Government of Republic of Korea.

23. Many operators are collaborating on species identification through collection and reporting of uncommon species and photographic submissions to government institutions and the national research institute.
24. Encounters with VMEs are not in the best interest of operators. For example, in the Atlantic Ocean fishing hotspots generally do not coincide with VMEs. Areas with corals are often in deep and turbulent waters, and are not where target species occur. Corals also cause problems with gear retrieval. Areas that contain corals are often known and are intentionally avoided.
25. However, there are many problems for fishers trying to respect requirements and guidelines. These include: a lack of easy, readable guides and identification manuals in particular where there are no RFMOs; and lack of consideration on the part of policy-makers of operational and logistical issues (increasing costs of fuel, location and access to fishing areas, human capital, etc.). Easily losing access to fishing grounds is fatal to a small operator. In addition, the valuable experience of fishers is often ignored in the processes involved in adopting conservation measures.
26. Suggestions for addressing some of the above-mentioned issues were made, including the dedicated use of trained fishers as an alternate option to diversifying the observer supply (notwithstanding cultural and communication problems), and the recommendation that area closures be very specific and not be used as a blanket conservation measure.
27. In conclusion, the deep-sea fishing industry of the Republic of Korea has been made aware of the current international initiatives related to these fisheries and understands the need to “sail with the current”, but is still in the early stages of preparing. Full preparation will require time and resources to adapt to new requirements. The full cost of proposals must be weighed and viable alternative options considered. There is also a need to develop national mechanisms for support and expert input to develop tools such as guides, etc.

CONCLUSIONS AND RECOMMENDATIONS

General recommendations

28. There are no intrinsic differences between well-managed deep-sea fisheries (DSFs) in the high seas and other well managed fisheries, however, there are certain specific challenges in DSFs that are either more likely to be encountered or more difficult to overcome including the management of low-productivity species.²
29. Based on the specific challenges in DSFs, the meeting focused on the unique problems and potential solutions to making DSFs sustainable as well as to assist states and RFMO/As in their tasks to meet the provisions in the FAO Deep-sea Guidelines, UNGA Resolution 61/105 and other international commitments related to these fisheries.
30. Most states and RFMO/As have only recently started to address many of the provisions in the FAO Deep-sea Guidelines with a view to their implementation. In May 2010, RFMO/As were still at an early stage of the implementation process and thought it premature to evaluate the effectiveness of the measures already taken. Participants at the Workshop recommended an evaluation of the implementation of the FAO Deep-sea Guidelines at a later date and the convening of further Workshops at regular intervals to examine the challenges and solutions as done at this Workshop. However, participants also agreed that even at this stage of implementation, it was possible to identify some common challenges and some promising pathways to implementation.

² For elaboration on the specific challenges in DSFs, see FAO. 2007. *Report and documentation of the Expert Consultation on Deep-sea Fisheries in the High Seas*. Bangkok, Thailand, 21–23 November 2006. FAO Fisheries Report No.838, Rome, FAO. 203p.

31. Participants highlighted the main actions listed below and emphasized prioritizing these actions in order to address major issues in the implementation of the FAO deep-sea Guidelines. Priority actions to assist states, RFMO/As and the industry in the implementation of the FAO Deep-sea Guidelines are to:

- support the development of RFMO/As where they do not currently exist as well as encourage the signature and ratification of RFMO/As where they are in progress;
- support developing countries in the implementation of the FAO Deep-sea Guidelines, including making best practices and relevant information accessible;
- compile best practices and develop relevant guidance on impacts and risk assessment;
- compile, clarify the use of, and make available best practices on encounter protocols and related mitigation measures, in particular the move-on rule;
- facilitate opportunities for discussions among fishing nations operating in the same area, particularly where no RFMO/A is in place;
- develop guidance on the use of the VME criteria, including triggers for what degree of presence constitutes a “significant concentration”; and
- support and facilitate work on deep-sea high seas stock assessments to ensure sustainable fisheries.

Governance considerations and frameworks

32. General governance considerations were discussed that relate to both areas where RFMO/As are in place and where they are not. Many governance issues are ubiquitous and apply to all deep-sea high seas fisheries, but some are specific to areas where no RFMO/As is yet in existence (discussed in paragraphs 38 to 41).

33. The importance of multidisciplinary stakeholder participation in different aspects of the assessment and management process was emphasized by participants. However, RFMO/As do not always have the necessary mechanisms, forums or funding in place for such participation. In addition, the importance of coordination and communication between RFMO/As and other relevant bodies is mentioned in the FAO Deep-sea Guidelines (paragraph 29).

34. Some participants suggested that alternative arrangements for countries that do not have the resources to participate in or establish RFMO/As should be examined. In recent years a number of RFMO/As have placed value on the participation of non-contracting parties in RFMO/As in terms of contributions to meetings as well as reporting and exchange of data. Other types of arrangements, informal and formal, have been set up that allow for cooperation between flag states and interested parties for management of fisheries (e.g. for pollock fisheries in the Central Bering Sea).

35. States that are struggling with the management of deep-sea fisheries inside their EEZs could be further encouraged to consider the application of the FAO Deep-sea Guidelines to the management of DSFs within their EEZs, as mentioned in paragraph 10 of the FAO Deep-sea Guidelines.

36. Many participants noted the need for the development of a stepwise approach to the implementation of the FAO Deep-sea Guidelines. Owing to the resources needed to address many of the provisions prioritization and a series of steps to follow to address each of the components considered to be most important could assist those states that are not immediately able to address all the provisions with a view at implementing them.

37. Participants also noted the importance of providing assistance to states in the implementation of the FAO Deep-sea Guidelines before programmes are established to authorize vessels to fish in deep-sea high seas fisheries. States should have appropriate frameworks that allow for the implementation of the FAO Deep-sea Guidelines and other relevant regulations before authorizing vessels to take part in these fisheries.

Priority actions for improved implementation:

- (a) Establish working groups to develop a stepwise approach to implementation, as well as prioritize the main provisions in the FAO Deep-sea Guidelines for specific contexts.
- (b) Assistance and training in the implementation of the FAO Deep-sea Guidelines, including a general introduction to the guidelines specifically for countries, agencies or institutions that have not yet been involved in these fisheries.
- (c) Improve availability of information and collate examples for both states and RFMO/As on approaches to implementation, e.g. examples of legal frameworks.
- (d) Provide assistance for capacity building and networking for improved implementation of the FAO Deep-sea Guidelines.

Governance frameworks in the absence of an RFMO/A

38. The discussion on issues in areas where a competent RFMO/A is not in place commenced on the grounds that the requirements where there is a RFMO/A in place and where a competent RFMO/A is absent are the same. In areas where there is no competent RFMO/A the responsibility for implementation of the FAO Deep-sea Guidelines is borne by each flag state individually. Such situations are particularly demanding for all states concerned, independent of their respective capacity or funding capability. This highlights the need for cooperation between concerned flag states either directly or within the framework of a RFMO/A. Identifying VMEs, completing assessments (impact assessments, stock assessments and risk assessments), operating monitoring, control and surveillance (MCS), and reporting are all fairly difficult individual achievements for any one flag state when not working in collaboration with others fishing in a given region.

39. There are generally two types of situations in areas where there is not yet a RFMO in place: (i) areas where there is a RFMO/A in the process of being established (e.g. Indian Ocean); and (ii) areas where there is no RFMO/A (e.g. southwest Atlantic). In both situations, the main opportunity to improve the implementation of the FAO Deep-sea Guidelines is to be found in existing or potential coordination mechanisms among interested flag states and coastal states. FAO may be able to play a role in the establishment or facilitation of such coordination mechanisms. In addition, facilitation of data exchange and knowledge as well as discussions on potential management measures relating to these fisheries, in some cases, will require substantial technical assistance (possibly from FAO and others).

40. In some regions, industry has formed collaborative management arrangements in the absence of a competent RFMO/A, e.g. between operators in the southern Indian Ocean. However, in such situations the application or implementation of management measures established through informal collaboration between states and industry is limited as not all flag states are bound by such measures. The prompt establishment of RFMO/As in areas where they are not in place is important, as well as the development of interim measures previous to such establishment.

41. Participants noted that a few individual states and regional economic integration organizations have also developed directives (e.g. the European Union³ and the Republic of Korea⁴) relating to the implementation of UNGA Resolution 61/105 and the FAO Deep-sea Guidelines for their vessels operating in areas without competent RFMO/As.

Priority actions for improved implementation:

- (a) Encourage the establishment of RFMO/As where there are none and the signature and ratification of the relevant constitutive agreement where such agreements have already been negotiated and adopted (paragraph 28 of the FAO Deep-sea Guidelines).

³ See Web page eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:201:0008:0013:en:pdf

⁴ Not currently available in English.

- (b) Develop informal arrangements or networks for collaboration on the implementation of the FAO Deep-sea Guidelines among interested parties and stakeholders.

Support for developing countries

42. Knowledge on DSFs and associated ecosystems is often difficult to access and, in some cases is non-existent, which further complicates involvement in the sustainable management of these fisheries for many developing countries, which often have limited experience with these fisheries. In some of them, a good relationship between the competent authority and the deep-sea high seas fishing industry has been the main path toward effective implementation of the FAO Deep-sea Guidelines taking into account, among others, the capacity of the DSF industry in providing data and knowledge with respect to these fisheries.

43. Many developing countries could benefit from the direct assistance of FAO in terms of training, capacity building and the development of networks of scientists, industry, and others involved in these fisheries. In addition, coping with MCS and developing appropriate legal frameworks for the management of DSFs in areas beyond national jurisdiction are areas in which developing countries need particular assistance. Assistance from FAO, *inter alia*, through the development of model legislation and organization of regional Workshops for awareness building was requested.

Priority actions for improved implementation:

- (a) Provide assistance in the development of appropriate legal frameworks necessary for the implementation of the FAO Deep-sea Guidelines, including a review of current legal frameworks that allow for management of deep-sea high seas fisheries and improved access to examples and additional information.
- (b) Review and prioritize objectives of the FAO Deep-sea Guidelines and for deep-sea high seas fisheries issues (as recommended in section 2).
- (c) Provide capacity building in developing countries, including support for training to increase deep-sea taxonomic knowledge.
- (d) Increase the participation of developing countries in various FAO meetings, international discussions and scientific meetings on DSFs on the high seas.

Management issues

44. Participants noted that joint or coordinated working groups or simply joint meetings could be established among RFMO/As and RFMO/A scientists to share experience and information on issues such as identification of VMEs, biodiversity concerns in management and other issues. This could serve to increase capacity in RFMO/As working on VME issues in areas with fewer resources. Efforts should be made to reduce costs by holding joint meetings on common topics rather than recommending activities that require a substantial amount of funding such as increasing the current number of meetings or expanding participation in meetings which is taxing on the limited resources of both RFMO/As and states.

45. Experience in the implementation of the VME components, in particular, of the FAO Deep-sea Guidelines should be compiled and shared among RFMO/As and their scientists. One participant noted that an informal network among RFMO/As secretariats has already been established. Enhanced coordination and collaboration and sharing of technical expertise among the RFMO/As would ensure more effective use of resources in organizations that already have limited funding and increasing responsibilities.

46. The need for training of skippers, operators and crew to ensure implementation of the FAO Deep-sea Guidelines was discussed. Participants noted that the issue to be discussed is in relation to the provisions of the FAO Deep-sea Guidelines and not in the context of maritime training in general.

47. Current practice in most RFMO/As is to rely on the flag states to ensure that the skipper and crew are informed of current regulations and management measures. However, the option of providing training for skippers, vessel operators or crew to raise awareness on the FAO Deep-sea Guidelines was considered a valid initiative.

Priority actions for improved implementation:

- (a) Develop a mechanism for sharing of experiences and best practices among RFMO/As, as well as creation of a network for scientists and scientific committees from these RFMO/As.
- (b) Compile RFMO/A current practices and experiences. A network could be developed for highlighting information on new management measures or other points of interest for interested parties and stakeholders.
- (c) Build awareness for skippers, operators and crew on the FAO Deep-sea Guidelines.

Data collection and reporting

48. The Chairperson noted that a list of types of data required to successfully manage bottom fisheries in the high sea is outlined in FAO Fisheries Report 860⁵ (page 6), but that this is not a comprehensive list, and it is important to include other data types such as those necessary for bioeconomic studies.

49. Industry is one of the main potential data providers. However, if there is a risk that commercial confidentiality is compromised it is a disincentive for the industry to collaborate. The major disincentive to providing data on fishing locations and catches is its possible commercial use by competitors. This is even more of a concern when the fishery providing data is operating consistent with the FAO Deep-sea Guidelines and the information might be used by fisheries less likely to operate responsibly. One of the solutions to this may be the use of secure entitlements in the fishery, where the governance system allows entitlements to be awarded and implemented successfully.

50. Both scientists, who expect independent validation of data obtained from commercial fishers, and members of the fishing industry, who are often reluctant to share data because of confidentiality issues, have much to gain from the establishment of trust in relation to data sharing and use.

51. Scientific data are also sometimes collected within areas where a competent RFMO is in place, but the data collected are not always made available to RFMO/As. Participants recommended that states and institutions should be encouraged to present all relevant available scientific information to the RFMO/As.

52. Not all management actions require the same scale of data and the data requirements necessary to achieve different objectives should be better specified. For example, the following four categories of assessments require different types of data and at least some will require very fine scale data:

- status and trends of target stocks;
- status and trends of bycatch;
- performance of the fleet (economically and socially); and
- impact of fishing on ecosystem.

Priority actions for improved implementation:

- (a) Provide guidance and models for the development of data exchange protocols specifying conditions under which data (including confidential data) are made available and shared.

⁵ FAO. 2008. *Report of the Workshop on Data and Knowledge in Deep-sea Fisheries in the High Seas. Rome, 5–7 November 2007*. FAO Fisheries Report No.860. Rome, FAO. 15p.

- (b) Develop guidance for appropriate data collection protocols between industry, scientists and management.
- (c) Establish procedures to build confidence between scientists and industry for improved collaboration e.g. legal protocols, regular exchange mechanisms, etc.
- (d) Establish positive incentives to reward those that are providing data.
- (e) Encourage states and institutions to share data and information collected from surveys within RFMO/A areas.
- (f) Encourage RFMO/As and flag states to submit information on their deep-sea high seas fisheries to FAO and collaborate on future FAO efforts to analyse and these fisheries through, *inter alia*, the FAO global inventory of fish stocks and fisheries.

Development of support material

53. Participants highlighted the importance of the development of generic material such as example or model forms, training manuals, guidance on data collection, and databases because such material is important for effective use and consolidation of information for a given fishery and would facilitate collaboration between states.

54. Data collection procedures and protocols have been established by many RFMO/As and, in some cases, RFMO/As communicate among themselves and their scientific advisory bodies on these topics.

55. FAO has developed a programme that will provide, when fully funded, vulnerable species identification guides for use onboard vessels, as well as training for the use of the guides. FAO and all regional and national organizations that are working on field guides for the identification of high seas species should make them available and promote training of observers.

Priority actions for improved implementation:

- (a) Forms, manuals, best practices that are already available on websites should be collated and made easily accessible from a single portal.
- (b) Generic material such as examples or model forms, training manuals, and databases should be developed and/or made available by FAO.

Historical data

56. The recovery and transcription of historical data are important for fisheries management in DSFs although in certain cases costs may exceed benefits. Participants noted that the collection of historical information is particularly important in areas where there are no RFMO/A as there is often a general lack of access to data. Historical data could be collected and compiled by FAO in collaboration with flag states. These data could be used to develop baseline information for these fisheries and to assist in the compilation of information on VMEs and the production of maps.

Priority actions for improved implementation:

- (a) Collect and compile historical data, particularly in data-poor fisheries and areas.

Data collection in areas without competent RFMO/As

57. Collaboration and facilitation of data sharing will enable the undertaking or improve the application of many of the provisions in the FAO Deep-sea Guidelines, including mapping of the area, impact assessments, and stock assessments in areas without competent RFMO/As as combined information from all states fishing in the area is important for an a scientifically sound basic description of catches and major potential ecosystem impacts. For example, robust stock assessments are particularly challenging in areas without RFMO/As when mechanisms for data sharing are not in place. In addition, VME assessments based only on the data from individual states present a

preliminary picture of habitats and impacts, whereas much more knowledge would stem from assessments based on information shared among countries fishing in the same area. In areas where RFMO/As are in place this could be and often is done through RFMO/As.

58. Marine ecosystems for which there is limited knowledge often coincide with areas where a RFMO/A is not currently in place. Work to assist interested parties in these areas would not only facilitate the implementation of the FAO Deep-sea Guidelines, but also advance knowledge on marine ecosystems in these little known areas.

Priority actions for improved implementation:

- (a) Develop networks to encourage collaboration between stakeholders.
- (b) Conduct VME assessments in information poor areas building on models existing in a number of other fields.
- (c) Seek sources of funding for research to gather data related to VMEs in knowledge-poor areas.

Assessments

59. Impact assessments, stock assessment and risk assessments are all included in the FAO Deep-sea Guidelines and all present specific challenges when undertaken in deep-sea fisheries. The group started the discussion by examining the guidance on impact assessments in the FAO Deep-sea Guidelines. The participants agreed that the text of the FAO Deep-sea Guidelines is clear on what needs to be included in an impact assessment. However, participants noted that a risk assessment is only one of the steps in the broader impact assessment. In that context, paragraph 48 on risk assessments seems to be left open to interpretation regarding the necessity of conducting risk assessments in historically fished areas as the FAO Deep-sea Guidelines only note there are “differing conditions” in fished and rarely fished areas. Many participants agreed that this means that risks assessments might differ among those types of areas, but some participants stressed that the text in paragraph 48 should not be interpreted as suggesting that no form of a risk assessment is needed in existing or recently fished areas.

60. The impact assessment, as outlined in paragraph 47 of the FAO Deep-sea Guidelines, should be done in all areas subjected to bottom fishing activities to determine if significant adverse impacts are likely. The amount of previous fishing will affect the nature of these assessments. Mapping of the fishing footprint by gear will be important for future evaluation of impacts. Greater clarity on the need for risk assessments in fished areas and the appropriate form of such assessments where necessary would be useful.

61. Now, RFMO/As are in the initial phases of implementing requirements for impact assessments and are still in the learning process. Currently impact assessments are being done by states on an uneven basis and with varying degrees of completeness. It should be noted that good impact assessments usually require extensive engagement of industry and scientific communities.

62. Participants noted that there is currently no mechanism for wide review of the quality of impact assessments submitted by flag states. The importance of providing good-quality impact assessments and ensuring appropriate review processes was highlighted. The possibility of reviewing impact assessments currently available and extracting best practices would provide an opportunity to learn from initial attempts.

63. The RFMO/As should ensure the participation of appropriate experts in the evaluation and review of impact assessments in order to cover the broader range of expertise necessary for the additional provisions under the FAO Deep-sea Guidelines (paragraph 50). Furthermore, the results of the reviews should be made publicly available (paragraph 51). To improve the reviews, guidance on best practices for the review of assessments should be developed.

Priority actions for improved implementation:

- (a) Compile best practices and develop relevant guidance on impacts and risk assessment as emphasized in the main provisions for action.
- (b) Develop guidance on the review and evaluation of impact assessment based on lessons learned.

Risk assessments

64. Undertaking risk assessments of likely impacts by the fishing operations in DSFs in the high seas requires addressing a series of questions such as What constitutes a “significant concentration” or a “significant impact” on vulnerable species and communities? and How can a significant adverse impact be determined? Furthermore, the scale of the impacts being analysed must also be addressed and the actual use of significant adverse impacts as an operational term, given the complexity involved, remains a challenge.

65. The determination of significant adverse impacts on VMEs will be influenced by the spatial scale, taxonomic level (species – phylum) and recovery metric (e.g. biomass, age structure, productivity, ecosystem function) evaluated. The appropriate scales and metrics used may depend on the life history, ecological function of the group, and the effects of the fishing in particular areas. Recognizing this complexity and explicitly defining these factors in developing an approach to evaluating significant adverse impacts is a critical component of the process.

66. The proper treatment of the above factors will be specific to individual fisheries and ecosystems. However, overall guidance on the factors that should be considered in each assessment and the interpretation of these key concepts would facilitate implementation of the FAO Deep-sea Guidelines.

Priority actions for improved implementation:

- (a) Develop further guidance on “significant concentrations” and “significant adverse impacts” and establish a joint working group to analyse and provide guidance on the operationalization of the Concept of significant adverse impact.
- (b) Collate and make readily accessible information and work done by scientific communities and states on risk assessments.

Ecosystem and stock assessment

67. There is a high level of uncertainty with regard to stock structure, dynamics and stock boundaries for many deep-sea species. Many of the assessment methods applied in conventional stock assessment are not necessarily applicable to many deep-sea species and fisheries. Reasons include a lack of necessary data, uncertainty about stock structure and, life history, and parameters that are not consistent with the usual assumptions of assessment models. Limited amounts of data will mean that there are certain limits to stock assessments.

68. Fishery dependent data are important for many purposes. However, for the different types of assessments requested in the FAO Deep-sea Guidelines, some types of data can only be provided using fishery-independent methods, or will be highly uncertain if fishery-independent data are not available. However, these types of surveys involve high costs when undertaken in the high seas. Collaborating with commercial vessels could enhance these programmes.

69. Collaboration on stock assessment processes, through RFMO/As or among fishing states where an RFMO/A is not in place is critical for robust assessments. Some states are able to complete stock assessments individually in areas without RFMO/As, but opportunities for these assessments to

be done in collaboration with the other flag states with vessels fishing in the area would greatly improve the outcome.

70. One of the primary problems in areas where there is no RFMO/A in place is that there is no central data storage and analysis facility where data confidentiality is ensured.

Priority actions for improved implementation:

- (a) Facilitate through relevant bodies (e.g. FAO, RFMO/As) working groups or other similar arrangements that would develop resource status assessments and assemble information made available by States.
- (b) Develop joint research programmes with industry to carry out surveys, using a variety of technologies, including acoustics.
- (c) Undertake fisheries independent surveys in areas of interest to fishing.
- (d) Gather existing and historical data, where available, for use in these assessments, and existing fisheries data should be re-evaluated for implementation of the FAO Deep-sea Guidelines.
- (e) Make use of all relevant information from deep-sea high seas research on biogeography and ecosystems concerned.

Management measures

71. Issues in the management of the DSFs in the high seas do not differ substantially in terms of substance from shallow water fisheries, but rather in terms of degree.⁶ Therefore, management measures considered for use in DSFs should adequately consider the degree of the problem and amount of precaution needed for the specific fishery. Management based on total allowable catch (TAC) is most effective when there are ample and reliable historical data and stock assessments have been carried out. Species taken in DSFs tend to be low productivity species that can only sustain relatively low exploitation rates and require more accurate assessments for TAC management. Management based on effort controls can be of limited effectiveness for fisheries targeting aggregations/concentrations of the target resource.

72. In general, the management measures and tools will be the same both in areas where RFMO/As are in place and where they are not, and many of the issues and challenges that have been identified for areas where RFMO/As do exist are equally applicable to high seas areas where no RFMO/A exists. However participants noted that the efficiency of the measures is likely to be low or compromised, if applied only by each flag state individually, without coordination with other flag states fishing in the same area and on the same stocks.

73. The opportunity for fishing nations to engage in discussions with other fishing nations operating in the same area will be important for effective management; however, some developing states might be unable to enter into such discussions because of limited resources. The possible role of FAO to act as a facilitator for discussion on management measures in areas where no mechanism for formal cooperation exists was raised by the Workshop participants.

74. Participants also discussed the value of providing incentives and not only disincentives as a tool to promote increased compliance and provision of data. Although problems related to creating a uniform incentive structure and ensuring that the incentives are right do exist, there was general agreement that a concerted effort to look into this would be welcome.

75. A range of management tools are available to satisfy VME conservation including the suite of standard fisheries management measures. Management measures should meet stated objectives in the fisheries including sustainable fisheries and the protection of VMEs and marine biodiversity.

⁶ See: FAO. 2007. *Report and documentation of the Expert Consultation on Deep-sea Fisheries in the High Seas, Bangkok, Thailand, 21–23 November 2006*. FAO Fisheries Report No.838, Rome, FAO. 203p.

Emphasis also needs to be placed on the link between the use of the VME criteria (paragraph 42 of the FAO Deep-sea Guidelines) and the resulting management implications. Paragraph 74 in the FAO Deep-sea Guidelines is clear in its description of what should be done when current knowledge and data do not allow adequate assessment of the likelihood of the presence of VMEs. In this case precautionary management and conservation measures are necessary.

76. High resolution bathymetric data and VME-predicting models can produce maps that could provide information for management and planning. Areas with significant concentrations of VMEs, areas of patchy VMEs and areas without VMEs could then be indicated as well as areas that are suitable or unsuitable (unsafe to deploy gear) for fishing. Identification of areas suitable for fishing and those areas where VMEs are determined present could reduce reliance on reactive mitigation measures to prevent significant impact on VMEs.

77. A large amount of work still needs to be done in multibeam mapping of the bathymetry of fishing grounds in high seas areas. However, the fishing industry and states in many cases have useful information. Confidentiality and ownership issues have to be resolved and effort should then be made to mobilize high resolution bathymetry data that are currently not in the public domain or easily accessible.

Priority actions for improved implementation:

- (a) Facilitate discussions on collaborative management measures between flag states and relevant coastal states.
- (b) Promote the production of VME maps using high resolution bathymetric data and VME-predicting models.

Spatial management measures

78. Area closures are often gear specific and are currently used broadly within RFMO/As as a general management tool as well as a tool for specifically protecting VMEs. The benefits of area closures will not be realized, at least not fully, if not all vessels in the area are obliged to or do not comply with the closure. Spatial management measures – marine protected areas, area closures, etc. – are only one of the tools in the fisheries management “toolbox” and should generally be applied along with other management measures.

79. The presence of VMEs or likely VMEs should always result in mitigation and management measures that prevent significant adverse impacts. However, it is important to note that such management measures do not necessarily have to be area closures, although the use of a closure may sometimes be the, or one of the, preferred management measures.

80. In order to increase awareness of area closures and other types of management measures, flag states or groups collaborating on these measures in areas where there are no RFMO/As could submit information on them to the FAO VME database.

Priority actions for improved implementation:

- (a) Design area closures in a systematic manner taking account of the features to be protected, the nature of the fishery, and other fisheries management measures in place.
- (b) FAO VME database, once operational, will help convey information on area closures and foster cooperation between flag states.
- (c) Make available currently inaccessible bathymetric and VME data to RFMO/As. These data could stem from a variety of sources including fishing nations and the fishing industry.
- (d) Provide guidance on precautionary management approaches in the absence of appropriate information for mapping.

- (e) Undertake studies to determine factors that affect the effectiveness of area closures in different fisheries.

Move-on rule

81. Move-on rules are not a new management response and have been used in other fisheries in the past. The effectiveness of move-on rules should be evaluated based on management objectives and the characteristics of particular fisheries. Workshop participants noted that the use of this rule in relation to the FAO Deep-sea Guidelines and UNGA Resolution (61/105) is new and studies need to be undertaken to determine the effectiveness of this management response in the specific context of high seas DSFs. Implementing the move-on rule is proving to be a major challenge because of difficulties in defining an encounter with a VME; and if an encounter has taken place, if and how moving on could contribute to reducing the risk of significant adverse impacts.

82. Move-on rules as currently applied in many areas may not be effective in preventing significant adverse impacts, particularly when used to protect sessile VMEs. Specific gear impacts should also be taken into consideration when designing move-on rules.

83. The move-on rule could be particularly useful when applied in areas where it is thought that there are not significant concentrations of VMEs, but where such a measure could assist with contributing to information on VMEs in the area. This rule could also be effective for bycatch species when their spatial distribution is known to be patchy but locations of patches are not highly predictable.

Priority actions for improved implementation:

- (a) Clarify move-on provisions and revise them as appropriate using the best available data on spatial pattern and distribution of VME indicators and undertake studies to determine the effectiveness of the move-on rule.
- (b) Develop guidance on appropriate threshold levels or triggers in relation to move-on rules.
- (c) Collaborate on and share data that could inform move-on rules and other management measures. Protocols for the sharing of these data should also be developed.
- (d) Stimulate research to improve the use and understanding of the move-on rule.

Compliance and enforcement

84. Participants recognized that many compliance and enforcement issues are common to all fisheries. However, additional challenges apply to DSFs in the high seas, particularly where an RFMO/A is not in place. In these areas, the flag state that authorizes a vessel to fish in areas beyond national jurisdiction is responsible for ensuring that the vessel complies with relevant national and international measures.

85. Some of the MCS tools used in coastal areas are expensive and impractical or more difficult to use when employed in areas beyond national jurisdiction, placing a greater emphasis on certain MCS tools, such as VMSs. Given that many of these fisheries are carried out by very few vessels, control could potentially be easier than for coastal fisheries with numerous vessels.

86. Options for individual vessels or vessel operators to report information on the activities of other vessels operating in high seas areas on an informal basis was discussed. As the FAO Deep-sea Guidelines encourage flag states to join the International Monitoring, Control and Surveillance Network, the MCS Network may be an appropriate organization to which this type of information could be submitted. Vessels should also be encouraged to report sightings back to the competent authority in their flag state.

87. It was noted that trade-related measures such as catch documentation schemes for target species could be useful for compiling further information on catch and effort and promoting compliance of vessels operating in high seas DSFs.

Vessel registers and records

88. In UNGA Resolution 61/105 in 2006 states were requested to make publicly available a list of vessels flying their flag authorized to conduct bottom fisheries in the high seas through FAO. Participants noted, however, that only the Cook Islands and the European Union had done so as of the date of the Workshop. FAO does have an existing information system framework to collect information on individual fisheries, including data such as number of participating vessels and catch. However, this framework does not collect information on individual vessels. Information on individual vessels in these fisheries might be obtainable in the future though initiatives such as the FAO Global Vessel Registry (currently under discussion).

Priority actions for improved implementation:

- (a) It was highly recommended that flag states submit their lists of vessels authorized to conduct bottom fisheries in the deep seas at the earliest opportunity and that this information is made publicly available by FAO.

Vulnerable marine ecosystems

Identifying and protecting VMEs

89. Identifying VMEs or VME components is a complex task that requires a large amount of work to enable implementation of the FAO Deep-sea Guidelines. Among other issues, better efforts need to be made to compile all relevant scientific information with a view to identifying VMEs and mapping VMEs.

90. Participants discussed the level of reporting or identifying of VME species that can reasonably be required in fisheries where there is not an observer specifically tasked with this work. Scientific work in relation to new VME related requirements has now broadened, increasing the workload and the knowledge required of observers and also potentially the vessel's crew. In some RFMO/As only scientific observers are used, whereas in others compliance observers are the norm. The scientific observers focus primarily on collecting information on catch (including species composition), effort, and biological data, whereas these tasks may be only part of the job of a compliance observer. In some fisheries specialized data collection officers (DCOs) are employed by the vessel operator to collect this information. The data collection may also be carried out by crew members and the data collection required for VMEs would then fall on them, placing further demands on crew with very limited available time.

91. The participants agreed that there is a definite need for tailored species identification guides for vulnerable deepwater species. Identification guides for some species groups are now being used or developed by several RFMO/As. Training for observers and crew who are assigned the task of species identification will be critical to the effective use of such guides.

92. The requirement for protocols for subsampling were discussed as sampling the full range of potential VME species could imply a significant increase in the amount of work for observers or crew. Participants noted that a large volume of experience and guidance on appropriate subsampling strategies is available. In addition, fisheries-independent research surveys should endeavour to maximize potential identification of VME species.

93. There has been mixed experience in the application of the VME criteria in the FAO Deep-sea Guidelines (paragraph 42) to species other than corals and sponges, and especially in the context of finfish species. In the Northwest Atlantic Fisheries Organization (NAFO), the issue of vulnerable

finfish bycatch species was extensively considered by its scientific council. The NAFO listed 14 finfish species that could be considered as being components of VME according to the FAO Deep-sea Guidelines (NAFO, 2008). Some participants raised the need to further identify vulnerable deep-sea fish species for the purposes of assessing the potential impacts of these fisheries. Participants noted that there are many general fisheries management measures already in place that address impacts on some vulnerable species (e.g. international plans of action (IPOAs) on sharks, bycatch restrictions, etc.). Most RFMO/As had already implemented measures to conserve fish stocks and bycatch species, using a range of fisheries management tools, before the VME issue emerged. Management measures to address conservation issues associated with fish stocks and bycatch species have been developed in parallel with the recent VME-related measures and are not disconnected. Further integration and awareness on the overall range of management measures in use by RFMO/As should be encouraged and those management measures already in place should be reviewed relative to their effectiveness at protecting VMEs (particularly species other than sessile, structure-forming benthos).

94. An additional complication is the question of the state of some invertebrates such as corals. In some regions, states, RFMO/As and the fishing industry have struggled with the question of whether dead coral should constitute a component of a VME. This represents a substantial issue in some fisheries and efforts should be made to resolve it.

95. Different levels of identification of VMEs or VME species may be needed to inform management responses and predictive models. This information will likely be used as the basis of data for predictive models and other analyses, making it crucial that the data are collected in an appropriate manner. The South Pacific Regional Fisheries Management Organisation (SPRFMO) has proposed guidelines on how to quickly quantify evidence of a potential VME as the management response (e.g. a move-on rule, etc) will often depend on rapid assessment.

96. Habitat suitability models are important for developing information on VMEs in areas where limited biological information and information on VME species and/or habitat distribution is available. The models should build on experience in terrestrial and marine environments and apply appropriate quality controls. Such models rely on data available from scientific observations and surveys as well as other sources. In addition, evolving marine-habitat mapping makes use of high-resolution environmental data. Participants noted the importance of validating the models to ensure quality outputs that could be useful for management.

Priority actions for improved implementation:

- (a) Improve implementation of the FAO Deep-sea Guidelines by providing additional guidance on the interpretation and use of the VME criteria in paragraph 42. A scientific meeting on the application of criteria, gear-specific issues, and development of good indicators species should be held. Special effort should be made to ensure adequate participation from developing countries in such meetings.
- (b) Develop quantitative criteria for clear identification of VMEs.
- (c) Compile current management measures for other potentially vulnerable species (e.g. sharks, certain finfish) currently being used by RFMO/As and/or states.
- (d) Evaluate the compiled measures relative to their effectiveness at protecting various vulnerable species and habitats from serious adverse impacts.
- (e) Develop vulnerable species identification guides to address different needs. Training on the use of the guidelines and identification of these species will be a vital component of this work.
- (f) Develop protocols and procedures for vessel crew to sample and submit species to relevant institutions where regional or state procedures are not already in place.
- (g) Collect and collate data to support the identification of VMEs and assessments.
- (h) Develop guidance on the appropriate use of models for VME identification.
- (i) Make use of improved multibeam-derived bathymetric maps and environmental (physicochemical oceanographic) data that will provide the basis for the generation of high resolution habitat suitability models.

VME database

97. Participants discussed and commented on the proposed FAO VME Information System presented to the meeting and requested FAO to consider the following points:

- the terminology used to name areas should be that of the concerned authority, although some degree of harmonization is required;
- area closures used in fisheries management and conservation should be included in the database;
- the frequency of updates should coincide with mechanisms put in place by concerned authorities;
- the level of resolution and detail should be compatible with the global and regional scale nature of the initiative, the confidentiality requirements, and capacities for data provision of data providers;
- duplication of already existing information should be avoided and every effort should be made to create synergies with existing initiatives; and
- this initiative is being supported and led by the fisheries sector and should reflect the sustainable fisheries management goals of this sector which include the provision of data to allow fishing to continue in areas where VMEs are not likely to be present.

Priority actions for improved implementation:

- (a) Collect information from those RFMO/As that have indicated that they might be able to provide the summary type of information requested for the FAO VME Information System.
- (b) Make use of existing databases (e.g. bathymetric maps of the International Seabed Authority (ISA) and the Intergovernmental Oceanographic Commission, as well as data from CenSeam's "seamounts on-line" database⁷).
- (c) Develop options for how the VME database should be analysed and developed, including the potential use of the same principles and mechanisms applied by FAO's Fishery Resources Monitoring System (FIRMS).

Review and implementation

98. The current Workshop provided a good opportunity to establish an overall view of implementation and discuss challenges faced, but as noted in the section on General Considerations many states and RFMO/As have only just begun to address many of the provisions in the FAO Deep-sea Guidelines and the UNGA Resolutions for the purpose of their implementation. In this respect, participants suggested that this should not be a one-time effort, but that additional meetings to evaluate the challenges and potential solutions in the implementation should be planned for the future. Additional evaluations of the implementation of the FAO Deep-sea Guidelines could also encourage relevant parties and stakeholders to continue their efforts on implementation.

Priority actions for improved implementation:

- (a) FAO should complete a comprehensive review of the implementation of the FAO Deep-sea Guidelines and relevant UNGA Resolutions at a later stage when more progress has been achieved.
- (b) Organize future Workshop on the challenges and opportunities related to the implementation of the FAO Deep-sea Guidelines and UNGA Resolutions once states have had an opportunity to move further in the process.

⁷ See Web site at censeam.niwa.co.nz/outreach/censeam_faq/censeam_numbers.

Agenda

DAY 1 – Monday May 10th	
9:00–10:30	<p>Introduction</p> <ul style="list-style-type: none"> - Welcome - Opening and administrative arrangements - Objectives of the meeting and work plan - Introductions <p>The FAO Guidelines and the programme</p> <ul style="list-style-type: none"> - Overview of FAO Deep-sea Guidelines for the Management of Deep-sea Fisheries in the High Seas and the FAO Programme
10:30–11:00	Coffee break
11:00–12:30	<p>Session 1: Fisheries management in areas where a competent RFMO/A is in existence</p> <ul style="list-style-type: none"> - Presentation: Ross Shotton <p>Discussion paper 1 – Challenges to RFMOs in applying the FAO Deep-sea guidelines in the management of deep-sea fisheries in the high seas</p> <p>Discussion on the implementation of the guidelines: Identification of major challenges and solutions</p>
12:30–14:00	Lunch
14:00–15:30	Session 1: Fisheries management in areas where a competent RFMO/A is in existence (cont.)
15:30–16:00	Coffee break
16:00–17:30	<p>Session 1: Fisheries management in areas where a competent RFMO/A is in existence (cont.)</p> <p>Conclusions and recommendations</p>
19:00–20:30	Welcome dinner
DAY 2 – Tuesday May 11th	
9:00–10:30	<p>Session 2: Protection of Vulnerable Marine Ecosystems (VMEs)</p> <ul style="list-style-type: none"> - Presentation: Jake Rice <p>Discussion paper 2 – Review of progress on implementation of the FAO Deep-sea guidelines for the management of deep-sea fisheries in the high seas – experience of RFMO/As with identifying and protecting VMEs</p> <p>Discussion on the implementation of the guidelines: Identification of major challenges and solutions</p>
10:30–11:00	Coffee Break
11:00–12:30	Session 2: Protection of vulnerable marine ecosystems (VMEs) (cont.)
12:30–14:00	Lunch
14:00–15:30	Session 2: Protection of vulnerable marine ecosystems (VMEs) (cont.)
15:30–16:00	Coffee break
16:00–17:00	<p>Session 2: Protection of vulnerable marine ecosystems (VMEs) (cont.)</p> <p>Conclusions and recommendations</p>
18:30–20:00	<p>Special evening event</p> <p>The Korean experience: deep-sea fisheries in the high seas</p>

DAY 3 – Wednesday May 12th	
9:00–10:30	<p>Session 3: Management and conservation where there are no competent RFMO/As</p> <ul style="list-style-type: none"> - Presentation: Dave Japp <p>Discussion paper 2 – Workshop on the Implementation of the FAO Deep-sea Guidelines for the Management of deep-sea fisheries in the high seas - Implementation of these guidelines in areas where no competent RFMO/A is in place</p> <p>Discussion on the implementation of these guidelines: Identification of major challenges and solutions</p> <p>Topics to be discussed</p>
10:30–11:00	Coffee break
11:00–13:00	<p>Session 3: Management and conservation where there are no competent RFMO/As (cont.)</p> <p>Conclusions and recommendations</p>
13:00–14:30	Lunch
14:30–15:30	Secretariat and reporters complete draft of recommendations and conclusions
15:30–16:00	Coffee break
16:00–	Adoption of key recommendations and conclusions

APPENDIX 2

Matrix of issues

Challenges and potential solutions to consider for each issue
(The categories are based on the sections in the FAO Deep-sea Guidelines have been integrated to facilitate use for the purposes of this Workshop)⁸

	Session 1 – Fisheries management	Session 2 – VMEs	Session 3 – Where there are no RFMOs
General issues	<p>How to appropriately publicize information?</p> <p>Impediments to effective implementation.</p> <p>How can the industry cope with the cost and management issues associated with the implementation of these guidelines?</p> <p>Is the use of fisher's, non-governmental organization (NGOs), and others being adequately utilized?</p> <p>What types of incentives can be provided within RFMOs?</p> <p>What types of socio-economic information would be useful in general?</p> <p>Addressing developing country requirements and involvement.</p>	<p>Coordinated programme to mobilize resources for assistance (for all issues, but particularly for VMEs as many new requirements).</p>	<p>Participation in regional meetings for the development of RFMOs or other types of regional cooperation mechanisms.</p> <p>General capacity building programmes.</p> <p>Coordinated programme to mobilize resources for assistance.</p> <p>High cost of participation and management of these fisheries.</p> <p>Other types (non-RFMO) of regional cooperation or communication mechanisms.</p> <p>Benefits of proper management of these fisheries and the resulting protection of marine biodiversity.</p> <p>Incentives to apply the FAO Deep-sea Guidelines.</p> <p>Awareness building and wider distribution of information.</p> <p>Coping with distant water fishing nation (DWFN) vessels that fish both in EEZs and high seas.</p>
Governance framework	<p>Coherence in requirements for vessels within different states and within RFMOs.</p> <p>Communication, cooperation and coordination between RFMOs and within society (research centres, etc.) to RFMOs.</p>	<p>Assistance to states for the development of appropriate legal frameworks to support protection of VMEs and participation in RFMOs.</p>	<p>Assistance with development of appropriate policy and legislation.</p> <p>Responsibilities of states to exercise jurisdiction over their vessels.</p>

⁸ Issues associated with Annex of the “International Guidelines for the Management of Deep-sea Fisheries in the High Seas”, have been integrated into the VME section; special requirements for developing countries have been addressed throughout as well as additional considerations.

	Session 1 – Fisheries management	Session 2 – VMEs	Session 3 – Where there are no RFMOs
Governance framework	How are transboundary stock issues dealt with? Is current cooperation adequate?		<p>States should implement relevant national policies, legislation and institutional frameworks necessary for the management of DSFs.</p> <p>States should work to strengthen existing RFMOs.</p> <p>Establishing RFMOs where none exist.</p> <p>Communication between states and other regional initiatives.</p> <p>How can transboundary stock issues be dealt with where there are no RFMOs?</p>
Data, reporting and assessment	<p>Is the collection of historical data within RFMO areas necessary for management? (ownership, sensitivity, availability, accuracy).</p> <p>Standardized collection of data (are RFMOs providing standard formats, etc.)?</p> <p>Observer and observer training programmes.</p> <p>Collaboration with industry.</p> <p>What types of socio-economic information would be useful for RFMOs?</p> <p>New and exploratory fisheries.</p> <p>Data confidentiality within RFMOs (conflicts between confidentiality and transparency).</p> <p>Data reporting and storage.</p> <p>Stock assessments Current stock assessment approaches.</p> <p>How can RFMOs cope with low information situations?</p> <p>What types of lower cost and innovative methods are in use or available.</p>	<p>Identification of species and collection of biological data related to VMEs.</p> <p>Obtaining information for adaptive management to prevent significant adverse impact (SAI) on VMEs.</p> <p>Transparency in data collection and analysis.</p> <p>Information for VME protocols and encounters.</p>	<p>Development of standardized methodologies and tools.</p> <p>Cooperation and communication between states for data and reporting, and assessing deep-sea stocks.</p> <p>Monitoring and reporting location of vessels in real time.</p> <p>Observer programmes.</p> <p>Efforts to collate biogeographic information.</p> <p>Information requirements for adaptive management.</p> <p>Data confidentiality issues for individual states.</p> <p>Stock assessments States collaborate on stock assessments and submit data to FAO on stock assessment and evaluation of impacts of fisheries on VMEs where there are no RFMOs.</p>

	Session 1 – Fisheries management	Session 2 – VMEs	Session 3 – Where there are no RFMOs
Data, reporting and assessment	<p>Stock assessments The role of fisheries-independent surveys.</p> <p>Have appropriate research protocols been developed?</p> <p>Mobilization of fishers' knowledge in stock assessments.</p> <p>Have scientific working groups been established?</p>		
Identifying VMEs and assessing significant adverse impacts (including Annex)	<p>How can impact assessments be undertaken and what is the current status? (general species issues and VMEs to addressed Session 2).</p>	<p>Identifying areas where VMEs are likely or known to occur.</p> <p>Collection of relevant information for inferring presence of VMEs.</p> <p>Improving and adapting the use of VME criteria (additional guidance on how the criteria should be applied in relation to different species groups).</p> <p>More balanced attention to the all the marine features in Annex and more comprehensive assessments of likelihood of VMEs.</p> <p>Collection and analysis of information of fisheries in relation to VMEs.</p> <p>Risk assessments (for VMEs specifically).</p> <p>Repeated assessments after changes to the fishery to prevent SAIs on VMEs when the fishery or natural processes have changed.</p> <p>Consideration of the legal basis and implications of research on VMEs in the high seas.</p> <p>VME database.</p>	<p>States should also submit their impact assessments as well as any existing or proposed conservation and management measures to FAO (and make them publicly available).</p> <p>Assistance with developing legal frameworks to support protection of VMEs.</p> <p>Assembling and analyzing relevant information for the identification of VMEs.</p> <p>How can developing states or those that only have a few vessels flying their flag obtain the necessary information for identifying and assessing SAIs on VMEs.</p> <p>Impact assessments.</p> <p>VME database for use by states.</p>
Enforcement and compliance	Vessel registers.	How to address VME encounter protocols?	Vessel registers. Data submission to FAO.

	Session 1 – Fisheries management	Session 2 – VMEs	Session 3 – Where there are no RFMOs
Enforcement and compliance	<p>Onboard observers (compliance observers). VMS</p> <p>Maintaining accurate information on vessels in the fishery.</p> <p>Trade and certification schemes.</p> <p>Port State Measures.</p> <p>Other methods of addressing illegal, unreported and unregulated (IUU) fishing.</p>		<p>Compliance observer programmes.</p> <p>Differences in MCS capabilities in areas where there are no RFMOs.</p> <p>Independent monitoring of vessels's activities.</p> <p>Preventing IUU fishing activities.</p> <p>Trade-related measures.</p>
Management and conservation tools	<p>Reference points and uncertainty.</p> <p>Fisheries management measures (regulation of effort, catch controls, area closures, etc).</p> <p>Mitigation measures for SAI.</p> <p>Application of precautionary management and conservation measures.</p> <p>Adaptive management strategies.</p> <p>New and exploratory fisheries.</p> <p>Fishery management plans.</p>	<p>VME measures in new and exploratory fisheries.</p> <p>Developing and improving protocols for encounters with VMEs (VME triggers).</p> <p>Move-on provisions.</p> <p>Modification and adoption of management measures for protection of VMEs.</p> <p>Management measures to reduce SAIs on VMEs and protect VMEs.</p> <p>Adaptive management.</p> <p>Evaluation of impacts and risks of fishing activities on VMEs.</p> <p>What management actions should be taken when there is too little information to determine if VMEs are present?</p>	<p>Appropriate development of framework for new or exploratory fisheries, and existing fisheries.</p> <p>Flag states should develop comprehensive maps showing the spatial extent of existing fisheries and cooperate with other states concerned and FAO in developing joint maps for relevant areas.</p> <p>States and RFMOs should adopt specific conservation and management measures for deep-sea fisheries. In the absence of an RFMO, flag states should develop and implement such measures.</p> <p>Area closures.</p>
Assessment and review of effectiveness of measures	<p>Evaluation of protocols and procedures – need for further support outside of RFMOs?</p> <p>Transparency.</p> <p>The role of the scientific committee.</p>	<p>Mechanisms for review and evaluation of fishing on VMEs.</p>	<p>Transparent system for regular monitoring of fisheries management plans and conservation and management measures.</p> <p>Regular review of information on VMEs, fish stocks, and impacts of fishing activities on VMEs, as well as review of impact assessments.</p>

List of participants

INVITED EXPERTS

BERGSTAD, ODD AKSEL

Institute of Marine Research
Norway
E-mail: oddaksel@imr.no

DURÁN-MUÑOZ, PABLO

Instituto Español de Oceanografía Centro
Spain
E-mail: pablo.duran@vi.ieo.es

GHIGLIA, MARC

Union des armateurs de la pêche française
France
E-mail: uapf@wanadoo.fr

GIANNI, MATTHEW

Deep Sea Conservation Coalition
Netherlands
E-mail: matthewgianni@netscape.net

GREHAN, ANTHONY

National University of Ireland Galway
Ireland
E-mail: anthony.grehan@nuigalway.ie

HOYDAL, KJARTAN

Northeast Atlantic Fisheries Commission
United Kingdom
E-mail: kjartan@neafc.org

IBALL, SUSAN DIANNE (SUSIE)

Interim Secretariat of SPRFMO
New Zealand
E-mail: susie.iball@southpacificrfmo.org

JAPP, DAVID

CapFish
South Africa
E-mail: jappy@iafrica.com

JEONG, II JEONG

Ministry for Food, Agriculture, Forestry and
Fishery
Republic of Korea
E-mail: iljeong@korea.kr

MANGAN, EAMON

Direction des pêches maritimes et de
l'aquaculture, MAAP
France
E-mail: eamon.mangan@agriculture.gouv.fr

MITCHELL, JOSHUA

Ministry of Marine Resources
Cook Islands
E-mail: j.mitchell@mnr.gov.ck

NORSE, ELLIOT

Marine Conservation Biology Institute
United States of America
E-mail: elliot@mcbi.org

ORLOV, ALEXEY

Russian Federal Research Institute of
Fisheries and Oceanography – VNIRO
Russian Federation
E-mail: orlov@vniro.ru

PARKER, STEVE

National Institute of Water and Atmospheric
Research
New Zealand
Email: s.parker@niwa.co.nz

PATCHELL, GRAHAM

SIODFA/Sealord Group
New Zealand
E-mail: gjp@sealord.co.nz

PEREZ, JOSE ANGEL ALVAREZ

University of “Vale do Itajaí” – UNIVALI
Brazil
E-mail: angel.perez@univali.br

RICE, JAKE

Department of Fisheries and Oceans
Canada
E-mail: jake.rice@dfo-mpo.gc.ca

ROGERS, ALEX

Institute of Zoology
Zoological Society of London
United Kingdom
E-mail: alex.rogers@ioz.ac.uk
www.zoo.cam.ac.uk/ioz

SEOK, KYU JIN

National Fisheries Research and Development
Institute
Republic of Korea
Email: pisces@nfrdi.go.kr

SHIN, JAE WAN

KOSAC Trading Co., LTD
Republic of Korea
E-mail: fleur@kospa.org

SHIN, HYOUNG CHUL

Korea Polar Research Institute
Republic of Korea
E-mail: hcshin@kopri.re.kr

SHOTTON, ROSS

Southern Indian Ocean Deepsea Fishers
Association
Greece
E-mail: r_shotton@hotmail.com

SLICER, NATASHA

Conservation of Antarctic Marine Living
Resources
Australia
E-mail: natasha@ccamlr.org

STOBUTZKI, ILONA

Fisheries and Marine Sciences Programme
Australia
E-mail: ilona.stobutzki@brs.gov.au

SWANSON, DEAN

National Marine Fisheries Service, NOAA
United States of America
E-mail: dean.swanson@noaa.gov

THOMPSON, ANTHONY

Northwest Atlantic Fisheries Organization
Canada
E-mail: athompson@nafo.int

TOMINAGA, HARUO

Fisheries Agency, Government of Japan
Japan
E-mail: haruo_tominaga@nm.maff.go.jp

OBSERVERS**LIM, GWANG SOO**

Ministry for Food, Agriculture, Forestry and
Fishery
Republic of Korea

KIHWAN, KIM

Ministry for Food, Agriculture, Forestry and
Fishery
The Republic of Korea
E-mail: volunteer33@korea.kr

KIM, DOO NAM

National Fisheries Research and Development
Institute
The Republic of Korea

SHIN, YOUN MIN

Pukyong National University
The Republic of Korea
E-mail: sym@korea.com

FAO

Viale delle Terme di Caracalla
00153 Rome
Italy
www.fao.org/fi

NOMURA, ICHIRO

Fisheries and Aquaculture Department
E-mail: ichiro.nomura@fao.org

BANG, TAEJIN

Fisheries and Aquaculture Policy
and Economics Division
Fisheries and Aquaculture Department
E-mail: taejin.bang@fao.org

SANDERS, JESSICA

Fisheries and Aquaculture Policy
and Economics Division
Fisheries and Aquaculture Department
E-mail: jessica.sanders@fao.org

TACONET, MARC

Statistics and Information Service
Fisheries and Aquaculture Department
E-mail: marc.taconet@fao.org

TANDSTAD, MERETE

Marine and Inland Fisheries Service
Fisheries and Aquaculture Department
E-mail: merete.tandstad@fao.org

PART 2: EXPERT CONSULTATION BACKGROUND DOCUMENTS

Discussion Paper 1

CHALLENGES TO RFMOs IN APPLYING THE FAO DEEP-SEA GUIDELINES ON THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS

by **Ross Shotton**

Southern Indian Ocean Deep Sea Fishers Association

The views expressed in this paper are personal to its author and do not reflect a formal position or opinion of FAO or any other organization or State.

SUMMARY

RFMOs that are responsible for the management of deepwater fisheries and the protection of biodiversity face similar problems. Where fisheries target slow-growing late-maturing species, which may consist of populations with poorly understood and unpredictable recruitment, then the requirements for appropriate management action should be similar across the RFMOs. Some deepwater species are widespread and can be found in all the major oceans; in other cases, fisheries may be for a species that is only targeted in the waters of a single RFMO, e.g. Patagonian toothfish. Here, management responses will be specific to that species. In both cases, management methods must address the vulnerabilities of the stocks to depletion given that the usual requirements for confident decision making in management are lacking. In the case of protection of biodiversity, certain norms have been developed over a relatively short period of a few years. There is common recognition that much deepwater benthic fauna is highly vulnerable to damage by fishing gear that makes bottom contact. In these cases RFMOs have been confronted with the need to define VMEs and to operationalize the definition. Associated with this concept is that of a SAI. Thus, once it is concluded that a VME is encountered, RFMOs need protocols to decide if an encounter with the VME by fishing gear constitutes a SAI. Different standards have been adopted reflecting the different circumstances of the RFMOs. The need to record encounters with VMEs has required the development of reporting arrangements and new observer responsibilities for taxonomic identification of often confusing benthic fauna groups. RFMOs have had to implement procedures when vessels encounter VMEs, principally a move-on requirement based on unavoidably arbitrary requirements of trigger thresholds, distances to be moved and subsequent fishing requirements that appear to fully satisfy few. This has been complemented by implementation of closed areas. International guidelines such as that of FAO Deep-sea Guidelines provide direction that is commonly accepted but, as usual, further work is required.

1. INTRODUCTION

The purpose of this paper is to:

- describe the challenges experienced by regional fisheries management organizations/agreements¹, fishing states and the fishing industry thus far in applying the International Guidelines for the Management of Deep-sea Fisheries in the High Seas (FAO Deep-sea Guidelines) and the nature of the potential solutions to these challenges;
- to document some examples where application of these guidelines has been undertaken by RFMO/As and fishing states; and
- provide a summary of the most important challenges.

¹ For brevity, referred to here as RFMOs.

Concerns about the issues associated with deep-sea fishing have been in existence for scarcely 10 years, although deep-sea fishing has been undertaken for perhaps over a century but on a scale of minor concern. Two issues stand above all else: (i) ensuring that deep-sea fisheries are not overexploited, a concern of major importance given that many deep-sea fisheries target species are vulnerable to overexploitation and/or have a bycatch of species with similar vulnerabilities;² and (ii) the effects of bottom contact fishing methods on benthic fauna that is highly vulnerable to physical damage and often so slowly growing that recovery of damaged individuals and populations, and the habitats they may form, is beyond human timeframe scales.

The response of RFMOs to the need to manage the effects of deep-sea bottom-contact fishing have ranged widely. To understand these reactions it is useful to reflect on the history, practices and causes that first prompted the creation of RFMOs. In some important fishing areas, RFMOs came into existence in the post Second World War years to manage the expansion of fishing arising from the development of high-seas distant-water factory-trawler fleets, primarily in the 1960s and the following two decades. For example, in the western Atlantic, the relevant organization was the International Commission for Northwest Atlantic Fisheries (ICNAF), later replaced by the North Atlantic Fisheries Organization (NAFO) following the extension of coastal state control (in this case primarily Canada and the United States of America) to 200 nm following the Law of the Sea agreements to recognize sovereign control over management of fishery resources in this area. These RFMOs had a strong tradition of dealing with commercial fishing and usually were used to ensure that past fishing practices were protected as much as possible. National delegations to annual commission meetings, if not lead by fisheries departments, inevitably had strong representation from the ministry responsible for fisheries. Today, the North East Atlantic Fisheries Commission (NEAFC), although not a RFMO of equally long standing, may be seen as representing a similarly orientated tradition with all its members having strong fishing traditions. These RFMOs may be considered as traditional fishing management organizations whose emphasis was mainly determining what stock-specific total allowable catches should be and how they should be allocated among their members. In contrast to these RFMOs is a new generation of international organizations whose geographical concerns were in areas that had not been characterized by major fisheries but were considered to be of major conservation concern. One such example would be the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) where the founding members had few, if any, fisheries interests in the southern Ocean, but most had strong scientific traditions in the area, if not territorial claims. RFMOs such as this were often represented by national delegations where fisheries representation was subservient to those responsible for conservation. The consequence was often strong interactions at meetings of the commissions between those that could be described as “fishing nations” and those perceived to be conservationist countries: many other countries were positioned somewhere in between this continuum and were subject to their own internal tensions.

The paper first deals with the issues of Governance and Management, and the various issues affective these. A third section addresses the Governance Framework and a fourth section, on Management and Conservation follows. Then follows a section on Enforcement and Compliance. The challenges faced by the fishing industry are described in a section devoted to their concerns and a concluding section examines the challenges and opportunities that exist.

² The characteristics of these species are well documented: slow growth, late maturity, considerable longevity, episodic recruitment and unknown stock-recruitment relationships. Target species with these characteristics include the now iconic orange roughy (*Hoplostethus atlanticus*), oreos (Oreostomidae: several species) and many deepwater sharks, some now considered to be threatened such as the gulper shark (*Centrophorus* spp.).

2. GOVERNANCE AND MANAGEMENT

General management considerations

2.1 Reference points and prevention of impacts (paragraph 21, (i))

The requirements of RFMOs defined in the FAO Deep-sea Guidelines under “Governance and Management”, in the case of deepwater stocks, can be onerous. In effect they require that the fish stocks, both targeted and bycatch species are exploited in a sustainable manner consistent with the management reference points in the FAO Code of Conduct for Responsible Fisheries, i.e.:

“7.5.3 States and subregional or regional fisheries management organizations and arrangements should, on the basis of the best scientific evidence available, inter alia, determine:

- (a) stock specific target reference points, and, at the same time, the action to be taken if they are exceeded; and*
- (b) stock specific limit reference points and, at the same time, the action to be taken if they are exceeded; when a limit reference point is approached, measures should be taken to ensure that it will not be exceeded.”*

In the case of some targeted deepwater species sustainable fisheries have not been achieved or the state of the fishery is a matter of contention. Management reference points conventionally include some combination of minimum/threshold spawning and target biomass levels. Management requires knowledge of when a threshold is exceeded and that appropriate management responses have been agreed upon. This may consist of a reduction in the total allowable catch (TAC), the amount of permitted fishing effort or even a closure of the fishery.

Implicit in using reference points is that knowledge exists as to the stock structure of the exploited populations. This is easily satisfied for some deepwater species, e.g. boarfish (*Pseudopentaceros* spp.), which appear to have a panmictic structure. Other important deepwater species are more problematic. The existence of fisheries targeting spawning populations on seafloor features raises the possibility that each spawning aggregation may be a distinct population. If these aggregations are numerous and relatively small, RFMOs may be unable to justify the execution of a fishery-independent stock assessment programme, which could be the preferred method of assessment especially as catch per unit of effort (CPUE) methods for assessing abundance will be inappropriate if it is an aimed-trawl fishery. In practice, this may imply the need for aggregation-based stock assessments. A further complication arises if the species in question undergoes serial spawning over an extended period so that only a fraction of the stock is present “on” the feature at any one time or if it is dispersed by survey (and fishing) activity.

The structure of the committees within the RFMOs undertaking the assessment can differ. In NAFO the scientific committee (Scientific Council) and the management committee (Fisheries Commission) are of equal status. In NAFO, assessments are undertaken by stock-specific designated experts, usually assessment biologists from a small number of Contracting Parties. A designated expert presents the assessment to the Standing Committee on Fisheries Science and they review the assessment and pass it to the Scientific Council who then develops the management advice. The advice is passed to Fisheries Commission who will use it as a basis for the management of the appropriate stock. For VME issues, NAFO uses the Working Group on the Ecosystem Approach to Fisheries Management rather than a standing committee. The further structure is that of RFMOs without scientific committees, e.g. NEAFC: in this case they use the International Council for the exploration of the Sea (ICES) for providing scientific advice.

Methods for determining TACs conventionally require knowledge of the relevant biological parameters (M, F, K, age distributions – these can only be inferred from size frequency distributions for faster growing species – and, perhaps, a belief in some form of stock-recruitment relation). This information

may be supplemented by knowledge of species fecundity and stock spawning structure among other biological information. There appears to be no history of the application of minimal-parameter methods such as surplus production models for determining management requirements of deepwater species.

2.2 Identification of VMEs and location of fisheries in relation to VMEs (paragraph 21, (ii))

The FAO Guidelines also address issues of conservation of biodiversity. The Guidelines require the adoption of measures to prevent SAIs on VMEs and the protection of the marine biodiversity that these ecosystems contain. Current practices of RFMOs to prevent SAI, however defined, consist of: (i) permanently closing areas to fishing; (ii) temporarily closing areas to fishing when a specified threshold of “VME bycatch” species are exceeded then reviewing the nature of the bycatch to decide if fishing may be continued at that location; and (iii), requiring that the “offending” vessel move-on a specified distance relative to the position of the fishing activity. Here, the RFMO must operationalize what may be a qualitative factor. Notwithstanding the expected poor relation between benthos returned by the fishing gear and damage caused by the fishing gear, RFMOs must decide what species form VMEs – easy for some species but perhaps not all – and what is an acceptable quantitative measure of what constitutes a SAI? Then, what should be the appropriate move-on distance and from where should it be measured, when the criteria indicating a VME has been encountered? Should there be mitigating factors? Might the move-on requirement result in increased chances of SAI elsewhere? A hapless skipper in one location may be equally hapless in his next.

Move-on directives that have been adopted differ among RFMOs, perhaps reflecting their antecedents as either fisheries or environmentally-allied organizations. Move-on rules no doubt evolved from the earlier application of their use to avoid bycatch. Such practices have been used in national waters for some time: in the case of a RFMO, CCAMLR implemented a 5-mile move-on rule in 1995 for bycatches of more than 5 percent in the fishery targeting the myctophid *Electrona carlsbergi*. Vessels violating the bycatch limit could not fish in the immediate area for five days. A similar 5 percent rule was implemented for bycatch of specified species in the Patagonian toothfish and Antarctic icefish fisheries. In 2007, NAFO modified its complicated double 5-mile bycatch move-on rule developed in 2000 and implemented a 10-mile move-on rule for vessels that exceed their bycatch allowance. When two tows exceeded the limit, the vessel was required to leave the NAFO Division in which it was working and not return for 60 hours.

Thus, there was a base for consideration of benthic bycatches in deepwater fisheries. The NAFO protocol requires that vessels notify their flag state, who in turn should inform the NAFO Secretariat, when bycatch exceeds a set-catch threshold of 60 kg of “live corals” (defined as antipatharians, gorgonians, cerianthid anemones, *Lophelia* spp., sea pens “or other VME elements”) and/or 800 kg of live sponges. The Executive Secretary then is to notify other NAFO members who in turn are to inform their flag vessels. A vessel breaching the threshold must move at least 2 miles from the end point of the set “in the direction least likely to result in further encounters”. It is not specified if or when the vessel may return to within 2 miles of the end of the offending set. In 2008, the NEAFC and the South East Atlantic Fisheries Organisation (SEAFO) adopted similar regulations in part, no doubt in the case NAFO and NEAFC, a consequence that many members were the same in the two RFMOs.

In contrast to the Atlantic practice, that in the Pacific and Southern Ocean is much more restrictive, both in terms of the limits that trigger a move-on and in the move-on requirement. CCAMLR also introduced specific requirements for longline fisheries. In the case of benthic VMEs a risk area of 1 mile radius is used. In the case of the SPRFMO, interim measures require that vessels cease bottom fishing activities within five nautical miles of where evidence of a VME is encountered, and report details of the encounter to the interim Secretariat.

2.3 Data collection and research programmes (paragraph 21, (iii))

RFMOs can usually specify what data must be provided by vessels involved in fisheries managed under their aegis for the purpose of: (i) effective management of the resources (resource management related);

and (ii) conservation of biodiversity (protection of habitat and VMEs). In the first case, RFMOs inevitably document what data vessels should record. This includes time/date information on tows, geographical locations of tows including depth, gear characteristics and catch information – both of targeted species and bycatch, whether retained (i.e. commercially valuable species) or discarded (i.e. species of no value such as deepwater sharks or invertebrate benthos). The collection of such information is usually a standard requirement of all high-seas fisheries.

For deepwater fisheries, especially where the RFMO has no controls on fleet size, disclosure of tow-by-tow information will be of extreme sensitivity to operators and it is imperative that the RFMO have procedures that satisfy vessel operators that confidential information – often considered to be the companies’ intellectual property – is appropriately protected. Even if the RFMO has mechanisms that ensure secure and exclusive fishing entitlements (generally they don’t) individual operators will still wish to protect knowledge of the locations that their skippers consider to be “sweet spots”, i.e. areas of on-going high catches. Resolving this need has required developing technical forums that provide the assurance that sensitive data will be kept confidential and not be leaked in a way that would compromise the competitiveness of those who supplied it.

Information will be required that informs on stock structure. This may be as simple as the collection of length frequency and gonad information. But it is important to recognize that even two observers may be fully stretched to undertake a fully satisfactory catch sampling programme without the cooperation and involvement of vessel crews. RFMO protocols may encourage vessel operators to directly inform RFMO Secretariats of situations that require reporting of catches or VME encounters and more and more comment is evident of the workloads that can be generated if every vessel must report details of its benthos bycatch, particularly as more detailed species identification becomes the reality and yet smaller and smaller quantities of specified species are reported.

RFMOs have developed similar procedures for the reporting of encounters with VME. Typically, the flag state must be informed when this occurs and this information is then reported to the secretary of the relevant RFMO. This issue will probably require further consideration as taxonomically quite different bycatch species can appear superficially similar. To facilitate this requirement, at least one RFMO and several states have developed excellent species identification guides³ to assist with onboard identification of benthos likely to occur as trawl bycatch and which may indicate an encounter with a VME.

2.4 *Using fishermen’s knowledge and best scientific information (paragraph 21, (iv))*

Paragraph 21 (iv) of the Guidelines requires that the management of deep-sea fisheries (DSFs) should be based “*on the best scientific and technical information when available taking into account fishers’ knowledge, where appropriate*”. This advice of the Guidelines appears self-evident – use the best scientific data available, although disagreements may occur as to what defines “scientific data”. Indeed, the best information that is available may be anecdotal, and RFMOs will need to reflect on how to respond in such situations: an appropriate risk-averse response might be to accord anecdotal information the status of acceptable information for management purposes.

Experiences with how different RFMOs work show that the outcomes to such questions can vary. The requirement to implement the Precautionary Approach⁴, a sort of qualitative risk-evaluation and management decision-making process, itself creates a challenge. These issues are generally the purview of an RFMO’s scientific committee. These committees have what is often an unenviable task of producing “scientific” advice within limited time and budget constraints and, at times, with data of inadequate quality and insufficient quantity. From these, useful direction to the Commission must be

³ E.g. www.ccamlr.org/pu/e/sc/obs/vme-guide.pdf.

⁴ See Article 6 of the 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.

devised. It does happen that the advice that is produced is that “the Scientific Committee is unable to provide advice with the information that is available”. In these situations, the RFMO commissioners, who are often from Departments of Foreign Affairs and thus with legal/ administrative backgrounds, rather than in quantitative decision making in situations of uncertainty, have the responsibility of deciding what is to be done. Thus, it is important that they receive appropriate support to their decision making in such situations. Experience, degrees of belief and subjective skills in dealing with unquantifiable uncertainty become important here.

Accumulating experience shows that vessel crews’ knowledge can be invaluable in understanding the dynamics of the deepwater fisheries⁵ but RFMOs often do not have formal mechanisms for capturing their experience. This is regrettable and efforts should be made to determine how to include the experience of these stakeholders in the management process.

2.5 *Selective fishing methods (paragraph 21, (v))*

The importance of this issue to an RFMO depends on the nature of the fishing undertaken in its area of competence. Extensive trawling along the seafloor, bottom gill netting and even bottom longlining may be unselective and thus of concern. Such methods may be banned for this reason. Aimed-trawling, in contrast, is usually highly selective. Skippers (must) develop the skills to identify the species composition of marks shown on their echo sounders and may manoeuvre the trawl around unwanted species that associate with the targeted species. In these cases, ensuring that skippers have the appropriate skills is more important than gear-design mitigation measures intended to reduce bycatch. This may also be the case in avoiding bottom contact by the gear: a skipper unfamiliar with local conditions may incur a SAI while another skipper fishing in the same place is able to avoid them. This relates to the importance of skipper experience in the type of fishery being prosecuted and raises the issue of required skipper certification. Skipper certification is something not yet addressed by RFMOs.

2.6 *Monitoring, control and surveillance in the deepwater fishing context (paragraph 21, (vi))*

Much experience exists within most RFMOs and with their members regarding the monitoring, control and surveillance (MCS) requirements of high-sea fisheries. In this regard, deepwater fisheries are similar to more traditional demersal fisheries. RFMOs usually have protocols by which vessel inspections can occur at sea; specific requirements for the carrying of observers (or an equivalent process especially for data collection) and the participation of vessels in compulsory VMS schemes is no longer the issue it once was, though how vessel positions are reported remains a common topic of debate – should the reporting be to the flag state or the RFMO? Reporting requirements are usually well described and enforced.

2.7 *Overcapacity, overfishing and IUU fishing (paragraph 21, (vii))*

While RFMOs typically have the mandate to address overfishing in terms of its affects on stock biomass and illegal, unreported and unregulated (IUU) fishing, overcapacity is essentially an economic issue (exacerbated by subsidies provided to vessel operators). However, fleet overcapacity is rightly considered in the context of overfishing and IUU fishing as this is precisely what happens when fleet size exceeds that required to take the TAC. The socially efficient solution to this problem is allocation of secure, exclusive and transferable fishing rights, something that is happening *de facto* among the members of some RFMOs. A more formal consideration of this problem would expedite more lasting solutions to this problem as it involves issues relating to the law of the sea. Because of the time and effort required to effectively address these issues progress in this direction is proving to be, alas, slow.

Another method used by RFMOs to combat the problem of IUU fishing is to publish lists of offending vessels. These lists are freely circulated and impede or prevent movement of offending vessels from

⁵ FAO. 2008. *Deep-sea fisheries in the high seas a trawl industry perspective on the International Guidelines for the Management of Deep-sea Fisheries in the High Seas*. FAO Fisheries and Aquaculture Circular No.1036. Rome, FAO. 31p.

one area to another or from switching flags so as to disguise past illegal fishing behaviour. For example, in the case of the NEAFC, vessels are observed and inspected by NEAFC inspectors and those without the correct licenses are added to the Commission's "A list" and have certain restrictions on them. Following investigation, if there are no extenuating circumstances the vessel is transferred to the "B List"⁶ and face severe restrictions on their activity in the NEAFC Area, and potentially beyond. NAFO and NEAFC have established a common Atlantic IUU list whereby vessels on the lists of one party are placed on the lists of the others. NEAFC has proposed having the same arrangement with CCAMLR. According to the NAFO Conservation and Enforcement Measures (NCEM) (Article 57.8) when NEAFC adds or deletes an IUU vessel, NAFO sends a letter to contracting parties stating that the vessel will be added or deleted from the NAFO IUU list unless an objection from a contracting party is received within 30 days.

2.8 *Handling the problem of data confidentiality while ensuring transparency and dissemination of information (paragraph 21 (viii))*

A standard requirement of RFMOs is that they compile and disseminate accurate and sufficient statistical information to ensure that the best scientific evidence is available for the management of the marine fauna in the area for which they have competence. This includes an important responsibility of making information available to the wider public. However, experience shows that these objectives are not independent and thus both cannot be optimized simultaneously. The maximum amount of information will be made available when data holders are confident that the confidentiality of information they supply will be maintained. However, data analysis by RFMOs may be undertaken collectively; in these cases those involved in the analyses must have access to the information they need. This they often express as "everything". This issue may be further complicated by national legislation that protects private information where the activities on an entity may be identified. For example, in Canada data must be aggregated to contain at a minimum the information from three entities; in Australia, it is six. To enable analysis to continue (and it is in the interests of vessel operators that fisheries resources are properly managed) a process must exist where discussions are restricted and there is assurance that data confidentiality will be maintained. Further, data held by the RFMO must be archived in a way that prevents inappropriate access to information that is deemed confidential beyond that which is publically made known by the RFMO. This is commonly done, but it is not a simple issue; the data holder must have the confidence of those providing data or else they will inevitably filter what they can provide – this does not help the scientific process.

Data typically required from the flag state may include:

- catch/bycatch and fishing effort data aggregated by flag state and calendar year, provided on a geographical basis, e.g. by 5° areas. If fewer than a minimum number of vessels exist, a lower resolution may be used; and
- the number and characteristics of vessels authorized to fish by the flag state and reporting period.

Standards exist that set the requirements for such data, e.g. ISO/IEC27002:2005 (updates ISO/IEC 17799:2005). RFMOs, when requested, may be required to compile and disseminate to their members more detailed information than that described above: this implies that such data are received from their members and contracting parties.

2.9 *Impediments to the effective implementation of RFMO programmes*

RFMO, as with any organization, must justify how they use their funds to members and indeed the outcomes of RFMO administration and finance committee deliberations are crucial in determining the extent of RFMO activity. Thus, general calls for RFMOs to undertake more responsibilities, manage more data requiring progressively larger information technology (IT) processes and host more sub-

⁶ E.g. www.neafc.org/blist.

committees dealing with yet more issues of environmental “importance”, pose increasing burdens on the operations of most RFMOs and require more funds that may not be forthcoming. Even where much work by experts is funded directly by national delegations, the additional expense must still be covered even if in a less evident manner.

Managing the impacts of fishing have a corresponding administrative and research work load. For example, bottom fishery impact studies, once received, must be assessed by competent reviewers. Additional information may be required and other members may need to be advised of the outcome of all steps in this process, which must all be archived in appropriate correspondence registers. Correspondingly, costs will be incurred by the RFMO, although in some cases these expenses may be recovered by a charge-back process to those responsible for the costs. Where there is a need for rapid action – e.g. interim (or permanent) closures –promulgations must be distributed swiftly, something that has been facilitated by the use of e-mail, although hard copy correspondence in some cases is still required. More assessments, more closures, more encounters, all place their burden on the operations of the respective RFMO and all have budgetary implications. Indeed, some believe that there limits to this type of management process, which may soon be met.

Governance framework

2.10 The continental shelf (paragraph 25)

High-seas RFMOs by definition will not be concerned with shelf issues within national EEZs. However, continental shelves do extend on to the high seas and below the conventionally accepted limit of 200 m depth. Here, international law dictates that shelf-related fauna remain under the control of the adjacent state. In general this is not an issue, although complications can be envisaged where a shelf species may have a deepwater pelagic phase, a benthic deepwater phase and so on.

2.11 Flag state control of fishing vessels undertaking high-seas deepwater fisheries (paragraph 24)

Flag state control of their vessels when fishing on the high seas has been a particular issue for areas where there have been no RFMOs and in these cases different vessels may be subject to different standards. And, where RFMOs exist, national regulations may impose more severe requirements, e.g. in relation to the trigger for move-on rules, than those imposed by the RFMO. In these situations, it is common experience for national delegations to strenuously try to persuade other commission members to agree to the RFMO adopting their state’s practice if for no other reason than to avoid penalizing their own vessels relative to those of other states. While such debate and intentions may be encouraged, this is, in the end, something that RFMO’s commissioners must address.

2.12 Creation of new RFMOs (paragraph 28)

Even before the 2006 the United Nations General Assembly (UNGA) resolution 61/105, an international impetus existed to create RFMOs for high seas areas where none existed. This process usually involves: (i) protracted negotiations on the proposed organization’s text; (ii) a signatory meeting to accept the text; (iii) a period whereby states ratify the text; and (iv) entry into force of the organization when the agreement has been ratified by the specified number of states. In the case of the Southern Indian Ocean Fisheries Agreement (SIOFA) negotiations over the text began in 2000. Subsequent negotiating sessions followed in Madagascar and Kenya with detailed interim discussions. A signing ceremony of the text was held in Rome in July 2006. But, entry into force of the agreement requires that two coastal states sign the agreement, although so far only the Seychelles has done so. Mauritius, both a coastal state and important port state for southern Indian Ocean fisheries is still discussing how it might join. Meanwhile, the deepwater fishery in the SIOFA is expanding as vessels, displaced from other areas by the advent of new RFMOs that are forcing the closing of grounds because of the existence of VMEs, move their operations to the SIO. While regulations exist to the extent that flag states control the activities of their vessels, few dispute that coordinated control of an area is needed to ensure conservation of fishery resources and VMEs.

2.13 *Communication, cooperation and coordination (paragraph 29)*

There are two areas relevant to communication, cooperation and coordination in relation to the activities of an RFMOs. RFMOs must be able to quickly inform members when TACs have been caught to prevent specified harvest levels being exceeded. In turn, members must inform the Secretariats of RFMOs on a timely basis as to the catches of their flagged vessels. This may involve at least four players: (i) the vessel's skipper, (ii) the national licensing authority, usually the department of fisheries; (iii) the national department with responsibility for dealing with the RFMO, often the department of foreign affairs; and (iv), the Secretariat of the RFMO that is to receive the information. The RFMO for its part must be able to anticipate as accurately as possible when they believe the TAC will be filled. This usually depends on experience gained in prior years. The instruction to stop fishing must be conveyed through the reverse of the process described above. Mutual agreements may exist to short-circuit this process through direct communication with the Secretariat – in any event the temptation to continue fishing because the “information was not received” can be formidable.

Ideally the RFMO will not have to address the issue of transboundary and straddling stocks or harvesting by non-members, whether they be non-contracting parties (legally accepted) who accept the provisions of the harvesting and conservation provisions of the RFMO or non-contracting parties who do not. But, in many areas (e.g. that for the NEAFC and NAFO) important stocks may be harvested both within and beyond national EEZs so expanding the RFMO's business. In the case of NAFO, assessments are done for the straddling stock and coastal states act on this advice to set joint TACs. Here commissioners may wear “two hats” and cooperation is essential to avoid failing to achieve the RFMO's objectives. Review of RFMO reports show this to be a common topic of contention.

RFMOs typically maintain contacts with other relevant RFMOs and scientific bodies through asking participants who attend other RFMO meetings to report back on relevant business. This is rarely an issue, but it is something to be stepped through in often packed commission meeting agendas.

3. MANAGEMENT AND CONSERVATION STEPS

Data, reporting and assessment

3.1 *Data collection and reporting (paragraphs 30, 31, 34–36, 38 and 39)*

Collection and provision of data is a major (and costly) undertaking for RFMOs. When it is done by members in a uniform manner the process is simplified – something immeasurably facilitated by the current nearly-universal use of computers.⁷ RFMOs may facilitate this process by providing standard formats for the provision of data through (often electronic) log books and standard forms. Fishing vessels can be asked or instructed to undertake the collection of data in highly proscribed ways, e.g. recording not only the bycatch from longlines but also the section of the line on which it was taken. Resource surveys, by their design requirements, usually are not changed frequently (which would invalidate the time series being established) and usually there is concordance on the processes to be followed. In the case of some RFMOs, e.g. CCAMLR, new (i.e. exploratory) fisheries must be undertaken and reported on following strict protocols. Where a fishery has been closed for some time, its status may revert to that of an unfished area: restarting fishing must follow the “new fishery” or “exploratory fisheries” protocol.

Reporting of “historic” data may be an issue. If it divulges information considered sensitive to the owner difficulties may be encountered in recovering such data, which may only be available voluntarily. Further, states that pioneered the fishery in an area may no longer be active in the fishery and, understandably, are unwilling to incur the cost of coding historic data and making it available. In

⁷ The correspondent of this paper can remember past RFMO commission meetings where national delegations, well-known for the practice, would report that they had been unable to collate the required national data in time to enable stock assessments to be undertaken, but to trust then with their verbal accounts.

some important cases of past high-sea fishing states (e.g. the Soviet Union, East Germany) the relevant state may no longer exist. Recovering information that exists in these cases needs careful consideration. Irrespective of the cost involved, considerations will be the value of the data – e.g. how accurately was it recorded; was there significant misreporting? Is sufficient detail available? Self-evidently, early exploratory data accurately recorded may be of immense value in providing insights in to the amounts of unfished biomass that may have occurred in an area and indications of species succession. Funding acquisition of such data can be of great benefit, although it may involve difficult negotiation over subsequent ownership of the data. Alternatively, it may be concluded that the historic data are of little value.

The FAO Deep-sea Guidelines encourage reporting and analysis of fisheries data to be done transparently to facilitate review of the effectiveness of management of DSFs and protection of VMEs. However, when this militates against the interests of confidentiality on the part of the state, this may not happen. Such directions are not helpful even if there is understanding as to how they arise.

3.2 New fisheries (paragraph 32)

It is important that RFMOs have mechanisms and protocols to manage new deep-sea fisheries, although understandably this is difficult, if not impossible, when there is little concrete information on which to expect that a profitable fishery will develop. In this case, procedures to be followed in the case of new fisheries must be pre-defined to ensure that exploratory fishing does not turn into full-scale fishing before management procedures can be undertaken. A further problem is that if new fisheries develop without appropriate monitoring measures information vital to the subsequent management of the fishery is often not collected. Further, no measures may be in place to protect previously unknown VMEs. For these reasons, RFMOs may have in place “new fishery exploitation procedures” that specify reporting and notification of bycatch requirements, especially of VMEs. In terms of resource management, only a nominal level of fishing effort may be permitted until information is obtained to allow more confidence in permitting exploitation of a fishery to expand.

3.3 The role of socio-economic surveys (paragraph 33)

While the FAO Deep-sea Guidelines refer to undertaking socio-economic surveys, it is not clear how an RFMO can use such information in its management processes. For example, the activities of one vessel may directly contribute to achieving Millennium Development Goals while those of a comparable vessel fishing alongside may not. But, there is no apparent basis in international law where preference could be given to one vessel over another, or one flag state over another, for socio-economic reasons, unless such provision is explicitly made in the constitution of the RFMO. It is difficult to conceive that this would ever be the case given the complications it could cause to the business of the RFMO.

3.4 Managing situations where information is scarce or lacking (paragraph 37)

RFMOs usually have few resources to undertake the mapping of areas of potential VMEs nor is it usually part of their mandate to do so, although they may have close relations with scientific bodies who undertake such activities. Despite this, mapping of VMEs and providing this information is considered to be important for provision to RFMO members. For example NAFO, through its Scientific Council, and NEAFC, through PECMAS, with information obtained from their respective contracting parties, identify and map sites where VMEs are known to occur or likely to occur and provide this information for circulation to all contracting parties.

Identifying vulnerable marine ecosystems and assessing significant impacts

3.5 Stock assessment (paragraphs 40 and 41)

The FAO Deep-sea Guidelines recognize that for many deep-sea fisheries, lower cost or innovative methods are needed but it is a mistake to conclude that they need be simpler. Fishing vessels using longlines may be required to report on the bycatch by fishing line segment to better indicate that area in which the bycatch from a long set occurred. Permission to undertake exploratory fishing may involve considerable operational requirements that will assist analysts to interpret exploratory fishing catch results. The “boutique” nature (i.e. small-size of targeted stocks and small number of vessels able to sustainably fish them) of many deep-sea stocks, which may be spread over enormous areas, will mean that fishery-independent surveys are unlikely to ever be economically justified. In these circumstances, commercial vessel methods with an emphasis on aggregation based surveys may enable high-quality “scientific” data to be collected. Such surveys differ from the more traditional area-based designs in that they are commonly undertaken by commercial fishing vessels when they encounter an aggregation of fish, and do not follow a pre-determined design. Successfully under-taking such surveys emphasizes the importance and role of involving vessel’s officers in the decision making process when scientists develop assessment programmes.⁸ Information on the nature of data commonly collected during deep-sea resource surveys is given in Shotton (2006)⁹.

3.6 Fishery impact assessments (paragraphs 47–49, 50, 52–53, and 70)

Both the FAO Deep-sea Guidelines and UNGA Resolution 61/105 refer to the need to conduct impact assessments prior to the undertaking of any fisheries. One constraint of such assessments is that unless a proposal is for an area known to contain important VMEs, there may be no substitute for actually undertaking some controlled exploratory fishing to explicitly establish what impacts may occur or even if VMEs occur. By controlling exploratory fishing, risks to VMEs may be minimized while providing for the opportunity to develop a fishery. At this point in the development of deepwater fisheries, it is probable that few unexplored areas exist, but it is still right to provide for situations that may develop. Risk prediction based on the impact assessment of likely impacts by the fishing operations should assist commissioners in deciding whether to allow exploratory fishing to occur.

Preparation of bottom fishing impact statements has been gaining greater emphasis as a formal way of reviewing potential impacts of fishing on benthos. Many RFMOs require these and have developed protocols to be followed in their preparation.

In the case of SPRFMO, a process along the following lines is required:

- define the critical terms that are referred in a bottom fishing impact statement, e.g. SAIs, VMEs, bottom fishing, etc.;
- define what constitutes “detection of VMEs” by the fishing process; and
- document the assessment of the bottom fishing impact on the benthic environment, especially on VMEs that are present.

⁸ A recent review of this topic is available in a FAO Fisheries Circular currently in press titled “Fishing Vessel Execution of Acoustic Surveys for Deep-sea Species Issues and Ways Forward.”

⁹ FAO. 2006. *Management of demersal fisheries resources of the Southern Indian Ocean. Report of the fourth and fifth ad hoc Meetings on Potential Management Initiatives of Deepwater Fisheries Operators in the Southern Indian Ocean (Kameeldrift East, South Africa, 12–19 February 2006 and Albion, Petite Rivière, Mauritius, 26–28 April 2006) including specification of benthic protected areas and a 2006 programme of fisheries research* by R. Shotton (comp.). FAO Fisheries Circular No.1020. Rome, FAO. 90p.

This may involve the following:

- participants must prepare bottom fishery impact assessments for all proposed bottom-fishing activities in the RFMO region of competence, irrespective of the proposed scale, area or previous history of such fishing activities;
- impact assessments are then submitted to the RFMO Secretariat prior to commencement of any bottom fishing being evaluated. Fishing may then proceed in accordance with the management and mitigation measures proposed in the proposal while the assessment is being evaluated;
- bottom fishing impact assessments are posted on the RFMO website for comment for 30 days and are then forwarded to the scientific working group for their comment;
- the Scientific Working Group (SWG) must evaluate an assessment and provide written comments to flag states through the SPRFMO Secretariat within 60 days; their comments are posted on the RFMO website; and
- flag states wishing to engage in the exploratory fishing are required to respond to the written comments provided by the scientific working group.

Many of these elements can be found in the exploratory fishing protocols of other RFMOs. In the north Pacific, interim arrangements require that impact assessments are done prior to new fishing activities, which are treated as exploratory fishing. Prior to any exploratory fishing, north Pacific RFMO members are to provide the SWG with an assessment that is to follow the RFMO's "Science-based Standards and Criteria for Identification of VMEs and Assessment of Significant Adverse Impacts on VMEs and Marine Species" with particular attention to evaluating the risks of SAIs in line with the "precautionary approach". Exploratory fisheries are then to be permitted only where they would not have SAIs on marine species or any VME on the basis of comments and recommendations of Scientific Working Group and other requirements. NEAFC requires that exploratory bottom fishing activities are subject to an assessment procedure in which particular care shall be taken in the evaluation of risks of the significant adverse impact on vulnerable marine ecosystems, in line with the "precautionary approach". In the case of NAFO, the Party proposing bottom fishing in new areas shall submit an assessment, where possible, of the known and anticipated impacts of its bottom fishing activities on VMEs, together with the mitigation measures to prevent such impacts. This information is to be submitted as required by the Scientific Council who assess the report and advise the Commission accordingly.

3.7 Evaluation protocols and procedures (paragraph 50)

Commissioners of RFMOs are typically informed on biological issues through a Scientific Committee. Such committees may opt to form ad hoc committees of specialists to address particular scientific issues that are outside the normal range of their activities. In either event, a particular concern can be the additional costs incurred and funding of such "ad hoc" committees. Scientific Committees normally report to the commission through the Scientific Committee's Chairperson. Here, there is commonly a challenge to communicate levels of uncertainty regarding the issue under consideration; commissioners may not understand the nature of the issues involved but at the same time desire "scientific certainty" as to what decision should be taken. This may make for rapid commission reactions to reports originating from the scientific committees with uncontested acceptance of their advice.

Scientific committees may in particular be asked to react to proposals for mitigating measures. These may include dealing with bird strikes of species found in high-seas (and thus commonly deepwater) areas and marine mammal interactions. In these cases it appears that, fortunately, these sources of damage by deepwater fishing boats are rare. More commonly the issue is that of the impact of fishing gear on the benthos. Commissions have reacted in various ways but given the common membership of so many RFMOs it is unsurprising that some RFMOs adopt measures that scarcely vary from those of sister bodies. An example is that of NAFO and the NEAFC, two north Atlantic organizations while the deliberations and decisions associated with development of the SPRFMO bear many commonalities with of CCAMLR. These latter two organizations also have many members in common and have

contiguous areas of competence. In any event, mitigation in relation to benthic impacts may as likely consist of changes to fishing practices as to changes in gear design.

3.8 *Publicity (paragraph 51)*

Almost all RFMOs now maintain internet web sites. The quality of these varies but the main RFMOs usually present all business that is in the public domain on their web sites. Information provided, in addition to RFMO constitutions and procedural rules, includes details of: (i) Commission meeting reports, (ii) impact assessments; (iii) existing and proposed conservation and management measures; and (iv), advice and recommendations provided by the appropriate RFMO/A scientific or technical committee.

Enforcement and compliance

Failure to enforce (and lack of the capacity to enforce) conservation regulations, in all fisheries, will result in compliance failures. Indeed, addressing compliance issues by the appropriate committee can be the most contentious of RFMO committee meetings. In this context, MCS issues relating to deep-sea fisheries are unlikely to differ significantly to other types of fisheries that a RFMO must deal with. The usual measures will be required, i.e. *inter alia*, on-board observers, satellite-based VMSs and particularly now, port state controls and product certification.¹⁰ As with other fisheries, information to be verified will be fishing locations, documentation of fishing effort, verification of catch data, and to the extent possible, verification of compliance with management measures.

RFMOs have various national or international mechanisms for using observers. Conventionally they report to the flag state. Observer programmes on deepwater fishing vessels are similar to those for other fisheries. However, because of the emphasis on detecting encounters with VMEs observers on deepwater fishing vessels must have the ability to determine the taxonomic identity of deepwater fauna that may be retained by the fishing gear. Invertebrates commonly include, e.g. Gorgonacea (Isididae – Bamboo corals); Coralliidae corals); Primnoidae (bottle brush, sea fans); Paragorgiidae (bubblegum corals); Chrysogorgiidae (golden corals); Hydroida (hydroids); Anthoathecatae (stylasterids – hydrocorals corals); Scleractinia (stony corals); Antipatharia (black corals); and Bryozoans (lace corals). An important and potentially vulnerable vertebrate group commonly taken are the deepwater sharks. Both discard groups can provide difficulty in identification even at a family level and, e.g. CCAMLR has produced its own guide for the identification of deepwater invertebrate benthos. Some national departments have also produced impressive identification guides. Post-cruise assistance may be required to enable satisfactory species identification given the difficulties in taxonomic identification of otherwise discarded species. Another group commonly taken by deepwater trawls are crustaceans, but these are generally not considered to be threatened.

Some RFMOs and/or flag states may require that two observers are embarked to ensure 24-hour coverage of vessel operations. Their duties can be extensive and include observing fishing practices, catch sampling, both of targeted and bycatch species and observation of vessel/gear interactions with species such as seabirds and marine mammals. The costs of observers are usually paid by the vessel operators and may be considerable. In many instances vessels' crews will have considerable familiarity with many of the more unusual bycatch fish species: this expertise is valuable and should be used by observers. Despite this, access to experienced taxonomists is usually a must and for this reason, where possible, observers should retain specimens and have the skills to take informative photographs.

3.9 *Characteristics of vessels in the fisheries (paragraph 56)*

Accurate information on vessels characteristics will allow monitoring of changes in fleet fishing power and thus help in interpreting the relation between fishing effort and fishing mortality. Improvements in vessel design but particularly gear controls (e.g. winch systems) and acoustic equipment for monitoring

¹⁰ E.g. www.ccamlr.org/pu/e/cds/cds-ops.htm.

gear position and fish detection are vital, especially for aimed trawling. Accurate descriptions¹¹ are also needed for MCS purposes to help in vessel identification.

3.10 *IUU fishing (paragraphs 58 and 59)*

A common problem for RFMOs is that of dealing with IUU fishing, a situation that is not always “black and white”. While the beneficial owners of vessels may stay the same, the flag state used for their vessels may move around various countries, often those that belong to RFMOs with competence for the areas where the vessels have operated “illegally” in the past. Countries may fail to remember to inform RFMOs that these vessels are now operating under their flag: this is important as some RFMOs maintain registers of IUU vessels that are circulated to other RFMOs in an effort to deter their continued operation.

States have been highly embarrassed at RFMOs meetings when presented with clear evidence that vessels they have flagged have been presenting false VMS information and have been operating in an RFMO area but without the appropriate notification to, or approval of, the RFMO. Catches in such cases have not been (properly) recorded and harvest levels are consequently underestimated with the danger of overexploitation. Where this has been a practice, Scientific Committees must estimate the amount of IUU catch in order to properly account for all harvests of particular species.

Partly for this reason, RFMOs usually have mechanisms whereby non-party states can become non-contracting parties by which they agree to observe the rules and procedures of the relevant RFMO but without incurring the expense of becoming a member. This often is a temporary measure undertaken after they have started fishing in an area but before their governments have been able to satisfy the requirements to join an international organization, with the responsibilities this implies. This, while not an entirely satisfactory situation, represents a compromise for the RFMO by which it gets the information it needs for management purposes. Non-contracting parties may be allowed to attend RFMO meetings but are usually only accorded observer status. Clearly, as is recognized in the FAO Guidelines, it is preferable that states be full members of RFMOs in which their flagged vessels operate.

3.11 *Trade related measures (paragraph 60)*

Detecting and controlling IUU fishing on the high seas is hugely expensive and often a “hit and miss” activity and the last decade has seen a change in emphasis from direct enforcement of fishing activities to shore-based controls. Catches must be landed and IUU vessels must be resupplied with fuel, gear and other supplies. Measures that are designed to exploit these operating requirements have developed along two lines. Some countries¹² (much to their credit) have implemented what are described as “trade-related measures”. These require that any imports of specified fish species must be accompanied with a certificate from a recognized national authority (often referred to as the CA – the competent authority) that attests that the product has been caught in accordance with the requirements of the relevant RFMO. Many of the higher value species taken by high seas fisheries are sold onto a relatively few national markets and the adoption by such measures by even only a few of these countries has been of great benefit in reducing (or eliminating) the profitability of IUU fishing. Such activity may not be completely stopped but uncertified product may be unable to be sold on the most profitable markets and so fetches a lower price. RFMOs themselves cannot insist that member countries adopt such measures: however member countries do use RFMO meetings to publicise their adoption of such measures and apply “moral suasion” on other members to do the same.

¹¹ For example, Shotton, R. 2008. Characteristics of SIODFA Vessels Operating in the Southern Indian Ocean Deep-sea Trawl Fisheries. SIODFA Technical Report 08/04. 9p.

¹² One example of such is the Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Regulations (EEC) No 2847/93, (EC) No 1936/2001 and (EC) No 601/2004 and repealing Regulations (EC) No 1093/94 and (EC) No 1447/1999.

One successful example of trade measures relating to a deepwater stock is that by the United States Food and Drug Administration, which issues compliance numbers to vessels that legally catch Patagonian toothfish. This was a response to the wide-scale illegal fishing for this species, so much so that formal CCAMLR assessments had to estimate IUU catches to estimate sustainable TACs.

Management and conservation tools

3.12 Management and conservation tools (paragraphs 61–65, 71)

The issue of “closing” of areas to DSFs where VMEs are known or likely to occur, based on the best available scientific and technical information” will be more contentious in the context of a “fishing” RFMO. When little or no direct observations have been made as to the benthos in an area, the “best available scientific and technical information” may not be good and/or may be subject to contentious interpretation. Meta-analyses may be useful guides but when used to justify management actions they are likely to encounter opposition as a basis for RFMO “conservation” action. Refraining from expanding the level or spatial extent of effort of vessels involved in DSFs is a welcome RFMO action but likewise may encounter opposition from countries who might claim discrimination for being a late entry in to the fishery. Hence the FAO Deep-sea Guidelines reference to “such interim measures” being “without prejudice to future allocations and participatory rights in the fishery, in accordance with international law”. How helpful such text is in the context of RFMO deliberations remains to be seen.

Again, RFMOs in practising “Precautionary conservation and management measures, including catch and effort controls” during the exploratory phase of a DSF” will usually experience heated debate if members wish to enter a new fishery, or one in which they have not previously participated. In such situations, countries may “reserve their positions”, or where the tradition is to act only on consensus, to at least threaten to do so. The management and conservation measures that RFMOs have at hand are usually those that are used for other non-deepwater fisheries as well. In such situations, “discussions in the margins of the meeting” are not uncommon.

3.13 Fishery management plans (75–78, 80)

The practice of using fishery management plans, as stock or fishery specific instruments, in an international context follows their widespread implementation at national levels, although, not everyone may understand the same thing by the term. RFMOs almost universally follow a fishery management plan approach in addressing management of their respective species, except when dealing with issues common to all fisheries, such as inspection or vessel monitoring protocols. Such plans may make reference to the need to observe the Ecosystem Approach to Fisheries Management and the Precautionary Approach, even if there is no indication as to what is exactly meant by these widely used terms. In the case of the FAO Deep-sea Guidelines, the need for adaptability is recognized in that it notes that states and RFMO/As should adopt and implement measures in accordance with the precautionary approach (as in Art. 6 of the 1995 UN Fish Stock Agreement and Articles 6.5 and 7.5 of the 1995 FAO Code of Conduct for Responsible Fisheries) and in accordance with an ecosystem approach to fisheries.

Fishery management plans for all fisheries commonly refer, explicitly or implicitly, to the need for consideration of biological reference points to ensure sustainable harvesting of fish stocks. Whether RFMO management guidelines adequately respect the uncertainties in their management strategies may be debatable, a frequent view of environmental non-governmental organizations (ENGOs). Whether exploitation rates are sufficiently low is often a point of contention between the traditional fishing-orientated members of an RFMO and those with a primarily “protection of biodiversity” orientation.

3.14 Transparency in RFMO processes (paragraph 79)

It should be apparent to observers of RFMOs that attitudes to the participation of non-member organizations (as observers) in meetings have been changing. One stimulus for this change has been the

practice by some countries of including NGO representatives as part of their national delegations. Because of this, meetings have become more open and objections to participation of observers by some RFMO members have come to mean little. Sensitive issues can be still dealt with through “heads of delegations” meetings and Chairpersons of RFMO meetings still can, and do, co-opt particular members to confer privately on sensitive issues when reaching agreement in plenary sessions proves too time consuming. The nature of RFMOs as organizations with usually exclusively sovereign-state members means that non-state entities such as industry and environmental lobbying groups can only influence RFMO business indirectly, either through presentations by invitation of the Chairperson or distribution of information in printed form or on respective web sites.

4. CHALLENGES TO THE INDUSTRY

Self-evidently, the regulations developed by RFMOs are of critical concern to the fishing industry. Areas closed to fishing may represent lost fishing opportunities, although this will be mitigated by the degree of mobility of the targeted species. A requirement to move-on because a tow has exceeded a VME trigger level may mean a 24-hour steam for the vessel if it has been fishing a remote and small bottom feature. More importantly, because deepwater aimed-fishing usually relies on encounters with fish aggregations that occur sporadically and unpredictably: being able to fish aggregations when they are found may mean the difference between a profitable and loss-making trip. Hence the incentive to ensure fishing complies with conservation regulations will be high.

Further, skippers usually have considerable incentives to avoid or minimize bottom contact with their gear. Putting the net on the bottom risks gear damage, coming fast with the gear or in rare cases, gear loss. However, the behaviour of some fish species may require bottom contact at some time during the tow. Again, skilled skippers will not knowingly tow their gear through coral stands – deep-sea fishing is enormously costly and the best markets for the species landed whole require that individual fish are undamaged – something not possible if jagged coral is mixed with the catch in the net.

For their part, international law is giving RFMOs options to provide the fishing industry with incentives that change the dynamics of how fisheries are managed and ensure the success of management objectives. Assurance of quotas on a sustainable basis goes far to remove the incentives to engage in risky fishing practices because of the pressures of competitive fishing. This, I believe, is the area in which the greatest progress is possible in ensuring sustainable deepwater fisheries returning a maximum of benefits to society.

5. MAIN CHALLENGES AND OPPORTUNITIES

Many of the tasks required of a RFMO in addressing management remain as challenging now as when they were first identified. Considerable effort has been invested in defining what is a “vulnerable marine ecosystem” and the associated concept of a “significant adverse impact”. RFMOs are accepting the FAO Deep-sea Guidelines as an appropriate standard to give direction on setting standards for management of deep-sea fisheries. Common operational practices are emerging. RFMOs have set thresholds for bycatches of benthic fauna that indicate the presence of a VME, although these vary considerably in the trigger values used. RFMOs have adopted reporting requirements and move-on rules for fishing vessels, although again, the decisions on what distance to move appears to owe more to past precedents in unrelated conservation situations than to any quantitative analysis. This is not unexpected given the variety of situations that will be encountered.

Operational experience has shown that skipper experience can determine whether or not there is a SAI on a VME but such variables would be even more difficult for a RFMO to address. In this case, a move-on requirement may merely shift the bottom affects of an inexperienced skipper to another area where the process of causing a SAI is repeated once again. As yet there is no sign that this particular issue is being addressed, not least because of the number of complex issues involved: who would certify a skipper as experienced and for what conditions; how would a skipper’s competence be assessed etc.?

Management of high-seas deep-sea fisheries, more than in other fisheries, demonstrates the need for more information with increases in the costs of management. Better decision making requires more, and better, information which in turn requires more resources for analyses and reporting and more time to do so – when timeliness may be of the essence. More information may simply demonstrate the complexity and uncertainty involved in the fishery situation, and lead to more complex management arrangements with no certainty that they will increase effectiveness.

The business of finance and administration committees at RFMO meetings is important and their decisions determine the extent of research and management activities. In the case of some RFMOs, significant fees are charged for processing applications for exploratory fishing which in part encourages serious forethought before such applications are made and penalizes cases where actual fishing does not come to pass. Nevertheless, at some point the balance will be reached between the benefits to be gained from more detailed reporting and the costs involved in doing so. Increased and more detailed reporting requirements result in increased workloads for RFMOs who must administer these activities, run databases and report to commission members, and have the resources to do so. The common solution in such cases in many national jurisdictions has been to devolve the respective responsibilities to the relevant fishery sector. This is an avenue that is still to be more effectively exploited by many RFMOs, although progress is unlikely to be facilitated by the wide range of practices that will occur among RFMO members.

RFMOs do have the opportunity of at least discussion regarding their common problems through their biennial meetings in conjunction with meetings of the FAO Committee on Fisheries (COFI). The management and conservation processes involved by individual RFMOs have much in common (data collection, analysis and reporting; specification and implementation of conservation regulations, ensuring compliance and enforcing regulations; and maintaining databases). Against these requirements, RFMOs are independent regional organizations. National membership will vary, and hence the synthesis of national interests. The nature of the deepwater fisheries that must be managed will vary even when they include fisheries for the same species, as will the problems of biodiversity that must be addressed and the manner of doing so. However, common memberships, the involvement of international organizations, both intergovernmental and non-governmental, result in many common elements in the problems that must be addressed and common approaches in addressing them.

Discussion paper 2

REVIEW OF PROGRESS ON IMPLEMENTATION OF THE FAO DEEP-SEA GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS – EXPERIENCE OF RFMO/As WITH IDENTIFYING AND PROTECTING VMEs

by **Jake Rice**
Fisheries and Oceans, Canada

The views expressed in this paper are personal to its author and do not reflect a formal position or opinion of FAO or any other organization or State.

SUMMARY

UNGA Resolution 61/105 calls on states to take a number of actions directly and through RFMO/As to ensure that ecosystem effects of fisheries are sustainable, or else not authorize fisheries to proceed. A key provision in the Resolution was to require that deep-sea fisheries are managed in ways that protected VMEs from SAIs. FAO undertook to provide guidance on how states and RFMOs/As should implement the provisions of 61/105 relative to ecosystem sustainability of fisheries, and protection of VMEs in particular. This guidance was built on the results of a series of Expert Consultations²¹. Two Technical Consultations in 2008 resulted in the International Guidelines for the Management of Deep-Sea Fisheries on the High Seas (FAO 2008; hence “the FAO Deep-sea Guidelines”)²². This report reviews the experience of RFMO/As with implementation of the paragraphs of those guidelines addressing the identification and protection of VMEs. It highlights gaps in implementation of the guidelines and opportunities to address gaps or increase the efficiency with which RFMOs/As are making progress.

1. INTRODUCTION

Direct contact was made with the Secretariats of several regional RFMO/As that are functioning or in the process of being established; specifically Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Northwest Atlantic Fisheries Organization (NAFO), North East Atlantic Fisheries Commission (NEAFC), South East Atlantic Fisheries Organization (SEAFO), South Pacific Regional Fisheries Management Organisation (SPRFMO), General Fisheries Commission for the Mediterranean (GFCM), and the developing RFMO for the northwest Pacific. Each was asked to provide the documents they considered most informative of their efforts to take action on UNGA Resolution 61/105 and on the FAO Deep-sea Guidelines. All RFMO/As responded positively, and the information they provided was followed up in several cases by direct reference to further documentation on the RFMO/A websites. All documents consulted in this review are listed at the end of this report.

²¹ *Expert Consultation on Deep-sea Fisheries in the High Seas (Bangkok, Thailand 21–23 November 2006)* – issues discussed, gaps in knowledge and capacity and focus for development of better management; *Workshop on Vulnerable Ecosystems and Destructive Fishing in Deep-sea Fisheries in the High Seas (Rome, 25–29 June 2007)* – to clarify issues of vulnerability, destructive fishing and adverse impacts; *Expert Consultation on International Guidelines for the Management of Deep-sea Fisheries in the High Seas (Bangkok, Thailand 11–14 Sept 2007)* – initial draft guidelines developed, amended, revised and adopted; *Workshop on Knowledge and Data on Deep-sea Fisheries in the High Seas (Rome, 5–8 November 2007)* – to improve guidelines in relation to data issues and review the *World Wide Review of Deep-sea Fisheries* (in press); *Skippers / Fleet managers Workshop on the International Guidelines (Cape Town, 25–29 May 2008)* – discussed trawl industry perspective on the international guidelines; *Technical Consultation on International Guidelines for the Management of Deep-sea Fisheries in the High Seas (Rome, 4–8 February 2008 and 25–29 August 2008)* – review and adoption of draft guidelines.

²² www.fao.org/docrep/011/i0816t/i0816t00.htm.

The documents were reviewed individually and material relevant to actions to identify and protect VMEs from SAIs was extracted from each one. Additional associated material relevant to the approaches adopted by each agency, to related conservation actions for VMEs, such as risk assessment protocols, and further planned science or management actions was extracted as well. For each RFMO/A the information was then sorted by whether it dealt primarily with identifying VMEs, with protecting areas where VMEs were known or likely to occur, or with managing fisheries in a precautionary manner in areas where VME status was not known.

Based on this information tabulation, summaries of progress, impediments, and gaps were prepared for those paragraphs in the FAO Deep-sea Guidelines relevant to identifying and protecting VMEs, and to managing fisheries when encounters with VMEs are possible. For the summary provided under the text for each paragraph, often examples are included from some of the RFMO/As. However these are presented for illustrative purposes only, and failure to list a particular RFMO/A under a particular paragraph should not be interpreted as that RFMO/A failing to take any actions on that particular issue. In a few cases the narrative summary is somewhat extended to present the evolution of action of an RFMO over a series of meetings. These cases are presented to demonstrate, via the path taken to reach a present status, either impediments that were encountered or strategies taken that facilitated progress.

UNGA Resolution 61/105, and the subsequent FAO Deep-sea Guidelines are important benchmarks in linking biodiversity conservation concerns to fisheries management. However, they were hardly the first moves in that direction. Many RFMO/As were taking actions consistent with conservation of biodiversity through bycatch management measures, fisheries management closures for a variety of reasons, and occasionally other measures, well before the UNGA Resolution and the FAO Deep-sea Guidelines. In fact, the Convention of CCAMLR was built around the concepts that underlie an ecosystem approach to fisheries management, even if that term was not being used in the early 1980s when the Convention was negotiated. The approach taken in this review, of considering specifically actions by RFMO/As after the FAO Deep-sea Guidelines were negotiated, is a reasonable approach for determining where gaps and opportunities for progress exist relative to implementation of the FAO Deep-sea Guidelines. However, it does not acknowledge any measures taken by RFMO/As before they became available. As such, it is inappropriate to interpret failure of an RFMO/A to take action relative to a specific paragraph of the FAO Deep-sea Guidelines as necessarily meaning that the RFMO/A has taken no actions relative to the intent of the paragraph. In some case previous measures implemented by an RFMO/A may have addressed the issue partially or fully. Any evaluation of performance of an RFMO relative to the FAO Deep-sea Guidelines and UNGA 61/105 should take account of the full suite of management measures it has in force, and not just those taken since the FAO Deep-sea Guidelines were negotiated.

This background paper concludes with a summary of main findings, but does not recommend any particular “best practices” or prioritize the gaps that exist in implementation. To the extent that those tasks are possible at this time, they are the prerogative of the Workshop informed by this background paper.

2. GOVERNANCE AND MANAGEMENT

General management considerations

2.1 Identifying areas where VMEs are likely or known to occur (paragraph 21, (ii))

All RFMO/As have undertaken actions to identify areas where VMEs may occur or are likely to occur, and to map the footprint of fisheries overall, and consequently in relation to those areas and features. Progress is uneven with regard to identification of different types of VMEs. More detailed information on the types of places and features that have been the focus of the identification efforts of the RFMO/As will be provided in subsequent parts of this paper, particularly in the commentary on paragraph 42. All RFMO/As acknowledge the incomplete, and in some cases (particularly the Pacific, South Atlantic, and Mediterranean) very limited data to use in the process of identification of VMEs.

Progress of the RFMO/As in the north Atlantic may be greatest, partly because a greater body of research results was available, and partly because both of those RFMOs commenced relevant actions by the middle of the 2000s. However, CCAMLR has made substantial progress with a single well-supported Workshop in 2009, and the other Pacific RFMOs are giving priority to pooling information that can be used in the identification of VMEs.

With regard to mapping the footprint of fisheries overall, most RFMOs are receiving detailed information on trawl efforts currently and in many cases for years to decades into the past. This is proving most challenging in the Mediterranean and South Atlantic RFMO/As. In those cases large fleets of small vessels are important fishery components and detailed reporting of fishing operations from such fleets is problematic overall. The historical data are being used by Science Advisory bodies of the RFMO/As to inform analyses and modelling of possible past locations of some types of VMEs.

2.2 Adopting and implementing management measures consistent with the precautionary approach (paragraph 22)

All RFMOs are discussing at least measures to avoid areas where presence of VMEs has been confirmed, and most are considering measures to reduce the risk of SAIs in areas where VMEs are likely to be present but exact locations are uncertain. Details of the types of measures being considered will be reviewed in the commentary on subsequent Guidelines paragraphs, particularly 63–67. In all cases where RFMOs have confirmed areas where VMEs are present, they have implemented mandatory closures of at least some of these areas. In almost all cases, these are areas with high densities and/or extensive stands of corals and sponges, or specific seamounts. All of these closures are for specified numbers of years, after which they will be reviewed. In the case of the north Pacific the RFMO is still in the process of being finalized, and the member states have agreed to comply with a proposed closed area, even though the RFMO does not yet have the jurisdiction to require and enforce a closure. Aside from CCAMLR, none of the RFMO/As have undertaken actions targeted at protecting VMEs other than corals and sponges or seamounts not being fished intensively at the time they were closed.

3. MANAGEMENT AND CONSERVATION STEPS

Data collection and reporting

3.1 Identification of species and collection of biological data (paragraph 36)

Several of the RFMOs are investing in developing coral and sponge identification sheets or manuals for observers on vessels fishing in the RFMO/A regulatory area, and some are offering training for observers in the use of the manuals. CCAMLR was the only RFMO that specified that training was being provided to fishers as well as observers, but that appears possibly to be the case in the Pacific RFMO/As as well. For RFMOs that chose to make modest investments in covering the costs of manual preparation and training, manuals reported to be useful and scientifically sound were consistently produced, although photographic material of corals and sponges native to various parts of the seas is unevenly available. Few of the RFMOs seem to be pursuing preparation of identification manuals for benthic invertebrates other than corals and sponges at this time. FAO has an extensive experience in preparing a wide range of technical species identification catalogues, field guides and species identification cards for commercial species and is now in the process of initiating large-scale activities to look into options for the development a range of species identification material including field guides for use on board vessels for corals, sponges and deepwater sharks.

3.2 Information for adaptive management (paragraph 38)

All RFMO/As are doing this to various extents, as a consequence of various activities to implement other provisions of the FAO Deep-sea Guidelines. None of the RFMO/As are specifically devoting effort to develop rule-based adaptive management strategies for preventing SAIs on VMEs. However,

such rule-based adaptive management requires the identification of a substantial portion of the VMEs in a regulatory area, determining operational indicators of the presence of features associated with VMEs during fishing operations, setting thresholds for what constitutes evidence of a VME, and having conservation measures whose effectiveness has been tested either for uniform application where VMEs are likely, or as reactive measures in areas where encounters with VMEs are possible. None of those components of a full adaptive management system are yet in place in any RFMO/A, and until substantially more progress is made on these components, it is premature to begin to establish adaptive management rules. Status and gaps in these components of an adaptive management system are reported under paragraphs 42, 63–67, and 70–73.

3.3 Transparency in data collection and analysis (paragraph 39)

All RFMO/As are encouraging observers to include the presence of at least corals and sponges in their reports of fisheries catches, and a few are asking for greater reporting of bycatches of benthos and non-target fish that may have life history parameters consistent with paragraph 42. Some RFMO/As are modifying catch reporting forms to allow fishers to report this information directly. Analyses of data regarding presence of and impacts on VMEs is usually assigned to whatever bodies provide scientific advice to the RFMO/A on other aspects such as fisheries and stock status. Some of these scientific advisory bodies have created either special Working Groups (e.g. the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources of the International Council for the Exploration of the Sea [ICES]) for NEAFC, the Subcommittee on Ecosystem Approach of the NAFO Scientific Council) or targeted Workshops (CCAMLR) to conduct these analyses. No special measures have been taken to make the activities of these science advisory bodies display a higher degree of transparency than other activities of the advisory and management bodies. However RFMOs are being encouraged to improve transparency of all their actions, and progress is being reported regularly. NAFO has taken the unique step of creating a special Working Group of Scientists and Managers to review information and analyses and provide recommendations to the NAFO Fisheries Commission. Membership in this working group (WG) is restricted and its transparency is not considered by some external groups to be as high as other WGs of the Scientific Council.

Identifying vulnerable marine ecosystems and assessing significant impacts

3.4 Criteria for identifying VMEs (paragraph 42)

There is partial progress on this Guideline. There have been several cases where RFMO/As have used the information in The Annex directly. Seamounts are one of the types of habitats listed in The Annex as features likely to be associated with the presence of VMEs, and several RFMO/As have closed most or all of some selected seamounts to fisheries.

With regard to use of the full set of criteria, NAFO is the only RFMO/A where a scientific working group has tried to apply all the criteria to marine fish and benthic invertebrates. Results of those efforts are summarized under paragraph 46. The WG on Ecosystem Approach to Fisheries Management of the NAFO Scientific Council considered all the criteria to be ecologically appropriate, but expressed concerns about the limited information expected to be available for assessments using the criteria, particularly those dealing with functional significance and life history traits. A special CCAMLR WG also considered the feasibility of using each of the criteria, and came to quite similar conclusions. The criteria are ecologically reasonable, but their application in assessments will pose substantial challenges to the assessment and advisory experts. Some proposals on possible approaches are reported in 3.7.

With regard to corals and sponges, several RFMO/As have tested various types of corals against the five criteria for VMEs. The science advisory bodies have consistently concluded that most types of corals and those types of sponges which may provide noteworthy three-dimensional structure do meet several of the criteria, and areas where there are “significant concentrations” are likely to be VMEs. Every single RFMO/A that has considered the use of the criteria for corals and/or sponges has

commented that the absence of any objective criterion for what constitutes “presence” greatly impedes objective use of the criteria. The RFMO/As discuss the issue primarily in the context of triggers for “encounter protocols” but the scientific advisory groups conducting assessments consistently remark that absence of triggers associated with the criteria impedes progress in using the criteria.

Major gap: Although science advisory bodies of the RFMO/As consider the criteria ecologically sound, they express the need for additional guidance on how they should be applied. This is particularly the case for criteria 42ii and 42iv, but triggers for use in assessments as well as encounter protocols are considered necessary for consistent and objective use of the criteria.

Opportunity: The additional guidance on how to apply the VME criteria should not be developed independently by each RFMO. This would be inefficient and risk bringing unjustified inconsistencies into practices and standards for identifying and protecting VMEs. Rather, the well-tested Expert Consultation processes of FAO, with inclusion of a representative and balanced group of experts from government, academic, and agency scientific centres, would be an appropriate model for producing the desired guidance documents. With the additional guidance, application of the criteria could continue to be done efficiently and consistently by the science advisory bodies of the individual RFMOs. See 3.8 for a more extensive discussion of this issue.

3.5 *Adaptation of criteria (paragraph 43)*

No RFMO/As have yet undertaken reviews intended to adapt or add criteria to those in paragraph 42 and the examples in The Annex. The reports of the RFMO/As suggest that they are finding the existing criteria taxing their capacity to deal with ecosystem issues in the contexts of reporting, assessment, or management, and are not ready to consider whether more are needed to ensure VMEs are adequately protected. They have not had sufficient experience with the existing criteria and examples to propose adaptations to them, beyond calls for greater specificity in what would constitute meeting a criterion.

3.6 *Collection and analysis of information of fisheries in relation to VMEs (paragraph 44)*

All RFMO/As have commenced actions to assemble and consolidate information on the spatial distribution of fisheries under their jurisdictions. Some RFMOs have at least partial information on historical fishing effort already available as part of regular reporting, or are requesting states to bring such information forward (North Atlantic, CCAMLR). Others, including the North Pacific, have made it a priority to obtain such information retrospectively. All comment that the use of VMS will improve the ability to track the spatial footprint of current and future fisheries.

All RFMOs are requiring members to file, at least, fishing plans for the coming year with varying expectations about how far into the future these plans should project distribution of effort. Reports of a couple of RFMOs discuss the complex trade-off that sound assessments of VME presence requires a lead time of at least a couple years, whereas future fishing plans are affected by a number of economic and ecological factors that are highly uncertain. The “analysis” of such information has been largely restricted to preparing maps with some form of contouring (i.e. gradation of effort by area) to reflect the recent or historical footprint of various fisheries.

Opportunity: The geo-referenced software for mapping and analyses of the spatial footprint of fisheries is being developed largely independently by all the RFMO/As. A review of practice suggests that the needs of the RFMO/As and the types of information they (could) have available are quite similar. Efficiencies could be obtained by a coordinated effort across RFMOs in developing, testing, documenting, and making available this software.

3.7 *Collection of relevant information for inferring presence of VMEs (paragraph 45)*

Several of the science advisory groups of RFMO/As have discussed, and in a couple of cases explored, methods for systematically using “other information that is relevant” to infer the likely presence of VMEs. This has been done in two different contexts. One has been to use relatively readily available and/or collected information on bathymetry, oceanography, etc., to develop “predictive habitat models”; that is, models which predict the probability that some type of habitat feature (usually corals and sponges) is present in an area, given data on the habitat features in the area. These models are developed, parameterized, and tested with data from some areas where presence/absence and/or quantity of various corals and/or sponges is well documented, for application in areas where the bathymetric and oceanographic data have been or could be collected, but information on corals and sponges could only be collected at significant cost. CCAMLR, NAFO, ICES for NEAFC, and SPRFMO are all engaged in such modelling work to varying extents. The other context is to use information on life history traits of well-studied species to serve as surrogates for the life history traits of evolutionarily similar or taxonomically related deep-sea species of fish and benthic invertebrates whose biology are poorly known. The life history traits are needed for application of at least criterion 42iv, and often 42ii and sometimes other criteria as well. This work has been discussed by the science advisory groups of at least CCAMLR, NAFO, and SPRFMO, but none have carried the work to an operational stage yet.

In all cases for both contexts, the scientific advisory bodies have considered the approaches feasible, and noted a significant body of scientific literature on both “predictive habitat modelling” and “biological traits analyses/life history evolution” already exists and can be built upon. However, all have noted that assessments using such surrogates will be more uncertain than assessments using direct and site-specific information, and management based on such surrogates would have to be more risk averse than management using direct and site-specific information, to provide a comparable level of protection to VMEs.

Opportunity: Many of the scientific challenges in developing and testing “predictive habitat models” and inferring life history traits of poorly studied deep-sea species are shared among all the RFMO/As. The specific models and trait inferences will always be case specific. However, a set of scientific “best practices” for developing and especially for testing such investigations will increase efficiency of all the RFMO/As and ensure a consistently high standard of practice is achieved.

3.8 *Use of criteria (paragraph 46)*

The assessments of VME presence by all the RFMOs have focused on the types of habitats and features listed in the Annex. Not even the full list of features in the Annex have been applied; rather seamounts, corals and sponges are the only features used directly in assessments to this point. Where RFMO/As have closed seamounts (NAFO, and some SPRFMO members in cooperation with each other and the RFMO) or areas containing parts of or multiple seamounts (NEAFC, North Pacific, CCAMLR), in all cases these were selected after some degree of review of biological information. However, in some cases little information was available and RFMOs decided to give full protection to selected seamounts until there was sufficient information and/or time for a full assessment of threats and risks (e.g. NAFO, SEAFO). In other cases there was a more formal, although usually qualitative, risk assessment preceding decisions to close all or some parts of some seamounts to fishing (CCAMLR, NEAFC, North Pacific, SPRFMO).

In terms of application of the full set of criteria, the Working Group on the Ecosystem Approach to Fisheries Management of the NAFO Scientific Council was the only scientific advisory group to attempt to apply the full set of criteria during their 2007–08 activities. They produced a map of the areas where VMEs were considered likely to occur based on all five criteria. Conclusions about areas to propose as VMEs were based on an integrated view across all the criteria, but no formal weighting of information sources or criteria was applied. This map was accepted by the Scientific Council, but has not led to management actions by the Fisheries Council. Scientific advisory bodies or working

groups of both CCAMLR and SPRFMO have begun discussions of the information and analyses necessary for an evaluation of fish and invertebrate species against criteria 42ii and 42iv, but have not yet commenced any such analyses.

All the RFMO/As have given high priority to review of information on various types of corals and sponges, and where rationales for this selective prioritization are given, the emphasis of corals and to a lesser extent sponges is attributed to The Annex, where different types of corals and sponges are the first two examples of species groups likely to be associated with VMEs, and listed again as a species group or community potentially supported by a topographic feature often associated with VMEs. Recalling the extensive debate during the Technical Consultations regarding if and how to include the information that eventually became The Annex, it appears that there was some foundation for the concerns of some states that including a partial list of types of areas likely to be associated with VMEs would lead to members of those partial lists being treated as of greater importance than other types of areas that also could support VMEs. Whether this is a positive or a negative result depends on the degree to which conservation is best served by focusing first on coral and sponge areas, and only considering other types of VMEs at some unspecified time in the future.

In assessments of areas supporting “significant concentrations” of corals or sponges, all RFMOs, and usually their scientific advisory groups, have stressed that the absence of quantitative thresholds for what constitutes a “significant concentration” represents an important impediment to systematic progress. This is already discussed as a major gap under paragraph 42. Some of the science advisory bodies of RFMOs have considered approaches to determine what might serve as such a threshold. NAFO considered using various high quantiles of the cumulative frequency distribution of corals (and later sponges) from all historical survey catches, but acknowledged this approach, although objective and empirical, would equate simply being the largest stands of corals and sponges with the ecological “significance” intended in the FAO Deep-sea Guidelines. Whereas the largest stands are considered highly likely to be “ecologically significant”, the implicit inference that all stands other than the largest ones are not “ecologically significant” is troublesome to many participants in the assessments and advisory processes.

The scientific WGs of NAFO have continued to explore this issue, looking at various contouring algorithms for density, for choosing thresholds based on the contouring results, and beginning to consider the degree to which simply “large” and “ecologically significant” are interchangeable concepts. The science advisory bodies of other RFMOs/As are following and building variously on the work of NAFO, but none consider the issue close to the same resolution. The science advisory bodies of all the RFMO/As currently stress that existing thresholds for assessing presence of corals and sponges are to some (usually large) degree arbitrary, and likely too high to provide a high likelihood protecting all VMEs characterized by presence of corals and sponges. The management bodies of their respective RFMO/As generally acknowledge that their thresholds for inferring the presence of VMEs are somewhat arbitrary and likely too high, but all conclude that without scientific basis for changing them to some specific alternative value, they prefer to leave the thresholds where they are. The science advisory bodies also stress that appropriate thresholds for what constitutes “ecological significance” are going to vary among ecosystem features (such as even different types of corals or sponges) and areas, even for the same species.

Major gap: Little progress has been made in using criteria other than those associated with fragile, structurally complex habitat features (usually corals and some types of sponges) in identification of VMEs. De facto, for most RFMOs efforts to identify and protect VMEs have become efforts to identify and protect areas of deep-sea corals and sponges, or selected seamounts. NEAFC and CCAMLR have gone further than other RFMOs in trying to use criteria other than corals and sponges, but there is a need to use the full set of criteria in more comprehensive assessments of likelihood of VMEs.

Major gap: Most experience has been gained with efforts to assessment presence of “significant concentrations” of corals and sponges. The absence of clear and consistent scientific and technical

guidance on how to apply the concept of “significant concentration” in practice is proving a major impediment to progress.

Opportunity: Some of the scientific challenges in setting scientific standards for concluding when the various criteria for “significant concentration” have been met are common to all RFMO/As and all criteria. The specific conclusions and inferences will always be case specific. However, a set of scientific “best practices” for interpreting and applying what constitutes “significant concentration” relative to the criteria in paragraph 42 and the Annex will increase efficiency of all the RFMO/As and ensure a consistently high standard of practice is achieved. A set of “best practices” for integrating information across multiple criteria would also increase consistency and efficiency of practices among RFMOs/As.

3.9 *Mechanisms for review and evaluation (paragraph 50)*

NAFO has established a WG of the Scientific Council and a Working Group of the Fisheries Council to conduct and review assessments. ICES has combined several separate expert groups into a Working Group on Deep-Sea Fisheries and Ecosystems, and this group informs NEAFC and sometimes NAFO on scientific and technical matters. CCAMLR has a full scientific advisory structure and thus far has dealt with these new advisory needs either through the existing structures or targeted and well-supported Workshops. SPRFMO and GFCM have been dealing with these issues through their existing science processes, without cutting off the possibility of spinning off dedicated bodies if considered necessary. To this point none of those bodies have directed scientific review and advisory efforts at the task of evaluating the effectiveness of mitigative measures that have been proposed, other than commenting on the possible boundaries of closed areas relative to known concentrations of corals and sponges.

Major gap: The scientific advisory bodies of the RFMO/As are being tasked with assessing the presence of some features associated with the criteria for presence of VMEs. To this point they have rarely been asked to advise on alternative mitigation measures other than boundaries for closed areas. Unless closures are to be the only mitigation measure used for protection of areas where VMEs are known or likely to occur, scientific and technical effort needs to be devoted to developing the capacity and frameworks for evaluating suites and alternatives for mitigation of risks.

3.10 *Repeated assessments after changes to the fishery (paragraph 53)*

There has not yet been sufficient time for action to be taken (or expected) on this criterion. The need for review is acknowledged in the reports of many RFMOs, but usually in the context of future review of areas where VMEs have been suggested as likely, rather than unlikely to occur.

Management and conservation tools

3.11 *Conservation and management measures (paragraph 63, (i, ii, iii))*

Of the areas reviewed for this paper, only the north Pacific developing RFMO/A was included. Regular meetings among interested parties have been held and interim measures have been agreed, but no fully functioning regulatory framework is yet in place. In the north Pacific the developing RFMO has called for a reduction in effort by participating states, proposed closure of a part of one seamount where there are several lines of evidence suggesting corals that would make the area a VME are or have in the past been present, and requested participating states to refrain from expanding at least fisheries using mobile, bottom-contacting gears into new or only occasionally fished seamounts. In the South Atlantic and Mediterranean the RFMO/As may not have built the capacity to exercise their regulatory authority as fully as the RFMO/As in the north Atlantic, southern Ocean and south Pacific, but these RFMO/As are making some progress on all of these types of measures.

3.12 *The precautionary approach (paragraph 65, (i, ii, iii, iv, v))*

Exploratory fisheries protocols have been or are being developed for new or exploratory fisheries by RFMOs/As in the north Atlantic, Pacific, and Southern Ocean. Support for their completion and implementation seems uniformly high. In all cases the protocols include provisions to deal with 65i-65v, although particularly for 64iv, the effectiveness of the measures has not been evaluated. Commentary in the reports of several of the RFMOs expresses some concern about the inherent contradiction of fisheries being one of the most feasible sources of information about the presence of VMEs in areas that are poorly known, but prosecution of new fisheries may pose a threat to exactly those poorly known VMEs. The right balance between precautionary regulation of new and exploratory fisheries and opportunity to increase knowledge and provide economic benefits is neither clear nor likely to be viewed consistently by all participants in the dialogue about conservation of biodiversity and management of fisheries on the high seas.

Opportunity: Many of the management issues associated with exploratory fishery protocols that are ecologically robust but allow adequate opportunity for sustainable deep-sea fisheries to be developed are shared among all the RFMO/As. The specific provisions of such protocols will always be case specific. However, a set of “best practices” for such protocols, including for testing and demonstrating the effectiveness of provisions for protecting poorly documented VMEs from SAIs will increase efficiency of all the RFMO/As and ensure a consistently high standard of practice is achieved.

3.13 *Area closures (paragraph 66)*

CCAMLR, NAFO, NEAFC, and SPRFMO have all closed at least some areas where assessments have documented the presence of VMEs to deep-sea fisheries that might cause SAIs (in the case of SPRFMO, the closures are agreements among several Parties that have not yet been formally adopted by the RFMO). The developing RFMO in the north Pacific has requested members to respect a closure in one area where VMEs are likely, and the member states and RFMO/As in the South Atlantic and Mediterranean are taking a variety of measures to reduce risk of SAIs while they proceed with developing the capacity for full assessments of the presence of VMEs. However, the correspondence between the areas that have been closed and the areas where science advisory groups have documented that VMEs may be likely to occur differs among RFMO/As. NEAFC and CCAMLR have closed or identified as “Risk Areas” some quite large areas, within which not all the included areas are likely to fully meet the criteria for VMEs. NAFO, on the other hand, has only closed those areas where the evidence of presence of VMEs is strong. Development of management measures to protect known VMEs in the Pacific RFMO/As are still in progress, with reports from SPRFMO suggesting that actions intermediate between those of NEAFC/CCAMLR and NAFO may occur.

3.14 *Protocols for encounters with VMEs (paragraph 67)*

All RFMOs are in the process of developing encounter protocols for deep-sea fisheries. All include some tentative triggers for what constitutes an “encounter”, and requirements that fishing operations cease, the encounter is reported, and some form of a move-on provision is instituted. The RFMO/As are clearly interacting with each other in developing these protocols, and there are substantial similarities among most of them. All claim that the provisions are based on science advice, although the linkages between the science advice (particularly narrative information in the advice about uncertainties) and provisions in the encounter protocols is sometimes hard to see. This report has already summarized the substantial problems with setting ecologically sound triggers for assessing the presence of VMEs (especially in 3.4 and 3.8), and these problems loom large in developing and applying the provisions of an encounter protocol. As several RFMOs have noted in the reports on encounter protocols, fishing gears are poor samplers of many benthic features that are VMEs. Some of these reports (e.g. CCAMLR and NEAFC) note explicitly that the presence of a feature such as coral or sponge in the catch of a fishing tow can be taken as evidence of the presence of the feature in the area being fished. However, absence of the feature in the catch cannot be taken as evidence that the feature is absent in the area being fished. All the RFMOs with quantitative triggers of coral and sponge

for encounter protocols also acknowledge these triggers are probably too high to provide protection to all VMEs that will be encountered. However most such acknowledgements are accompanied by comments that there is no strong scientific basis for changing to another trigger value, so they will continue to use the same quantitative trigger while asking that additional science advice be provided, should more information on which to base new science advice come available.

Similarly, the distances specified in the move-on provisions are generally considered large relative to the size of most stands of deep-sea corals and sponges, but small relative to the distances of individual deep sea fishing tows. Consequently some reviews of the encounter protocols being developed by RFMO/As have questioned whether such provisions actually provide effective protection to VMEs. The scientific advisors to both NAFO and NEAFC are conducting analyses of the patchiness of coral and sponge concentrations in their regulatory areas, and when these analyses are complete, they may provide additional information on what types of spatial provisions might provide protection to VMEs encountered during fishing operations.

Major gap: None of the encounter protocols being developed by RFMO/As are including triggers for any features associated with the VME criteria in paragraph 42 and The Annex except corals and sponges. This leaves all other types of VMEs unprotected by current encounter protocols.

Major gap: The triggers for encounter protocols are currently measures of the amount of coral or sponge in fishing tows and/or entangled in longlines. These are acknowledged to be poor indicators of the presence of VMEs, with errors much more likely to be misses (VME present but no or insufficient coral or sponge in the catch) than false alarms (coral or sponge in the catch, but no VME actually present). This is exactly the wrong type of detection errors for a measure intended to function in a risk management (and particularly a precautionary) framework. Other indicators of the presence of all VMEs, including corals and sponges, that are reliable in fishery operations, are needed urgently.

Major gap: The primary conservation measures in the current encounter protocols and those under development are spatial. However, at least the ecosystem features of greatest concern at present (corals and sponges) are known to often be patchy on fine scales, but the patterns of these features is poorly quantified in most areas. Hence it is very difficult to design and evaluate the likely effectiveness of specific spatial measures such as move on provisions, with regard to the protection they can provide to VMEs that have been encountered in fishing operations.

Opportunity: Many of the conservation issues associated with provisions of encounter protocols, including indicators to be used for detecting presence, trigger values on the indicators, and specific response measures, particularly spatial ones, are shared among all the RFMO/As. The specific provisions of such protocols will always be case specific. However, a set of “best practices” for such protocols, and for the scientific and technical analyses underpinning such protocols, will increase efficiency of all the RFMO/As and ensure a consistently high standard of practice is achieved. These “best practices” could include the practices for:

- testing candidate indicators of an encounter;
- selecting indicators based on the results of the tests;
- designing standards for ecologically consistent and meaningful triggers on the indicators;
- conducting and interpreting the spatial pattern analyses needed to design effective move-on (or other) provisions for protecting poorly documented VMEs from SAIs; and
- setting conservation measures in the encounter protocols, based on the results of the spatial pattern analyses.

3.15 *Information for VME protocols and encounters (paragraph 68)*

To the extent that detailed seabed surveys and mapping information is available, all RFMO/As are making use of that information. The need to use the seabed survey and mapping results to identify areas which meet or are likely to meet the criteria in paragraph 42, or have the feature in The Annex are requiring new types of analyses and modelling. RFMO/As and their member states are supporting experts to conduct such analyses and develop such models. Measures being implemented are being developed in the context of other management measures already in place, for example with regard to requirements for monitoring and reporting of catches by observers and for using VMS and related technologies for tracking and managing the footprint of fishery operations. The review found no reference to explicit actions by RFMO/As to harmonize all new measures to protect VMEs with measures for other objectives. Neither, however, did the review find indicators that the RFMO/As were finding the new measures to be incompatible with other measures, beyond the inevitable consequence that the additional measures to protect VMEs would lead to further restrictions on fishing opportunities, and increase demands on fishery officers. This concern was particularly high with regard to the additional duties expected of fishery observers.

Opportunity: Some of the scientific challenges in making best use of information from seabed surveys and mapping are common to all RFMO/As and all criteria. The specific analyses and the conclusions and inferences based on them will always be case specific. However, scientific experts for all the RFMO/As could work together on developing and testing analyses and geo-statistical methodologies for analyses of such data. Any results could increase efficiency of all the RFMO/As and ensure a consistently high standard of practice is achieved.

3.16 *Modification and adoption of management measures (paragraph 69)*

The types of measures referred to in paragraph 67 are either still in development or have only recently been implemented. Several of the RFMO/As have called for a review of experience with the protocols after a few years of use, an action that is a necessary precursor modifying or adapting the management measures. However, it is premature to expect action on this paragraph at this stage in the overall implementation of the set of FAO Deep-sea Guidelines.

3.17 *Management measures based on assessment results (paragraph 70)*

All RFMO/As have either adopted conservation and management measures following assessments pursuant to paragraphs 42 to 53, or else have such measures under consideration. All were developed on a case-by-case basis. All were intended to reduce the likelihood of SAIs on identified VMEs, and at least the large closed areas (or risk areas) implemented by CCAMLR and NEAFC, and the closures of all or most of some seamounts by NAFO, SPRFMO and the developing north Pacific RFMO/A are expected to be effective for as long as they are in place. However, no RFMOs have to this point implemented any measures to achieve long-term conservation and sustainable use of living resources other than corals and sponges that may meet any of the criteria in paragraph 42, or have other features in The Annex. The gaps associated with paragraphs 42 and particularly paragraph 46 are relevant here as well. Until the full suite of criteria for VMEs are used in assessments, long-term conservation of VMEs and sustainable use of the full range of biodiversity cannot be ensured.

Major gap: Because only some of the criteria for VME identification have been used to this point, even if all measures that have been implemented are well chosen and effectively implemented, only some types of VMEs are receiving protection. Moreover, as discussed under paragraphs 65 and 67, the effectiveness of the various measures for protecting VMEs and for ensuring sustainable use of species with vulnerable life histories has not yet been evaluated, so even the effectiveness of present measures is not yet established.

3.18 *Types of conservation and management measures (paragraph 71, (i, ii, iii, iv))*

Effort controls are being encouraged by several RFMOs/As, particularly those in the Pacific, as a way to reducing risk to VMEs identified or potentially present. However, as described in the information on several previous paragraphs, temporal and particularly spatial restrictions are by far the preferred method for protection of VMEs for which RFMOs have so far taken action. This is consistent with the focus on corals and sponges as the types of VMEs given priority by the RFMO/As to this point. There has been no special discussion of gear modifications relative to protecting VMEs, although all RFMO/As have been proactive to varying degrees in promoting gear modifications and technical measures as overall tools for conservation of biodiversity and sustainable use of targeted fish and invertebrates. In this context there has been some general attention by all the RFMO/As to matching the performance of gears to general conservation objectives. However, there has been no focused review of such measures specifically in the context of protecting species and habitats that meet the various criteria in paragraph 42 or show the features in the Annex.

Opportunity: All RFMO/As have experience with the use of the various types of management measures listed in this paragraph of the FAO Deep-sea Guidelines. One or more focused Workshops, perhaps collaboratively among several or all the RFMO/As, to provide explicit guidance on the conditions that may influence the effectiveness of each class of management measure to provide protection to VMEs meeting each of the criteria in paragraph 42 or showing the features in The Annex, could speed the process of selecting management measures to protect VMEs as they are identified, and ensure both greater consistency and greater transparency in the actions taken by the RFMO/As.

3.19 *Complementary “suites” of management measures for VME protection (paragraph 72)*

The discussion under paragraph 71 largely covers the information on this found in the reports by the RFMO/As. Likewise, the expert Workshop(s) suggested under the opportunity for progress under paragraph 71 could specifically consider the potential synergies and conflicts among management measures to protect various types of VMEs, and between measures intended to protect VMEs and measures to achieve other management objectives.

3.20 *Management of activities to ensure prevention of SAIs (paragraph 73)*

The review of RFMO/A activities found that only some of the RFMO/As directly evaluated whether specific fisheries would pose a risk of SAIs to identified or potential VMEs. This was perhaps most thoroughly done by the developing north Pacific RFMO, where each state presented an analysis of each of its fisheries (defined by gear and target species). Discussion in the Mediterranean RFMO/A also addressed the threats posed by some specific fisheries to some specific ecosystem features consistent with the presence of VMEs. However, the work of this RFMO/A has not yet progressed to the point where VMEs have been identified and management measures have been adopted for implementation by states. In the RFMOs where such fishery-specific evaluations have not occurred, the management measures adopted are generally closures that would affect all gears used by fisheries under the jurisdiction of the RFMO. There are some concerns that the measures adopted may not fully ensure fisheries that authorized to proceed pose little risk of SAIs to VMEs, but these concerns are already discussed under previous paragraphs, particularly 65, 67, 70 and 71. The additional consideration in this Paragraph is the suggestion that RFMOs should be doing some form of impact assessment for each fishery under their jurisdiction, at least relative to SAIs on identified or likely VMEs. Some of the RFMOs have risk assessments for such a role under development, with at least CCAMLR and NAFO giving moderate priority to building such impact assessment frameworks. They are building on experience with developing risk assessment frameworks for fisheries in national jurisdictions of some member states. However fisheries generally are being authorized to proceed in all areas except those where there is strong positive evidence of the presence of VMEs.

Major gap: Few RFMOs have complete and required processes for the evaluation of the risk that specific fisheries would cause SAIs to the various types of VMEs known or likely to occur in an area. Several RFMOs have such processes under development, but in the meantime fisheries usually are allowed to operate under their usual conditions except where general closures to fishing have been implemented. These have rarely been implemented in places where fisheries are currently or have recently been active. Thus, de facto it seems to be assumed that no existing fisheries pose risk of SAI to VMEs, under status quo operations.

Opportunity: Many of the challenges in developing and implementing practices associated with assessing the risks that particular fisheries would cause SAIs to are shared among all the RFMO/As. The specific provisions of such risk assessments will always be case specific. However, a set of “best practices” for such assessments and for prioritizing which types of fisheries are most likely to pose risks to which types of VMEs could increase the efficiency of all the RFMO/As and ensure a consistently high standard of practice is achieved.

3.21 How to proceed if VMEs are present (paragraph 74, (i, ii, iii))

To this point RFMOs seem to have either determined VMEs are present and required some form of conservation measure (often a closure) is implemented, or have continued with “business as usual” while encounter protocols have been developed. Some of the RFMO/As have closed or labelled as “risk areas” quite large regions, particularly CCAMLR and NEAFC, or taken anticipatory closure action in some areas where information was sparse (SPRFMO). However there has been no systematic effort to partition regulatory areas into those where assessments have determined that VMEs are present or likely, where there is evidence to support a conclusion that VMEs are unlikely to be present, and intermediate areas where there is uncertainty about the presence of VMEs. The work of the science advisory bodies for several RFMOs, including those in the north Atlantic, Pacific and Southern Ocean could be the basis for such a classification of areas, but to this point the fisheries management components of those RFMO/As have not used the information for comprehensive classifications of their regulatory areas in that way. Nor, as reviewed in the commentary on paragraphs 67–69, have encounter protocols been completed and adopted for use in areas that were designed as highly uncertain regarding the presence of VMEs. Hence the gaps and opportunities under those paragraphs are also relevant here.

Major gap: A comprehensive evaluation of the regulatory area of each RFMO/A into areas where VMEs are known or likely, not likely, and uncertain has not been completed. To varying extents at least portions of the information needed for such evaluations could be extracted from work undertaken by the science advisory bodies to the RFMOs, but the consolidation of that information into that three-part classification has not been completed in any case.

Assessment and review

3.22 Review of information on VMEs (paragraph 82)

Review of existing information is covered fully in the information provided on the previous paragraphs, particularly 42–46 and 65–72. All RFMO/As are still in the first round of identifying VMEs and implementing measures for their protection. Several have called explicitly for a review of experience with the measures, and for reassessment of the areas which may meet the criteria of paragraph 42 or show the types of features specified in The Annex. Some (e.g. NAFO, SPRFMO, have specified dates for such reviews). It is premature to expect any such reviews to have been conducted at this stage in the implementation of the FAO Deep-sea Guidelines.

4. SPECIAL REQUIREMENTS FOR DEVELOPING COUNTRIES

4.1 The actions of RFMO/As to paragraphs 84 and 85 are presented together.

Reports of the RFMO/As in the south Atlantic, south Pacific, and Mediterranean have all called attention to the need for capacity building overall for implementation of the FAO Deep-sea Guidelines and for increasing participation of the less developed states in each region. Aside from the specific theme, the suggestions (and in a few cases, such as the Mediterranean, specific proposals) for capacity building and addressing the special needs of developing countries relative to the FAO Deep-sea Guidelines had few unique features that would not be seen in proposals for capacity building and special needs in many similar fisheries management issues. However, the cases for addressing these needs were made clearly, and underscored by reference to the comments even from the RFMOs in the north Atlantic that capacity to implement the FAO Deep-sea Guidelines was limited, and new types of expertise were needed. This review did not explore in-depth the types of resources that are available to developing states, but neither did it find encouraging evidence that substantial new resources were being provided for capacity building and addressing the special needs of developing countries.

Major gap: Even the RFMOs associated with the areas where some of the most developed states are located are noting the high demands on science and management capacity to implement the FAO Deep-sea Guidelines. RFMOs/As in areas bordered by some less-developed states are highlighting the special needs of developing countries. However, at least this review has not found evidence of any coordinated programme to mobilize such resources, whether following the approaches suggested in paragraph 84 or through other modalities. Failure to ensure the capacity building and to address the special needs for developing countries could result in the undesirable situation where experts from the developed world, whether for governments, intergovernmental organizations (IGOs) or non-governmental organizations (NGOs) will assemble the information, conduct the central analyses and largely deliver finished products for use in assessments and developing management measures in areas where the less-developed countries have a central interest.

5. ADDITIONAL CONSIDERATIONS ON IMPLEMENTATION

5.1 Global database on VMEs (paragraph 87)

RFMO/As will be receiving assistance from FAO in the form of a global database on VMEs in areas beyond national jurisdiction. This reviewer is aware of interactions among FAO, other IGOs and NGOs, and potential funders with regard to creation of such a database. A concept note on the functions and content of a global database on VMEs in areas beyond national jurisdiction has been developed and FAO is interacting with potential donors with regard to their potential support. It is expected that the Workshop for which this report is being prepared will contribute to the discussions on how and what type of assistance RFMOs/A can provide to “populate” this database.

6. ANNEX

The actions of RFMO/As with regard to identifying areas having the types of features listed in this Annex and providing protection to those areas are presented in the material on paragraphs 42–46 of the FAO Deep-sea Guidelines. Likewise the Gaps and Opportunities in those paragraphs are relevant to application of this Annex as well. In particular, it should be noted that:

Major gap: Although science advisory bodies of the RFMO/As consider the criteria ecologically sound, they express the need for additional guidance on how they should be applied. This is the case for all the types of features listed in both parts of the Annex.

Major gap: Little progress has been made with species groups and habitats in The Annex other than corals, some types of sponges, seamounts, and in a very few cases hydrothermal vents. De facto, for most RFMOs efforts to identify and protect VMEs have become efforts to identify and protect areas of deep-sea corals and sponges, or selected seamounts. NEAFC and CCAMLR have gone further than other RFMOs in trying to use criteria other than corals and sponges, but there is a need to give more balanced attention to all the marine features in The Annex in more comprehensive assessments of likelihood of VMEs.

Major gap: Most experience has been gained with efforts to assess the presence of “significant concentrations” of corals and sponges. The absence of clear and consistent scientific and technical guidance on how to apply the concept of “significant concentration” in practice is proving a major impediment to progress for all the types of VMEs, including corals and sponges.

7. CONCLUSIONS

RFMOs/As have all taken actions to assess the presence of VMEs and protect them from SAIs. Almost all the efforts of RFMOs/As have focused on identifying areas with “significant concentrations” of corals and sponges, and in a few cases seamounts. Very little work has been done with other VME criteria.

In almost all cases RFMOs/As have noted that the absence of clear standards for how to interpret “significant concentrations” has impeded progress on identification of VMEs based on presence of corals and sponges.

Incomplete information on distribution, abundance and species composition of corals and sponges specifically, but more generally of all the ecosystem features that may meet the VME criteria, also impedes progress of RFMOs/As to implement the FAO Deep-sea Guidelines. However, in all cases the RFMOs/As have been able to assemble enough information to make at least partial progress on identification of areas where corals and sponges are present.

Management measures used to protect VMEs have been almost exclusively closures of areas considered to have significant concentrations of corals and sponges (and in a few cases, seamounts). There is some exploratory work with other mitigation measures, but such work is in early stages.

There are numerous gaps remaining in the implementation of the FAO Deep-sea Guidelines, many arising from either the focus on corals and sponges at the expense of attention to other VME criteria and from the lack of operational guidance on how to interpret “significant concentrations”.

There are also numerous opportunities for activities to increase progress. Most of these involve collaborative efforts among RFMOs/As, and usually with FAO playing a major role in facilitating the collaborations. Development of a global database on known VMEs (and the criteria they meet), and sponsoring Expert meetings for provision of “best practice” guidance would be roles that should return particularly high benefits.

8. REFERENCES

- Allen M.** (Executive Secretary – SPRFMO) to A. Mikulka (Director – DOALOS) Interim Measures adopted by participants in negotiations to establish the South Pacific Regional Fisheries Management Organisation, January 2009.
- Cacaud, P.** 2005. *Fisheries laws and regulations in the Mediterranean: a comparative study*. GFCM Studies and Reviews. No. 75.
- CCAMLR.** 2008a. *Fisheries management and conservation under conditions of uncertainty*. CCAMLR-XXVII.
- CCAMLR.** 2008b. *Report of the twenty-seventh meeting of the Scientific Committee*. SC-CCAMLR-XXVII (especially Annexes 4 and 5).

- CCAMLR.** 2009a. *Schedule of conservation measures in effect 2009–2010.* (available at www.ccamlr.org/pu/e/e_pubs/cm/09–10/toc.htm).
- CCAMLR.** 2009b. *Report of the twenty-eighth meeting of the Commission. Hobart, Australia, 26 October–6 November 2009.* CCAMLR-XXVIII.
- CCAMLR.** 2009c. *Report on conserving Antarctica from the bottom-up: implementation of UN General Assembly Resolution 61/105 by the Commission for the Conservation of the Antarctic Marine Living Resources.* WG-FSA–09/45.
- CCAMLR.** 2009d. *Report of the Workshop on vulnerable marine ecosystems, La Jolla, CA, USA, 3–7 August 2009.* SC-CAMLR-XXVIII/10.
- Directorate General of Fisheries and Aquaculture – Spain.** 2009. *The fisheries of Spain in the SPRFMO during the season 2009–2010. Preliminary assessment of the risk of cause of serious damage to the vulnerable marine ecosystems and protocol of action.* SP–08–SWG–DW–02.
- Durán Muñoz, D., Murillo, F.J., Serrano, A., Sayago-Gil, M., Parra, S., Díaz del Río, V., Sacau, M., Patrocinio, T. & Cristobo, J.** 2008. *A case study of available methodology for the identification of vulnerable ecosystems/habitats in bottom deep-sea fisheries: possibilities to apply this method in the NAFO regulatory area in order to select marine protected areas.* NAFO SCR Doc. 08/6 Serial; No. N5491.
- Fisheries Agency of Japan.** 2009a. Report on identification of vulnerable marine ecosystems in the emperor seamount and Northern Hawaiian ridge in the Northwest Pacific Ocean and assessment of impacts caused by bottom fishing activities on such vulnerable marine ecosystems or marine species as well as conservation and management measures to prevent significant adverse impacts (bottom gillnet).
- Fisheries Agency of Japan.** 2009b. Report on identification of vulnerable marine ecosystems in the emperor seamount and Northern Hawaiian ridge in the Northwest Pacific Ocean and assessment of impacts caused by bottom fishing activities on such vulnerable marine ecosystems or marine species as well as conservation and management measures to prevent significant adverse impacts (bottom trawl).
- Fisheries Agency of Japan.** 2009c. Appendices A–R to bottom trawl and bottom gillnet reports.
- Fuller, S.D., Murillo Perez, F.J., Wareham, V. & Kenchington, E.** 2008. Vulnerable marine ecosystems dominated by deep-water corals and sponges in the NAFO convention area. NAFO SCR Doc. 08/22; Serial No. N5524.
- FAO/GFCM/CGPM.** 2009. *Report of the eleventh session of the Scientific Advisory Committee. Marrakech, Morocco, 1–5 December 2008/Rapport de la onzième session du Comité scientifique consultatif. Marrakech, Maroc, 1–5 décembre 2008.* FAO Fisheries and Aquaculture Report/FAO Rapport sur les pêches et l’aquaculture. No. 890. Rome, FAO. 86p.
- González-Costas F., & González-Troncoso, D.** 2009. Spanish 2006–2008 fisheries footprint, scientific observers and surveys coverage and update of the standardized CPUE indices for Greenland halibut. NAFO SCR Doc. 09/22 Serial No. N5657.
- Hoydal K.** 2006. “Regional fishery closures in Europe as a management tool” Talk given to Marine Nature Conservation in Europe 2006, Stralsund 8–12 May 2006. (available from NEAFC Secretariat info@neafc.org).
- ICES.** 2009a. Paragraph 1.5.4.1: Answer to request from NEAFC for evaluation and advice on a proposal to expand the areas closed for fishing on the mid-Atlantic Ridge ICES Advice 2009, Book 9.
- ICES.** 2009b. NEAFC request on vulnerable marine ecosystems (VMEs) concerning move-on provisions and threshold values for key indicator species. ICES Advice 2009, Book 9. Paragraph 9.3.2.4.
- Kenchington, E., Cogswell, A., Lirette, C. & Murillo-Perez, F.J.** 2009. *The use of density analyses to delineate sponge grounds and other benthic VMEs from trawl survey data.* NAFO SCR Doc. 09/06; Serial No. N5626.
- Kenchington E., Best, M., Cogswell, A., MacIsaac, K., Murillo-Perez, F.J., MacDonald, B., Wareham, V., Fuller, S.D., Jørgensbye Hansen, H.I.Ø., Sklyar, V. & Thompson, A.B.** 2009. *Accurate identification of deep-water coral harvested in the NAFO regulatory area.* NAFO SCR Doc. 09/7; Serial No. N5632.
- Kulka, D., Templeman, N., Janes, J., Power, A. & Brodie, W.** 2007. *Information on seamounts in the NAFO convention area.* NAFO SCR Doc. 07/61; Serial No. N5414.

- Ministry for Food, Agriculture, Forestry and Fisheries.** 2009. Reports on identification of VMEs and assessment of impacts caused by bottom trawl fishing activities on VMEs and/or marine species. Republic of Korea.
- Ministry of Fisheries.** 2009. Reports on identification of VMEs and assessment of impacts caused by bottom fishing activities on VMEs and marine species; Document and 5 Annexes. Russian Federation.
- Murillo, F.J., Durán Muñoz, P., Sacau, M., González-Troncoso, D. & Serrano, A.** 2008. *Preliminary data on cold-water corals and large sponges bycatch from Spanish/EU bottom trawl groundfish surveys in NAFO Regulatory Area (Divs. 3LMNO) and Canadian EEZ (Div. 3L): 2005–2007 period.* NAFO SCR Doc. 08/10; Serial No. N5501.
- Murillo, F.J., Durán Muñoz, P., Mandado, M., Patrocinio, T. & Fernández, G.** 2008. *Bycatch of cold-water corals from an experimental trawl survey in three seamounts within NAFO Regulatory Area (Divs. 6EFG) during year 2004.* NAFO SCR Doc. 08/11; Serial No. N5502.
- NAFO.** 2008a. *Report of the ad hoc working group of fishery managers and scientists on vulnerable marine ecosystems (WGFMS) 8–12 September 2008 Montreal, Canada.* NAFO/FC Doc. 08/8; Serial No. N5564.
- NAFO.** 2008b. *Report of the NAFO scientific council working group on ecosystem approach to fisheries management (WGEAFM).* NAFO SCS Doc. 08/10 Serial No. N5511 NAFO SCS.
- NAFO.** 2008c. *Report of the NAFO scientific council working group on ecosystem approach to fisheries management (WGEAFM) response to fisheries commission request 9.a.* NAFO SCS Doc. 08/24 Serial No. N5592.
- NAFO.** 2009a. *Report of the working group on the Ecosystem Approach to Fisheries Management (WGEAFM).* NAFO SCS Doc. 09/6. Serial No. N5627.
- NAFO.** 2009b. *Report of the Ad Hoc Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems (WGFMS), 19–20 March 2009, Vigo, Spain.* NAFO/FC Doc. 09/2; Serial No. N5625.
- NEAFC.** 2008. *Report on implementation of UNGA Resolution 61/105 OP 83–90 (8 December 2006).* Available from NEAFC Report on implementation of UNGA Resolution 61/105 OP 83–90 (8 December 2006).
- NEAFC.** 2009a. *North-East Atlantic Fisheries Commission Contracting Parties: Denmark (in respect of the Faroe Islands and Greenland), the EU, Iceland, Norway and the Russian Federation.* Press release 27 April 2009, 11:00 am GMT.
- NEAFC.** 2009b. *Response of the North East Atlantic Fisheries Commission, NEAFC, to the Secretary General of the UN on actions taken pursuant to paragraphs 83–84 of Resolution 61/105.*
- NEAFC.** 2009c. *Report of the Twenty Seventh Annual Meeting of the North-East Atlantic Fisheries Commission 10–14 November 2008.* Volume I – Report.
- NEAFC.** 2009d. *Report of the Twenty seventh Annual Meeting of the North-East Atlantic Fisheries Commission 10–14 November 2008.* Volume II – Annexes.
- NEAFC.** 2009e. *Recommendation XIII: 2009. Recommendation by the North-East Atlantic Fisheries Commission In Accordance With Article 5 of the Convention on future multilateral cooperation In North-East Atlantic Fisheries at its annual meeting held 10–14 November 2008.* To adopt the following recommendation on operational procedures for fishing in existing and new bottom fishing areas.
- New Zealand Ministry of Fisheries.** 2009. *Bottom Fishery Impact Assessment for SPRFMO Area.*
- NOAA.** 2009. *North West Pacific Ocean: Reports on identification of VMEs and assessment of impacts caused by bottom fishing activities on VMEs and marine species NOAA Fisheries, USA. 23 December 2008.*
- Rais, C.** 2008. *Inventaire et synthèse bibliographique concernant la pêche et la biodiversité des zones de mer profonde.* CGPM:XXXII/2008/Dma.2.
- Sacchi, J.** 2008. *Impact des techniques de pêche sur l'environnement en Méditerranée.* GFCM Études et Revues No. 84.
- SPRFMO.** 2008. *Revised Draft Bottom Fishery Impact Assessment Standard Eighth International Meeting: Science Working Group.* SP–08–SWG–DW–01.
- SPRFMO.** 2009a. *Report of the Deepwater Sub-group 12–15 May 2009.* Annex SWG–04.

- SPRFMO.** 2009b. *Classification Guide for potentially vulnerable invertebrate taxa in the SPRFMO area.* SP-08 SWG-DW-03.
- SPRFMO.** 2009c. *Remarks to “SPRFMO Bottom Fishery Impact Assessment Standard” (BfiAS) Draft October 2009.* SP-08-SWG-DW-05 Bottom Fishing Activities by New Zealand.
- Thompson A.B. & Campanis. G.M.** 2007. *Information on Fishing on and around the Four Closed Seamount Areas in the NRA.* NAFO SCR Doc. 07/06 Serial No. N5347.
- Vinnichenko V.I. & Sklyar, V.V.** 2008. *On the issue of areas closure to protect vulnerable marine habitats in the NAFO Regulatory Area.* NAFO SCR Doc. 08/79 Serial No. N5612.

Discussion Paper 3

WORKSHOP ON THE IMPLEMENTATION OF THE FAO DEEP-SEA GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS – IMPLEMENTATION OF THESE GUIDELINES IN AREAS WHERE NO COMPETENT RFMO/A IS IN PLACE

by **D. Japp**
Cap Fish

The views expressed in this paper are personal to its author and do not reflect a formal position or opinion of FAO or any other organization or State.

PREAMBLE AND OBJECTIVES

The objective of this paper is to present discussion points (at a mostly technical level) relating to the implementation of the International Guidelines for the Management of Deep-Sea Fisheries in the High Seas (the FAO Deep-sea Guidelines), which were adopted by member countries of the FAO in 2008. These guidelines were developed following the UNGA Resolution 61/105 relating to concern for the impacts of deep-sea fisheries on cold-water corals, sponges, seamounts and vulnerable benthic ecosystems and species in general. Resolution 61/105 called on both states and RFMOs to regulate high seas bottom fisheries through various mechanisms including, conducting impact assessments to determine whether significant adverse impacts to VMEs would occur. Also areas of the high seas where VMEs are known or likely to occur should be closed to fishing unless such fisheries could be managed to prevent significant adverse impacts. The intent was that high seas fisheries should be managed to ensure the long-term sustainability of targeted deep-sea fish stocks and requires that impact assessments of bottom fisheries on the high seas should be conducted to determine if “significant adverse impacts” to these ecosystems were likely to occur.

Implementation of the FAO Deep-sea Guidelines is challenging, mainly due to the unregulated historical manner in which deep-sea fisheries have developed and also because of the dependence placed upon functional management structures through which the guidelines can be implemented. In some areas in which high seas demersal fisheries have developed, existing RFMOs or “arrangements” do not have the mandate to manage these fisheries, or in some cases no RFMO yet exists. In these situations the responsibility for implementation of the FAO Deep-sea Guidelines therefore often falls upon the flag state whose vessels may historically (or currently) be fishing high seas demersal resources.

This paper therefore addresses primarily the role of the state in applying the FAO Deep-sea Guidelines in the absence of any other management regime and specifically considers:

- the challenges of implementation;
- ways forward or possible solutions to these challenges; and
- the Indian Ocean as an example throughout the discussion.

1. INTRODUCTION

Implementation of the FAO Deep-sea Guidelines will have to address issues that are generic to deep-sea high seas fisheries around the world, as well as those that are unique to particular areas or fisheries. Fisheries management regimes, however, that fall within national responsibility are dealt with by national legislation, as well as applying, as far as possible, best global practice and guidelines

such as FAO Code of Conduct for Responsible Fisheries, national plans of action, the United Nations (UN) Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks (UNFSA)¹, etc.

At a different level, fisheries beyond areas of national jurisdiction (or high seas) may include resources or stocks that may also be found in the national waters of more than one state (transboundary), as well as beyond areas of national jurisdiction. Those stocks or resources in areas beyond national jurisdiction present an entirely different management regime – one that requires both state intervention and collaborative (between states) management. In this regard, RMFOs become the principal management tool, although states may maintain autonomy with respect to the exploitation of the transboundary resources within their own fishing zones (assuming no regional agreement). RFMOs, which are common in most parts of the world's oceans, give rise to many management and political issues not least of which is the allocation of effort between interested and affected parties. The problem of fishing that is not subject to regional agreements and potential over-exploitation of stocks is another issue to be dealt with – the ability of the flag state to manage comes to the fore under these circumstances.

In addition, distant water fishing nations (DWFNs)² (commonly refers to foreign vessels licensed to fish in the EEZ of a coastal state) are often vessels that have not reflagged to the licensing country, although countries like South Africa are trying to force reflagging, and may use the license to fish inside EEZs but also move freely into and out of the EEZ and into the high seas essentially to optimise fishing (and typically following the resource). This is of course difficult to monitor, but a potential solution is for the licensing state to insist that the operator make a port call to drop/collect Observers and discharge product (empty holds) so that the catch in the EEZ can be quantified – other requirements also need to be met at this time such as ensuring VMS is reporting. Typically these vessels are pelagic longliners, but the same principle can be followed by deepwater vessels where a deep-sea high seas permit may be issued to an operator that may fish under a joint venture agreement with a local operator.

The lack of RFMOs or a fisheries management regime presents a problem for many coastal states which may derive benefits from licensing fees, but are unable individually to provide real management of high seas operations or meaningful contributions to compliance and assessments of the stocks exploited.

In areas where an RFMO is in existence and regulations are violated there are often methods that can be utilized to deter further violations or inflict a penalty. The RFMO may have a strong enforcement regime and may be able to directly penalize violations if a state is a member of the RFMO or often pressure can be applied by the RFMO or other member states on a state to comply with obligations. However, there are several obvious problems that may occur:

- there may be no competent RFMO or arrangement;
- an RFMO or arrangement may be present, but the flag state may not be party to the relevant agreement; and
- the state may be party to the relevant agreement, but does not exercise effective control over its vessels.

¹ 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, 1995.

² Distant water fishing nations – this is a commonly used historical reference to vessels fishing under license to coastal states from countries other than the coastal state. Such vessels typically included many of the Asian tuna fleets that may also fish in national waters through joint venture arrangements with local operators.

An example of the complexity of overlapping management regimes is in the South East Atlantic where:

- the tuna and tuna-like stocks fall under the management of the International Commission for the Conservation of Atlantic Tunas (ICCAT);³
- management of transboundary stocks of the South East Atlantic coastal states (South Africa, Namibia and Angola) now fall under the newly-formed Benguela Current Commission (BCC); and
- High seas bottom fisheries fall under the management of the South East Atlantic Fisheries Organization (SEAFO).

The essential difference between these organizations is the nature of the stocks exploited – ICCAT is responsible for the tuna and tuna-like species, BCC all transboundary stocks and SEAFO the bottom-dwelling or “demersal” stocks. The relationship and designation of responsibility between these three management regimes is not always clearly defined (in the author's opinion) while, in many instances, there are overlapping or poorly understood stock delineation issues. This presents a real challenge to a state wishing to issue permits for the exploitation of a resource fished both within and outside of national jurisdiction. For example, the demersal stocks of both Orange roughy (*Hoplostethus atlanticus*) and Alfonsino (*Beryx splendens*) should fall under three management regimes (SEAFO, BCC and national fisheries) as these stocks are fished within national waters in Namibia, South Africa, Angola (BCC), as well as the high seas (SEAFO). It could be argued that, with the exception of ICCAT, management of all trans-boundary resources in the coastal zone and adjacent high seas of the South East Atlantic might be best served by a single consolidated management regime assuming single stock(s) of these species.

On the other side of the African continent, the Indian Ocean, no regional management regime exists (such as ICCAT) for demersal species. The Indian Ocean Tuna Commission (IOTC) remains dependent upon FAO, as does the relatively new South West Indian Ocean Fishery Commission (SWIOFC). The SIOFA is not yet in force and the Indian Ocean Commission (IOC) is a largely subregional agreement that serves southern Indian Ocean island states. The stated objectives of each of these organizations and or arrangements varies from managing tuna and tuna-like species (IOTC), to all “fishery resources” meaning “fish, molluscs, crustaceans and other sedentary species within the area, but excluding: (i) sedentary species subject to the fishery jurisdiction of coastal states pursuant to Article 77(4) of the 1982 Convention; and (ii) highly migratory species listed in Annex I of the 1982 Convention” (Article 1 of the SIOFA agreement (f [i,ii]) (SIOFA), and “all living marine resources without prejudice to the management responsibilities and authority of other competent fisheries ...” (SWIOFC), as well as the broad socio-economic/political objectives of the IOC that includes all fisheries.

The major management arrangements of the Indian Ocean can be summarized as:

- IOTC – an RFMO that manages tuna and tuna-like species in the Indian Ocean;
- SIOFA – an agreement that will cover management of high seas species not covered by IOTC, but is not yet in force;
- SWIOFC – a commission that deals with all stocks and resources within the EEZs of the southwest Indian Ocean; and
- IOC – an inter-governmental organization without a management mandate that includes Comoros, France (Réunion Island), Madagascar, Mauritius and Seychelles with an objective to promote sustainable development of the Western Indian Ocean Islands.

³ Noting that the coastal State still retains a level of autonomy with respect to the management of highly migratory species within their EEZ, although member States must still maintain obligations to the RFMO.

In the context of the implementation of the FAO Deep-sea Guidelines the main management organizations that could take direct responsibility in the Indian Ocean for new, exploratory or existing fisheries for bottom-dwelling deep-water/sedentary species is SIOFA when it goes into force⁴. The mandates of some of the other organizations do however have scope to implement the FAO Deep-sea Guidelines. The SWIOFC may be the most appropriate organization but is limited by the area of its mandate with most of the high seas fishing areas in the Indian Ocean falling outside of the SWIOFC area⁵. The current lack of an RFMO in part explains the formation of the Southern Indian Ocean Deepwater Fishers' Association (SIODFA), essentially an "industry body" that has independently taken the initiative to manage areas fished by members of the association in the South Indian Ocean.

Due to the complexity of the existing management regimes in the Indian Ocean region, any state wishing to license a vessel to fish in the high seas for demersal species may voluntarily implement the FAO Deep-sea Guidelines independently, until a suitable management arrangement is established.

The independent implementation of the FAO Deep-sea Guidelines presents the single biggest challenge to any state wishing to issue a high seas license for deepwater species. The onerous nature (onerous for many reasons, especially with respect to costs and capacity to undertake the many activities defined in the FAO Deep-sea Guidelines) implies that states that wish to fish on the high seas where there is no RFMO will often have no alternative but to negotiate with other interested and affected parties to create a collaborative arrangement to effectively fulfill the FAO Deep-sea Guidelines recommendations.

2. IMPLEMENTATION OF THE FAO DEEP-SEA GUIDELINES BY FLAG STATES WHEN THERE IS NO RFMO/A

For purposes of this discussion, states are referred to as either developed, or developing. These would be, by way of example, for the West Indian Ocean region, Kenya and South Africa⁶ both defined as "developing". Developing countries are specifically recognized in both the Straddling Stock agreement (Article 24) and the FAO Deep-sea Guidelines (paragraphs 84 and 85).

2.1 Applicable underpinning the United Nations agreements and paragraphs of the FAO Deep-sea Guidelines

Both Resolution 61/105 and the FAO Deep-sea Guidelines refer to the obligations of states and RFMO/As. With respect to implementation (states or other organizations) the text in the paragraphs switches between "states" and "RFMO/As" or both, presumably separating in places where a guideline can be implemented by one or the other, or both. Flag states are responsible for ensuring any vessels licensed to fish in areas beyond national jurisdiction comply with international conservation measures, where applicable⁷. Paragraphs 6 and 7 of the FAO Deep-sea Guidelines state that the purpose of the FAO Deep-sea Guidelines is only to provide tools and guidance and "encourage the efforts of states and RFMO/As towards sustainable use of marine living resources exploited by deep-sea fisheries, the prevention of significant adverse impacts on deep-sea VMEs and the protection of marine biodiversity that these ecosystems contain". Further the FAO Deep-sea Guidelines "are to be interpreted and applied in conformity with the relevant rules of international law, as reflected in the United Nations Convention on the Law of the Sea (UNCLOS) of 10 December 1982 (1982 UN Convention)"(paragraph 7). They also note that the FAO Deep-sea Guidelines "are not intended to prejudice the rights, jurisdiction and duties of states under international law as reflected in the Convention" (paragraph 7).

⁴ One more coastal State to sign SIOFA for ratification (Sanders, personal communication).

⁵ Note that SWIOFC is restricted to national waters (EEZs) – however in several coastal states of the West Indian Ocean (such as Tanzania and Kenya) the narrow shelf area restricts most fishing activity to within territorial waters.

⁶ South Africa is more appropriately described in some contexts as "developing" although in a fisheries management context is advanced and can be compared with most other countries with well established fisheries management regimes.

⁷ Such as the FAO Code of Conduct for Responsible Fisheries, UN Fish Stocks Agreement and UNCLOS.

In addition to the 1982 UNCLOS, the UNFSA is also one of the underpinning agreements for the FAO Deep-sea Guidelines. This agreement also places obligations on states with respect to arrangements that a state might not be party too (in particular, Article 17 [regarding non-member parties]). All states that are signatories to the UNFSA must co-operate with sub-regional or regional fisheries management organisations or arrangements in the conservation and management of relevant straddling fish stocks and highly migratory fish stocks, even if the state is not a member of, or a participant in, those organisations or arrangements.

The FAO Committee on Fisheries (COFI) has also recognized the potential problem relating to the implementation of the FAO Deep-sea Guidelines by emphasizing in their 28th session in Rome in March 2009 “the need to establish new RFMO/As in areas where they did not exist and to strengthen the capabilities of RFMO/As to achieve effective implementation of UNGA Resolution 61/105 and the International Guidelines, and for flag states to ensure such implementation, particularly in areas where no competent RFMO exists”. FAO, through the FAO Deep-sea Guidelines, is also encouraged to provide the support needed “for areas where no competent RFMO/A currently exists” including the following paragraphs of the FAO Deep-sea Guidelines:

- states should submit data on DSFs at the appropriate resolution for stock assessment and evaluation of impacts of fisheries on VMEs, which in turn should submit aggregated data to FAO (paragraph 34);
- states should, on an annual basis, submit their impact assessments as well as any existing or proposed conservation and management measures to FAO, which should make them publicly available (paragraph 52);
- states should submit vessel register or record data on at least an annual basis to RFMO/As, where applicable, or, for areas where RFMO/As do not exist, to FAO together with information on the measures they have adopted to regulate the activities of such vessels. RFMO/As and FAO should make such data and information publicly available by FAO Statistical Area (paragraph 57); and
- comprehensive maps showing the spatial extent of existing fisheries should be compiled by RFMO/As. For areas not covered by RFMO/As, each flag state should develop such maps and cooperate with other states concerned and FAO in developing joint maps for relevant areas (paragraph 64).

High seas, and specifically deep-sea permits issued by flag states need detailed description in national law – developing countries, in particular, may lack the technical expertise to apply detailed permit conditions and regulations – making permits and licensing an important area to be addressed in supporting documents or technical guidelines on implementing the FAO Deep-sea Guidelines.

2.2 *Definitions and interpretations*

Where a flag state authorizes a vessel to fish in areas beyond national jurisdiction it is responsible for ensuring that the vessel complies with relevant national and international laws and does not undermine international conservation and management measures adopted by RFMOs.

If there is no RFMO/A, a state can authorise their own vessels to fish for resources in the high seas. South Africa, for example, now licenses their own high seas fishing fleet (as do other flag states exploiting the SIO such as New Zealand and Australia). Recent (2010) general high-sea permits were not available from the designated management authority in South Africa, although a trap fishery for fishing in the South Indian Ocean (high seas) was licensed under an “exploratory” regime. Permit conditions associated with the exploratory permit for this vessel contained many of the elements relating to the FAO Deep-sea Guidelines, but give no indication of specifically applying the guidelines⁸.

⁸ In this particular example, the vessel intended to fish on the high seas in areas close to but not within the SWIOFC area (national EEZs).

2.3 Governance, management and stock assessments

The implementation of paragraphs 21–41 for developing states will be extremely challenging. Developed states such as New Zealand, which have an established deep-water fishery, have the capacity to implement the FAO Deep-sea Guidelines relatively easily. However, developing countries will require revisions of their current legislation. The South African *Marine Living Resources Act of 1998*, for example, is sufficiently broad to cover the recommended components in paragraphs 21–29. Although, specific regulations and permit conditions will need to be developed, the cost and effort of which might be difficult to justify. Less developed countries, such as Kenya or Tanzania, are highly unlikely to be able to provide appropriate supporting legislation to manage high seas fisheries. Under such circumstances, the state would benefit from a regional management organization or arrangement.

Suggestions that could support states in this regard are:

- *promote the need for an RFMO*: In regions where no RFMO for high seas bottom fisheries exists promote the development of an RFMO to support, in particular, developing states that have inadequate capacity to apply the FAO Deep-sea Guidelines for the management high seas bottom fisheries;
- *scientific and Compliance Observers*: The deployment of a specialized corps of trained Scientific and Compliance Observers for high seas vessels is the most obvious solution. Observers are independent and do not report to the vessel operator. Such observers will need skills in the identification of vulnerable marine deep-sea species;
- *data collection officers (DCOs)*⁹: Are now commonly used in many high seas fisheries. DCOs are often independent, trained individuals that follow strict data collection procedures and report to both the company (operator) and the licensing authority (state), which in turn has an obligation to report to the RFMO (e.g. CCAMLR has successful reporting system of DCOs and Scientific Observers);
- *stock assessment working groups*: Each licensing state will need to establish a specialized research and stock assessment group. Deep-water assessments are highly specialized and few developing states have the technical capacity or funds to undertake stock assessments. Further, sampling protocols need to be fine-tuned if reliable data are to be made available for stock assessments. Collaborative arrangements between the fishing industry and states (such as SIODFA) offer the most practical alternative where assessments are outsourced to stock assessment specialists;
- *surveys*: States would need to consider “independent” surveys as a primary stock assessment tool. The logistics and costs of undertaking such surveys are beyond the means of most states. Collaborative arrangements between commercial operators with a legitimate stake in the development of the fishery are the most probable solution. The use of commercial vessels to do acoustic surveys while simultaneously fishing under a controlled exploratory fishing strategy has been done effectively by some established deep-water fishing states (e.g. New Zealand and Australia); and
- *standardized methodologies and tools*: To enable developing states to harness the potential social and economic benefits from a developing high seas fishery, standardized methodologies should be developed. The FAO Deep-sea Guidelines provide no practical implementation tools such as species databases, specialized sampling procedures, reporting protocols, etc. Guiding manuals, for example, could be generic and adapted for each specific fishery. This would facilitate the easy consolidation and compatibility of data for assessment.

⁹ DCOs are appointed by vessel operators to ensure correct data are recorded and captured for submission to the RFMO or managing authority and include checking of data collected by on board observers.

2.4 Impact assessments, spatial planning and biodiversity considerations

The implementation of impact assessments under the FAO Deep-sea Guidelines has wide-ranging cost implications for states. Even in established deepwater fishing nations regular impact assessments are highly unlikely to have been completed (FAO Deep-sea Guidelines recommend they should be presented on an annual basis (paragraph 52) in areas that are unregulated by an RFMO). Routine stock assessments of established commercial fisheries are required in most management regimes, however, impacts assessments imply an entirely different process. Public demand due to the sensitivities around VMEs and deep-water resources in general, will place significant pressure on states and fishers to perform these tasks and develop specific conservation and management measures for deep-sea fisheries (paragraph 62) that includes spatial management measures, such as the closing of benthic areas.

Implementation of the FAO Deep-sea Guidelines will require a structured commercial sampling regime integrated with ongoing spatial assessments that include stratified biomass surveys, habitat descriptions and potential impacts on biodiversity. Implementation should probably also include an element of independent monitoring by a legitimate non-governmental organization (NGO) or a protocol agreed to that meets the approval of a recognized independent monitoring group.

2.5 Monitoring, control and surveillance and port state measures

A may choose to allow the landing of vessels in home ports to discharge catch and provision or undergo repairs. These issues are dealt with under the new port state measures agreement and are not addressed in the FAO Deep-sea Guidelines, but are important in respect to controlling IUU fishing in deep-sea high seas fisheries.

Monitoring of activities of high seas vessels is unlikely to significantly increase the existing burden of land-based monitoring. States do have tools in hand that can be prescribed to operators wishing to land in a particular port. This would include prescriptive VMS. In South Africa high seas vessels wishing to land in South African ports are required to obtain special gear permits and to complete catch declarations to entering the EEZ¹⁰. Ideally all flag states should permit independent monitoring of their vessel's activities, either by independent observers and or with continuous VMS monitoring. CCAMLR has taken the lead globally in this respect, although because of the high costs associated with continuous satellite monitoring there are economic implications, particularly for developing states. Again the priority objective should be the formation of an appropriate RFMO (if not already present) with collaborative effort control and other management measures (such as precautionary catch limitations).

At sea transshipments of vessels engaging in illegal, unreported and unregulated fishing (IUU) is a more problematic issue in high seas fisheries. Traceability tools have proven effective in some global fisheries (e.g. Patagonian toothfish), but again such documentation schemes are only effective through collaborative arrangements such as a regional fisheries management organisation.

¹⁰ Noting that South Africa has not yet signed the international Port State Agreement.

3. IMPLEMENTATION OF FAO DEEP-SEA GUIDELINES IN THE SOUTHERN INDIAN OCEAN

The development of the deep-sea Indian Ocean fishery along the Madagascar and south west Indian Ocean Ridges (as well as other ridges further east) provides an interesting example. Initially the fishery was exploited by three main states (Australia, New Zealand and South Africa), but many other countries and vessels, some with flags of non-compliance, became involved at the peak of the fishery in the early 1990s. The high cost of the fishery (distance offshore, vessels and gear requirements, etc.) eventually excluded many operators when returns diminished and economic viability declined. It is also worth noting that the potential for the area as a deep-water fishery was well known prior to its expansion in the 1990s. Research and exploratory fisheries were undertaken by the high seas fleets of other states such as the former Union of Soviet Socialist Republics (former USSR) and later Japan, Russia and others.

3.1 *Management arrangements*

The rapid development of the fishery resulted in a generally poor response time to implementation of any mechanism by which effort could be managed to not only sustain the resources exploited, but also to reduce the impacts of the fishery on VMEs in the area. South Africa, as a coastal state, played a significant role as a fishing nation although the political instability in the country at the time as well as the insecurity associated with the renewal of long-term fishing rights encouraged established deep-sea companies to fish on the high seas¹¹.

South Africa responded by drafting regulations that required special permits for South African operators if they wished to land deep-water species in South Africa. This affected both domestic landings (deepwater species were occasionally caught within the economic zone of South Africa) and high seas fisheries. Both New Zealand and Australia were better prepared in this regard as they had established domestic deepwater fisheries and consequently appropriate legislation already in place.

From a South African perspective the situation remains somewhat unsatisfactory. As with any other developing state the capacity to monitor, conduct research and manage such a fishery was, and still is, lacking. South Africa nevertheless responded by issuing high seas permits, legitimizing the operations of the vessels fishing on the high seas flying South Africa flag state. Other countries, notably New Zealand and Australia, also issued permits for the deepwater fisheries of the Indian Ocean. Subsequent attempts to encourage countries to buy into the SIOFA, it can be argued, have failed as the agreement is not yet in force. However, some states have issued independent requirements for vessels fishing in deepwater high seas areas where no RFMO/A exists which also applies in the Indian Ocean, such as the European Union¹². South African ports were also, at the peak of the exploitation of the South West Indian Ocean Ridge, being used to land and ship deep-sea products caught on the high seas, a situation not uncommon to other states such as Mauritius and Mozambique.

It was arguably easier for a foreign flagged vessel to use South Africa as a platform for high seas operation than it was for domestic flagged vessels operating under the permit conditions of South Africa (although the implementation of more stringent port state measures followed).

¹¹ Noting that South African flag vessels fished the Tasman Rise in an area managed by agreement between New Zealand and Australia.

¹² Refer to EU Council Regulation 743/2008.

3.2 *The formation of SIODFA*

The formation of the SIODFA, comprising four fishing companies is an interesting development, and one in which operators¹³ (with a perceived long-term stake in the South Indian Ocean deep-water fisheries) took an initiative to protect their interest. Association member vessels have developed a strong commitment from some of the flag states (e.g. Cook Islands) to comply with effort controls and an MCS regime. Members of SIODFA have also independently developed protocols on conservation and fishery management practices (including working with IUCN to close areas, referred to as Benthic Protected Areas), collective actions in support of fisheries management (including biological data collection and industry-based acoustic surveys), and effort limitation (restricting effort to one vessel per company). SIODFA also operates in an unsubsidised manner, has developed an MOU with IUCN works with FAO and has participated in the development of the FAO Deep-sea Guidelines.

3.3 *Implementation of the FAO Deep-sea Guidelines in the context of a developing coastal state*

Two typical examples can be used, South Africa which has a reasonably advanced fisheries management system, and Tanzania whose fisheries are primarily artisanal and restricted to territorial seas, but also licenses fishing vessels owned by foreign operators.

South Africa

Historically, South Africa, as has been demonstrated in this document, was closely involved in the development of the SWIO deep-sea fisheries. Despite having issued high seas trawl permits in the past, presently no permits for deep-sea high seas trawling are being issued¹⁴ and there are no clear guidelines or permit conditions in place that follow the FAO Deep-sea Guidelines. South Africa does, however, license vessels for pelagic high seas fisheries (tuna) fishing under joint ventures with South African rights holders. It is not clear if all South African vessels wishing to fish on the high seas (other than large pelagic longliners) in the future will be issued with “high seas trawling permits” or will only be issued with “exploratory” permits. Operators with high seas permits from countries other than South Africa can get permits to land in South Africa and port state measures now appear to be more closely applied to these operators. There is, however, no capacity for deep-sea research, no provision for surveys and no current compliance with the impact assessment requirements and other VME-related conditions. South Africa has not yet applied the FAO Deep-sea Guidelines although it should be noted that most states have not yet applied the guidelines.

The few that have begun to apply the guidelines, such as New Zealand and Australian fisheries management authorities, have clearly developed high seas management protocols for deepwater vessels.

Tanzania

Tanzania has good fisheries management legislation and also works collaboratively with Zanzibar¹⁵. Both countries license distant water fishing nations (DWFNs)¹⁶ for tuna. More recently, the formation of a Deep-Sea Fishing Authority (DSFA) in Zanzibar is aimed at managing fishing in their economic zone (to the 200 nm limit) and also aims to support the regional management of high seas fisheries in the Western Indian Ocean (through collaboration, vessel monitoring, etc.). Nevertheless, Tanzanian

¹³ Austral Fisheries (Australia), B&S International Ltd (Mauritius), Trans Namibia Fishing (Namibia) and United Frame Investments (Cook Islands).

¹⁴ Noting that an exploratory permit has been issued for trap fishing on the high seas and that there is no demand for the issuing of trawl permits to fish on the high seas.

¹⁵ The United Republic of Tanzania and the Revolutionary Republic of Zanzibar have separate governments but are associated economically as the Union of Tanzania and collaborate closely on many issues.

¹⁶ Distant Water Fishing Nations – this is a commonly used historical reference to vessels fishing under license to coastal states from countries other than the coastal state. Such vessels typically included many of the Asian tuna fleets that may also fish in national waters through joint venture arrangements with local operators.

fisheries remain focused on coastal fisheries. However operators of vessels from other fishing nations continue to seek licenses to fish in Tanzanian and Zanzibar waters, but there is little management of these vessels and the license agreements are seen primarily as a source of income through license fees.

4. IMPLEMENTATION OF FAO DEEP-SEA GUIDELINES

The examples of South Africa and Tanzania beg the question – do the FAO Deep-sea Guidelines provide a useful tool by which states can manage potential deep-sea high seas fisheries in the region, or at least manage vessels licensed under their flag?

The author's view is that in at least one case (South Africa), where high seas fisheries are well understood the guidelines, in theory at least, provide all the information needed to implement a state-run high seas fisheries protocol. One then needs to examine why the guidelines have not yet been implemented, not only by South Africa, but by many states in similar situations.

Secondly, Tanzania represents an entirely different perspective related to deep-sea high seas fisheries. This country, and other similar undeveloped coastal or island states, are only likely to see the potential benefits of such fisheries as “additional license fees” and are unlikely to implement the FAO Deep-sea Guidelines given the existing economic and political climate in the country. In this case the FAO Deep-sea Guidelines are unlikely to be applied.

4.1 Problems identified

There may be several reasons that many developing states are reluctant to implement the FAO Deep-sea Guidelines. These may include:

- a trade-off between the cost and effort needed to manage such fisheries and associated commitments. In South Africa's case, the cost and capacity needed to manage domestic fisheries is stretched to the limit; high seas fisheries and related research are low priority and are unlikely to be given the attention needed;
- other countries, such as Tanzania, have not generally dealt with high seas bottom fisheries, focus on coastal fisheries only, and also have huge cost, capacity and management issues that will result in the FAO Deep-sea Guidelines being given little attention;
- the FAO Deep-sea Guidelines are onerous on any state trying to apply them; it is likely that only developed states with a direct stake in the development of such fisheries will be politically willing to apply FAO Deep-sea Guidelines;
- many developing countries focus on socio-economic priorities and there is generally no political will to deal with issues that are costly and do not provide much in the way of direct economic benefits; and
- the potential benefits of high seas bottom fisheries are poorly understood – this relates not only to the direct financial benefits possible from a well-managed high seas fisheries, but also the biodiversity and conservation benefits, as well as global gains through improved research and management.

4.2 Some solutions and ideas

One obvious solution to the issue of the difficulty for individual states in applying the FAO Deep-sea Guidelines is the creation of an RFMO. However, the scale of high seas fisheries in the Indian Ocean (or anywhere else for that matter) needs to justify the cost and effort needed to manage such an organization. The SIOFA has all the tenants of a useful instrument to manage the South Indian Ocean high seas fishery, but the reluctance by states to ratify the agreement is unclear (economic considerations are the most likely reason). The formation of SIODFA is an obvious response to the need for management in the absence of an appropriate management framework. SIODFA will, however, always suffer from the issue of “independence” as it could be interpreted as serving only commercial interests.

Further options need to be explored to support states in implementing the FAO Deep-sea Guidelines in the Indian Ocean, these include:

- obtaining buy-in to SIODFA and use it as a first step to the formation of a full RFMO such as SEAFO¹⁷;
- piggybacking on an existing RFMO in the region – this could include SWIOFC or IOTC, although IOTC is not the best choice as the fishery is quite different¹⁸;
- a collective initiative by coastal states to start addressing issues, through for example, the Tanzanian example of the Deep Sea Fishing Authority;
- there are numerous projects ongoing in the Indian Ocean – in particular the South West Indian Ocean Fishery Project (SWIOFP), the Agulhas Somali Current Large Marine Ecosystem (ASCLME), the Marine and Coastal Management Coastal Environment Project (MACEMP) and the Kenya Coastal Development Project (KCDP – under development). These multidisciplinary projects all have “offshore” components, are required to look at transboundary and high seas issues, will develop strategic action plans (SAPs), and are undertaking transboundary diagnostic analysis (TDAs). The timing is therefore right to consolidate the efforts of these programmes to help support or initiate the development of an appropriate collaborative instrument for bottom fisheries in the high seas; and
- the SIODFA model may provide a useful alternative simply because high seas deep-sea fisheries are costly to manage and limited in this area. Buy-in from industrial operators is central to the success of good fisheries management. An alternative perhaps is the expansion of the SIODFA concept to a more broad-based membership that includes state management authorities and possibly other interested and affected parties, rather than a more formal international instrument that relies on public funding. Industrial associations largely function as business units that are self-funding and managed in a cost effective manner.

At the level of the state considerable more effort needs to be done to sensitize nations that have not been engaged in the previous discussions to the FAO Deep-sea Guidelines. The following suggestions might provide a useful basis for discussion at the Workshop:

- develop a set of “Implementation Guidelines” – the intent is not to undermine the FAO Deep-sea Guidelines, but to provide a more useful step-by-step approach for, in particular, developing states;
- the implementation process should include “generic” advice on revisions needed in existing fisheries or related legislation of coastal states;
- the development of communication materials to sensitize fisheries managers and politicians to the nature of high seas fisheries, biodiversity concerns, MCS and research requirements. This could include regional Workshops targeting politicians and fisheries managers and scientists;
- develop appropriate tools by which the FAO Deep-sea Guidelines can be implemented. For example, templates for VME impact assessments, manuals for identification (generic drawing on some of the already developed guides by other organizations), appropriate generic data recording forms, a generic data base for easy capture and submission of specialized bottom-fishery data, etc; and
- develop a research protocol – tools that go from the basics of research for countries that do not have advanced research facilities to sophisticated research for states which have advanced facilities and abilities.

¹⁷ Comments and suggestions from SEAFO on important aspects to address in the development of an RFMO in the region would be important.

¹⁸ Given however that SIOFA may be close to ratification, this point could become irrelevant.

5. SUMMARY AND CONCLUSIONS

In circumstances when no RFMO/As exists the FAO Deep-sea Guidelines place a clear responsibility on the state to apply the guidelines. The main issue here, according to the author, is that there is no incentive, apart from a moral obligation, for a state to apply the FAO Deep-sea Guidelines if no collaborative arrangement is in place. Perhaps the next step of the FAO Deep-sea Guidelines is to develop supporting implementation tools as suggested above. Top priority should obviously be given to the development of an appropriate RFMO. However, the preponderance of RFMOs with the associated costs and bureaucratic burden may not justify the need in some areas, assuming that the scale of deep-sea fisheries is relatively minor compared to large pelagic sectors.

In the Indian Ocean, the formation of a fishing industry group of interested and affected parties appears to have begun to address, in part, the need for management relating to bottom trawling on the ridges and seamounts of the South Indian Ocean. However, there is still a need for an independent management body without direct commercial interests. Further, additional fishing vessels with other gears need to be incorporated into SIODFA (assuming the association does not exclude demersal longliners and trap fishers).

Key discussion points for the Workshop highlighted in this paper include:

- there is a general need to provide implementation support for the FAO Deep-sea Guidelines. The complexity of the guidelines may seem daunting to states with poorly developed fisheries management regimes. A stepwise approach that not only prioritises implementation but also accommodates the constraints of individual states (these may include financial, political and skills capacity);
- the implementation process could include terms of reference for reviews of existing legislation to facilitate the changes needed to incorporate the FAO Deep-sea Guidelines;
- is there a trade-off between the cost of establishing and running an RFMO and the potential benefits the high seas resources might have in a particular region? If so, is there not a more appropriate instrument to manage the fishery (if an RFMO is not present);
- generic material need to be developed that can be used for implementation – these can include basic sampling forms, a standardised data base and generic species identification guides;
- research protocols should be developed – tools that go from the basic research requirements possible only by countries that do not have advanced research facilities to the more developed research possible for states which have advanced research facilities and capacity; and
- there is a need for generic training materials for a specialized corps of trained Scientific and Compliance Observers with skills in the identification of vulnerable marine deep-sea species:
 - (i) Guidance on the conducting of independent commercial surveys as a stock assessment tool should be provided. Collaborative arrangements between commercial operators with a legitimate stake in the development of the fishery are the most probable solution. The use of commercial vessels to do acoustic surveys while simultaneously fishing under a controlled exploratory fishing will support implementation of the FAO Deep-sea Guidelines.
 - (ii) Stock assessment tools related to high seas (and deep-water stocks specifically) that can be relatively easily applied by managers and stock assessment specialists should be developed.

6. REFERENCES

- FAO.** 2007. *Report and documentation of the Expert Consultation on Deep-Sea Fisheries in the High Seas. Bangkok, Thailand, 21–23 November 2006.* FAO Fisheries Report No. 838. Rome. 204 pp.
- FAO.** 2009a. *International Guidelines for the Management of Deep-Sea Fisheries in the High Seas: FAO Technical Consultation document.* Rome. 73 pp.

- FAO.** 2009b. *Report of the twenty-eighth session of the Committee on Fisheries. Rome, 2–6 March 2009.* FAO Fisheries and Aquaculture Report No. 902. Rome. 64 pp.
- UNGA.** 2007. *Resolution 61/105 Sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments.* UNGA /RES/61/ 105. 21 pp. (also available at www.un.org/Depts/los/general_assembly/general_assembly_reports.htm).

This is the report of a workshop to analyse the challenges and propose ways forward for the implementation of the FAO International Guidelines for the Management of Deep-sea Fisheries in the High-seas held in Busan, Republic of Korea, from 10 to 12 May 2010. The report is divided in two parts. Part 1 provides the meeting summary and the main conclusions and recommendations with respect to general considerations, governance, support to developing countries, management issues, compliance and enforcement, vulnerable marine ecosystems (VMEs) and review and implementation processes. Part 2 contains the background documents on: 1) issues with respect to fisheries management in areas where there are regional fisheries management organizations or arrangements (RFMO/As); 2) VMEs in areas where there are RFMO/As; and 3) both topics in areas where there are no RFMO/As.

ISBN 978-92-5-106826-7 ISSN 2070-6987



9 7 8 9 2 5 1 0 6 8 2 6 7

I2135E/1/03.11