SPRFMO Report Annex D

REPORT OF THE SCIENCE WORKING GROUP
Guayaquil, Ecuador, 3 - 5 March 2008

1. Welcome & Introductions

The fifth meeting of the Science Working Group (SWG) was opened by the Chair, Mr Andrew Penney (New Zealand), who welcomed all participants. The Chair introduced and welcomed the recently appointed interim Executive Secretary, Dr Robin Allen, and the Data Manager, Ms Susie Iball. The participants in the SWG meeting are shown in Annex 1.

2. Adoption of Agenda

The agenda was adopted without modification, and is attached in Annex 2.

3. Administrative Arrangements

3.1 Meeting Documents

The full list of documents tabled at the meeting is attached in Annex 3. The Chair noted which documents applied to which agenda items.

3.2 Meeting Arrangements

The Executive Secretary informed participants of the meeting arrangements and proposed meeting schedule.

4. Nomination of Rapporteurs

Martin Cryer (New Zealand) and Kelly Denit (USA) offered to assist the Chair and Executive Secretary in rapporteuring the meeting.

5. Inter-Sessional Work Programme

5.1 Report from the Interim Secretariat on status of catch & effort data submission

The Data Manager presented document SPRFMO-V-SWG-10, showing which data and information had been received to date from flag states on interim measures, vessels, catch and effort, and the extent to which these met the standards for submission of these data. The SWG noted that a substantial amount of data had been received, but that there were data outstanding from some flag states. All participants

were requested to ensure that their outstanding data were submitted as soon as possible. It was noted that submission of jack mackerel data prior to the planned Jack Mackerel Workshop in June 2008 was particularly important.

The Executive Secretary informed the Group that a contract had been issued to an independent company for the development of a SPRFMO Database to capture all data submitted. This would be designed to meet all of the agreed requirements for confidentiality of these data.

5.2 Update by the Interim Secretariat on status of the SPRFMO bottom fishing footprint maps, and the SPRFMO GIS database

The Executive Secretary noted that the SPRFMO GIS database had not yet been developed, but that this would be done once bottom fishing footprint and other geospatial data had been received, and the necessary GIS software obtained. It was noted that bottom fishing footprint information had recently been received from New Zealand, and that Australia was working on developing their bottom fishing footprint maps, and would submit this information when available.

New Zealand presented aspects of their document SPRFMO-V-SWG-09 describing their process to develop bottom trawl and bottom line footprint maps for the 2002 – 2006 reference period. Individual tow or set data had been groomed to remove positional errors and plotted using GIS. The trawl or line footprints were then mapped by overlaying 20 minute blocks touched by at least one trawl or set (as required in terms of the Benthic Assessment Framework), producing a trawl footprint consisting of 200 blocks, and a bottom line footprint of 40 blocks. An effort index (the number of tows which impacted each block) had been applied to each trawled block, to allow for classification of past impact levels by block.

New Zealand specifically noted that their respective footprint maps for trawling and bottom lining differ substantially, with bottom lining typically occurring in different areas from trawling. In terms of the interim measures requirement to "*Not expand bottom fishing activities into new regions of the Area where such fishing is not currently occurring*" (bottom fishing interim measure 2), it would appear to be inappropriate for bottom trawling activities to expand into previously un-trawled areas of the bottom line footprint during the interim period. This indicated that separate joint footprint maps should be developed for different fishing methods such as bottom trawling and bottom longlining or drop lining.

6. Establishment of the Deepwater Sub-Group

6.1 Terms of Reference for the Deepwater Sub-Group

A requirement to establish terms of reference for the SWG Sub-Groups was identified at the 4th SWG Meeting at Noumea. Proposed draft terms of reference for the Sub-Groups were tabled in document SPRFMO-V-SWG-07, which also presented the diagram showing the proposed relationship between the SWG and Sub-Groups presented to the 4th meeting.

The draft Terms of Reference for the Deepwater Sub-Group were adopted without modification as the Terms of Reference for the Deepwater Sub-Group during the interim period. These are attached in Annex 4. It was noted that these could be

adapted and improved by the SWG and Sub-Group, if necessary These should also be fully reviewed following establishment of any SPRFMO Commission, Scientific Committee and Scientific Working Groups.

The SWG endorsed the views of the Jack-Mackerel Sub-Group that regular meetings of the Sub-Groups should not take place more that twice per year, unless considered absolutely necessary, and agreed to by the SWG and Sub-Group participants. This would not preclude the holding of additional special workshops or ad-hoc consultations considered necessary and agreed to by the Sub-Groups.

6.2 Chairmanship of the Deepwater Sub-Group

No nominations were received at this meeting for the Chair of the Deepwater Sub-Group. Participants agreed to conduct an intersessional email exchange on nominations for this position before the next SPRFMO meeting. The SWG reaffirmed the importance of establishing the Deepwater Sub-Group to deal with all aspects of research and assessment of deepwater species.

7. SPRFMO Benthic Assessment Standard

7.1 Development of the Benthic Assessment Standard

The Chair presented an update on progress with development of the detailed SPRFMO Benthic Assessment Standard. A draft standard is being developed by New Zealand under a research contract with NIWA. This draft is expected to be completed by the end of April 2008, for circulation to SPRFMO participants and consideration at the next SWG meeting. The standard will be based on the current Benthic Assessment Framework, adopted by SPRFMO at the 4th meeting, but provide detailed guidance on information and methodology recommended for preparation of each section of the benthic assessments required in terms of the SPRFMO interim measures on bottom fisheries.

Efforts to develop this benthic assessment standard have highlighted the need to give further consideration to definitions of the biological components of VMEs, and to operational definitions of ‘evidence’ of VMEs, actual existence and distribution of VMEs, significant adverse impacts and adequate protection measures, if the standard is to provide practical guidance to flag states on evaluation of interactions with VMEs.

7.2 Definition of Vulnerable Marine Ecosystems

The SWG recalled that, when adopting the proposed working definition of VMEs included in the SPRFMO Benthic Assessment Framework adopted at the 4th meeting, it had been noted that the FAO Expert Consultation being held in September 2007 would be re-considering an appropriate definition of VMEs, for incorporation in the draft FAO guidelines for management of deepwater fisheries on the high seas. The report of that consultation (SPRFMO-V-SWG-INF002) contains proposed examples of vulnerable species groups (corals, sponges and other habitat-forming species) that could be considered to represent VMEs, as well as examples of seabed habitats that are likely to support such species.

The SWG noted that the FAO technical consultations on these draft deepwater management guidelines were still underway, and had not yet adopted these proposed examples of VMEs or vulnerable habitats. The Group therefore proposed that the current working definition of VMEs in the SPRFMO Benthic Assessment Framework be retained, but be revised as appropriate to conform to any final definition of VMEs adopted by the FAO Technical consultation on Deepwater Guidelines, once these have been adopted.

The SWG nonetheless recognised the potential value of the proposed VME examples when attempting to develop practical procedures to evaluate interactions and impacts on VMEs. The examples offered by the September 2007 FAO Expert Consultation are provided in Annex 5.

7.3 Evidence and Existence of VMEs

New Zealand provided an overview of key aspects of their document SPRFMO-V-SWG-09 on work done to develop protocols for detection of evidence interactions with VMEs during individual fishing operations, and a process for evaluating likelihood of existence and distribution of VMEs from subsequent review of a range of relevant data and information. The examples of proposed vulnerable species / groups proposed by the September 2007 FAO Expert Consultation on Deepwater Fisheries (see Annex 4) was used as a starting point to develop a list of taxonomic groups to be used for evaluating evidence of interactions with VMEs on a tow-by-tow basis. Analyses of scientific observer data on benthic invertebrate by-catch in past New Zealand trawling operations were used to determine median weights of by-catches of these taxonomic groups during past fishing operations, to use as thresholds for determining 'evidence' of VME interaction. These are coupled with a sensitivity ranking for each taxonomic group, and a total 'VME score", to provide a proposed protocol to be used by scientific observers on future New Zealand bottom trawling operations in the SPRFMO area, to activate the move-on rule in moderately fished area where evidence of VMEs is encountered. It was noted that the IUCN had proposed a similar approach, and similar weight thresholds for detecting interactions with VMEs (SPRFMO-V-SWG-INF01).

New Zealand then described a proposed process for subsequent analysis of a range of data to evaluate likely existence and distribution of VMEs, including detailed benthic by-catch data collected by scientific observers, information on repetitive encounters with VMEs over time and space (see SPRFMO-V-SWG-INF01), information on topography of seabed features likely to support VMEs (see SPRFMO-V-SWG-INF02 and examples in Annex 4) and principles for evaluating likelihood that such features do support VMEs (such as ocean region, depth, seabed geology and topography, oxygen content and localised nutrient levels). It is intended to conduct such analyses periodically to delineate areas with a high likelihood of supporting VMEs and to review, and revise as necessary, spatial closures to protect an adequate proportion of such areas across the scale of distribution of such VMEs. Such analyses would also be appropriate for use in detecting and delineating VMEs across the SPRFMO area, as a basis for developing future proposals for spatial closures of adequate and representative areas to protect VMEs.

There were a number of questions for clarification from participants relating to the selection of taxonomic groups to detect evidence of VMEs, levels of biodiversity in

past bottom trawl by-catches and procedures to ensure that observers are adequately trained to conduct such by-catch evaluations.

Australia noted that they were conducting similar analyses in the process to develop an implementation approach for the bottom fisheries interim measures, and may present information on their analyses and proposed approach at a future meeting. Chile indicated that they were also working on an approach to implementation of bottom fishing interim measures.

7.4 Mapping of Seamounts

The Chair presented a brief overview of document SPRFMO-V-SWG-05, prepared by Allain *et al.* (2008), describing the process and results of a project to review and revise available geospatial information on the location and characteristics of seamounts in the SPRFMO area. Through comparison and integration with a number of other seamount data sets for the region, the initial database of seamount locations developed by Kitchingman & Lai (2004), and which was used in the SPRFMO Benthic Assessment Framework to provide an initial map of seamounts for use in benthic assessments, was substantially improved. Position errors were corrected, invalid seamounts removed, additional confirmed seamounts added and bathymetric information used to provide descriptions of the shape of a number of seamounts. Analyses were also presented of the distribution and proportion of seamounts likely to be suitable for supporting various deepwater fish species.

The SWG recommended that this updated seamounts database be obtained from the authors, and be used for evaluation of likely interactions between future bottom fishing operations and seamount VMEs, during preparation of benthic assessments for such fisheries. The SWG also noted that the Hillier & Watts (2007) dataset described in the paper, which contains information on 34,256 underwater features smaller than 1000m in height, would be a valuable addition to these data, given the current SPFRMO working definition of VMEs as including seabed features >100m in height.

The Secretariat was requested to obtain the updated seamounts database from the authors, and to integrate this information into the SPRFMO GIS database, when this was developed.

8. Deepwater Species Assessment and Management

SWG participants had been requested to give inter-sessional consideration to options for effective assessment and sustainable management of deepwater species.

No specific papers on deepwater species assessment and management were tabled at this meeting. However, it was noted that documents SPRFMO-V-SWG-INF01 and SPRFMO-V-SWG-05 did contain some initial suggested guidelines on the implementation of precautionary approaches to sustainable exploitation of deepwater fisheries, suggesting that such approaches should include one or more of the following measures:

- Highly conservative effort limits, particularly where information is scarce and reliable assessments on sustainable exploitation rates of target and main by-catch species are not available.

- Precautionary feature and sub-area catch limits, designed to ensure that exploitation rates do not exceed 5%, to prevent serial depletion of low-productivity stocks,
- Regular review of appropriate indices (such as acoustic survey indices or CPUE) of abundance of deepwater species at a feature or sub-area scale, to revise feature or sub-area catch limits downwards when significant declines in abundance are detected.
- Comprehensive monitoring of all fishing effort, and capture of all species, including adequate observer coverage to validate information on catch, effort, CPUE and interactions with VMEs.

The SWG recognised that the above suggestions provided a theoretical framework for designing effective deepwater management measures. It was noted that information may often be inadequate to allow reliable estimation of aspects such as feature or sub-area abundances and exploitation rates, but that uncertainty or lack of information should not prevent implementation of precautionary conservation and management measures. Effective implementation of measures such as conservative effort and feature catch limits would require good international cooperation to ensure implementation of such measures across all participants. The SWG noted their conclusion at the previous meeting that effective protection of deepwater ecosystems and VMEs would probably require the implementation of a system of adequate and representative spatial closures.

9. Benthic Assessments

No benthic assessments were tabled inter-sessionally, or at this meeting, for review and comment by the SWG.

New Zealand noted that they had been working on an approach to implementation of the SPRFMO interim measures for bottom fisheries, and that this would form the basis of a benthic assessment for New Zealand bottom fisheries to be conducted during the 2008/09 fishing season. Dr Martin Cryer presented an overview of key aspects of document SPRFMO-V-SWG-09, which described the proposed New Zealand implementation approach. This includes a three-tier classification of blocks by previous trawling effort, proposed closure of blocks with negligible effort (< 0.5 tows per year) over the 2002 – 2006 reference period, additional precautionary closures of moderately and heavily fished blocks containing seabed features likely to support VMEs and application of the 'move-on' rule (bottom fisheries interim measure 7) in moderately fished areas where existence of VMEs was unknown. The total proportion of the New Zealand bottom trawling footprint area that would be closed in terms of these measures would be 41%, which New Zealand considered to be adequate protection and mitigation to prevent significant adverse impacts on VMEs, across the scale of their bottom trawling footprint. New Zealand intends to prepare, and submit for review, a benthic assessment based on this implementation approach over the next few months.

There were a number of questions of clarification regarding the proposed approach. Participants offered no suggestions for improvement to the approach. Mr Sandy Morison noted that they were also working on developing an approach to

implementation of the bottom fishing interim measures, but that the details of implementation would probably differ from the New Zealand approach in a number of respects. He indicated that Australia would also be preparing and submitting a benthic assessment based on their implementation approach at some stage in the future.

10. Species and Habitat Profiles

10.1 Review of new species or habitat profiles

No new species profiles were tabled for discussion.

10.2 Revisions to existing profiles

No revisions were proposed at this meeting for any of the existing species or habitat profiles. Chile and Peru informed the Group that they were working on some proposed improvements to a number of species profiles, and would submit these before the next meeting for consideration by the SWG.

10.3 Prioritisation and process for further species profile development

The SWG re-iterated the recommendations of the previous meeting to complete the draft species profile for oreos, and to develop profiles for pelagic armourhead, toothfish and wreckfish.

11. Guidelines for Annual National Reports to the SWG

11.1 Consideration of overview by the SPRFMO Secretariat on National Report guidelines from other RFMOs

The Executive Secretary presented document SPRFMO-V-SWG-06, which contained examples, extracts and a summary of national reporting guidelines implemented by other RFMOS. Nine RFMOs had been contacted directly for information on their scientific National Report requirements, and FAO Regional Organizations were contacted through the FAO. A number of RFMOs reported that they did not have standard National Reporting guidelines, or that their scientific advice is provided by ICES. Extracts of the standards for seven RFMOs and the ISC were obtained, and were used to prepare a summary table of national report elements required by each organization.

11.2 Consideration of draft guidelines for annual National Reports to the SPRFMO SWG

The Chair presented documented SPRFMO-V-SWG-08, containing his initial draft of proposed guidelines for annual national reports to the SPRFMO SWG.

There was substantial discussion concerning the purpose and level of detail of proposed national reports. It was emphasized that these were intended to provide a brief, summarised description of major characteristics, changes and developments in each flag state's fisheries over the previous fishing year. The purpose of such reports

would be to provide a short and concise overview of the fisheries of each flag state in a standardised format, to annually inform SWG participants of major developments. Such reports were not intended to replace any aspect of data submission or submission of detailed scientific papers and so would not be expected to include high levels of detail.

A number of participants recognised the value of standardised national reports in providing overviews of fisheries, and expressed some support for the proposed guidelines. It was noted that annual national reports would also be of value to participants in the negotiations, and to any future Commission or other subsidiary bodies. However, many participants required additional time to consider the proposed national report guidelines, and it was agreed to defer adoption of such guidelines until the next meeting. Chile emphasized the importance of making progress towards adopting such guidelines, and it was agreed to conduct an inter-sessional exchange of views and proposed revisions, with a view to agreeing on report guidelines to adopt at the next meeting.

12. Consideration of the Report of the Jack Mackerel Sub-Group

The Chair of the Jack Mackerel Sub-Group presented the report of the Sub-Group (attached in Annex 6). The contents of the report were noted, and all recommendations of the Jack Mackerel Sub-Group were endorsed by the SWG.

Noting the concerns in the Chilean assessment report about the declining state of the Chilean jack mackerel stock, and the increased risk to the stock, and further noting the reported increase in fishing capacity, some participants urged states to respect the interim measures and recommended that participation in the jack mackerel fishery in the area covered by the Chilean assessment should not exceed a level consistent with sustainable utilization of this resource.

13. Future Scientific Work Programme

The SWG identified the following inter-sessional work requirements:

- Complete final arrangements for the Chile / FAO Jack Mackerel Stock Structure and Assessment Workshop, and conduct this workshop from 30 June – 4 July 2008.
- Complete development of the detailed Benthic Assessment Standard, based on the Benthic Assessment Framework, for consideration at the next meeting.
- Review and comment on any submitted benthic assessments, either inter-sessionally, or at the next meeting, depending on when these are received.
- Complete the draft species profile for oreos and develop profiles for pelagic armourhead, toothfish and wreckfish, and submit proposed revisions to other species profiles.
- Consider and comment on proposed draft national report guidelines.
- Exchange of proposals for nominations for the Chair of the Deepwater Sub-Group.

The SWG also requested the Secretariat to attend to the following:

- Follow up outstanding data submission requirements, particularly for jack mackerel data which might be required by the Jack Mackerel Workshop in June/July 2008.
- Obtain geospatial information on the updated database of seamounts in the SPRFMO area (reported in SPRFMO-V-SWG-05), and continue development of a SPRFMO geospatial database of joint bottom trawl footprint, seamounts and VMEs, bathymetry and EEZ boundaries.
- Coordinate the Benthic Assessment Process.
- Receive and circulate information for proposed improvements to species profiles.

14. Other Matters

14.1 SWG Chairmanship

The SWG confirmed that Andrew Penney would remain in the Chair for the next inter-sessional period.

No other matters were discussed.

15. Adoption of SWG Report

The SWG report was adopted, following inclusion of revisions proposed by participants.

16. Meeting Closure

The Chair thanked participants for their contributions to discussions. The meeting was closed at 15h00 on 5 March 2008.

Annex 1 to the SWG Report

List of Participants at the 5th meeting of the SPRFMO Science Working Group

"FIFTH INTERNATIONAL MEETING ON THE ESTABLISHMENT OF A SOUTH PACIFIC REGIONAL FISHERIES MANAGEMENT ORGANISATION"

SCIENCE WORKING GROUP

Guayaquil, Ecuador, 3 - 5 March 2008

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Annex 2 to the SWG Report

AGENDA – SCIENCE WORKING GROUP
Guayaquil, Ecuador, 3 - 5 March 2008

1. **Welcome & Introductions**

2. **Adoption of Agenda**

3. **Administrative Arrangements**
   - 3.1. Meeting documents.
   - 3.2. Meeting arrangements.

4. **Nomination of Rapporteurs**

5. **Inter-Sessional Work**
   - 5.1. Report from the Interim Secretariat on status of catch & effort data submission.
   - 5.2. Update by the Interim Secretariat on status of the SPRFMO bottom fishing footprint maps, and the SPRFMO GIS database.

6. **Establishment of the Deepwater Sub-Group**
   - 6.1. Terms of Reference for the Deepwater Sub-Group.
   - 6.2. Chairmanship of the Deepwater Sub-Group.

   (If a Deepwater Group can be fully established at this meeting, then SWG agenda items 7 - 9 could be dealt with by the Deepwater Sub-Group)

7. **SPRFMO Benthic Assessment Standard**
   - 7.1. Development of the Benthic Assessment Standard.

     (Update on progress to date with development of the detailed SPRFMO Benthic Impact Assessment standard)
   - 7.2. Definition of Vulnerable Marine Ecosystems.

     (Consideration of updated definitions of VMEs from the 2007 / 2008 FAO Expert and Technical Consultations on Management of Deepwater Fisheries)
   - 7.3. Evidence and Existence of VMEs.

     (Consideration of effective approaches for detecting evidence of VMEs during fishing operations, and for determining existence of VMEs)
   - 7.4. Mapping of Seamounts.

     (Consideration of an information paper submitted by Valerie Allain, SPC, provided an update on mapping of seamounts in the Pacific Ocean region)

8. Deepwater Species Assessment and Management

(Discussion of any papers submitted on options for reliable assessment and effective management of low-productivity deepwater species)

9. Benthic Assessments

(Discussion of process for consideration of any benthic assessments that may have been submitted for proposed fisheries in the SPRFMO area, or discussion of questions which have arisen about these assessment requirements or process since SPRFMO4 in Noumea.)

10. Species and Habitat Profiles

10.1. Review of new species or habitat profiles.

10.2. Revisions to existing profiles.

10.3. Prioritisation and process for further species profile development.

11. Guidelines for Annual National Reports to the SWG

11.1. Consideration of overview by the SPRFMO Secretariat on National Report guidelines from other RFMOs.

11.2. Consideration of draft guidelines for annual National Reports to the SPRFMO SWG.

12. Consideration of the Report of the Jack Mackerel Sub-Group

13. Future Scientific Work Programme

13.1. Identification of short & medium term science requirements.

14. Other Matters

15. Adoption of SWG Report

16. Meeting Closure

Annex 3 to the SWG Report

SCIENCE WORKING GROUP: & SUB-GROUPS
Document List – SPRFMO V 2008, Guayaquil, Ecuador

SPRFMO-V-SWG-01:	SWG Agenda for 3-5 March 2008
SPRFMO-V-SWG-02:	Jack-Mackerel Sub-Group Agenda for 3-5 March 2008
SPRFMO-V-SWG-03:	SWG Document List for Fifth Meeting (this document)
SPRFMO-V-SWG-04:	Timetable for D&IWG, SWG and Sub-Group meetings, 3 - 7 March 2008.
SPRFMO-V-SWG-05:	Seamount mapping – Valery Alain's paper
SPRFMO-V-SWG-06:	Overview of National reports for RFMO Scientific Committees - Secretariat Paper
SPRFMO-V-SWG-07:	Draft Terms of Reference for the Jack Mackerel and Deepwater Sub-Groups
SPRFMO-V-SWG-08:	Draft Guidelines for Annual National Reports to the SWG
SPRFMO-V-SWG-09:	New Zealand Implementation of the SPRFMO Interim measures on Bottom Fisheries
SPRFMO-V-SWG-10:	Summary of data received by the Interim Secretariat.
SPRFMO-V-SWG-11:	Updated status of the Chilean Jack Mackerel stocks
SPRFMO-V-SWG-12:	Recent genetic studies of Pacific jack mackerel *Trachurus murphyi* in Russia
SPRFMO-V-SWG-13:	Progress Report: Population structure of the Chilean jack mackerel, Trachurus murphyi, in the South Pacific Ocean
SPRFMO-V-SWG-14:	Progress on the Chilean Jack Mackerel Workshop
SPRFMO-V-SWG-15:	Jack mackerel (*Trachurus murphyi*) fishery and biological aspects in Ecuadorian waters

Information Documents

SPRFMO-V-SWG-INF01: IUCN 2008. The Science behind the Guidelines: A scientific guide to the FAO Draft International Guidelines (December 2007) for the management of deep-sea fisheries in the high seas, and examples of how the guidelines may be practically implemented. *IUCN Global Marine Programme Report*, 39pp.

SPRFMO-V-SWG-INF02: FAO 2007. Draft International Guidelines for fhe Management of Deep-Sea Fisheries in the High Seas (*as adopted by the Expert Consultation on International Guidelines for the Management of Deep-sea Fisheries in the High Seas*), Bangkok, Thailand, September 2007. 29 pp.

SPRFMO-V-SWG-INF03: FAO 2008. Draft International Guidelines for the Management of Deep-Sea Fisheries in the High Seas. *Report of the FAO Technical Consultation*, Rome, February 2008, 17 pp.

Annex 4 to the SWG Report

Deepwater Sub-Group Terms of Reference

The Deepwater Sub-Group shall:

i) Develop research programmes, and coordinate research activities, on deepwater species caught in bottom fisheries in the SPRFMO area, including ecologically related species, species caught in association with deepwater species, and species caught in bottom fisheries.

ii) Review the results of these research programmes and activities, and assess the status and trends of the stocks of deepwater species in the SPRFMO area.

iii) Provide advice to the Science Working Group on the status of the stocks, and evaluate conservation and management options, for deepwater species in the SPRFMO area.

iv) Consider any other matter related to research and assessment of stocks of deepwater species referred to it by the Science Working Group.

Annex 5 to the SWG Report

Examples of Vulnerable Species and Habitats, as proposed by the FAO Expert Consultation on International Guidelines for the Management of Deep-sea Fisheries in the High Seas (Bangkok, Thailand, 11-14 September 2007)

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1. Examples of vulnerable species and habitat-forming species that are documented or considered sensitive and potentially vulnerable to deep-sea fisheries in the high seas (FAO 2007)

a) Coldwater corals of various types e.g., reef builders and coral forest including: stony corals (scleractinia), alcyonaceans and gorgonians (octocorallia), black corals (antipatharia), and hydrocorals (stylasteridae);

b) Sponge grounds (e.g. sponge dominated communities);

c) Communities composed of dense emergent fauna where large sessile protozoans (xenophyophores) and invertebrates (e.g. hydroids and bryozoans) form an important structural component of habitat; and

d) Seep and vent communities comprised of invertebrate and microbial species found nowhere else (i.e. endemic).

2. Examples of areas (mega-habitats) which are topographical, hydrophysical or geological features (including fragile geologic structures) known to support vulnerable species, communities, or habitats (FAO 2007):

a) Edges and slopes of oceanic islands and continental shelves (e.g., corals and sponges),

b) Summits and flanks of seamounts, guyots, banks, knolls, and hills (e.g., corals, sponges, xenophyphores),

c) Canyons and trenches (e.g., burrowed clay outcrops, corals),

d) Hydrothermal vents (e.g., microbial communities and endemic invertebrates), and

e) Cold seeps (e.g., mud volcanoes, microbes, hard substrates for sessile invertebrates).

Annex 6 to the SWG Report

Report of the Jack Mackerel Sub-group Meeting
Guayaquil, Ecuador, 3-5 March 2008

1. Opening of the meeting

The meeting of the Jack Mackerel Sub-group (JMSG) of the Science Working Group (SWG) was opened by the chair, Mr Sandy Morison (Australia) who welcomed all participants. The participants were the same as for the SWG and are listed in the report of that group.

The Chair informed participants of the meeting arrangements and proposed meeting schedule. The proposed agenda was agreed and adopted by the meeting and is attached in Annex 1.

The chair provided some introductory remarks reminding delegates of the role of the group in providing advice through the Science Working Group to the Participants to the Negotiations on the status of jack mackerel stocks, and on conservation and management measures that should be applied, as requested in the Interim Measures.

2. Rapporteurs

Rapporteurs were called for and Dr Aquiles Sepúlveda (Chile) and Dr Alexander Glubokov (Russia) volunteered to act as rapporteurs for the meeting.

3. Terms of Reference for the Jack Mackerel Sub-group.

Some background to the development of the draft terms of reference was provided by Mr Andrew Penney (New Zealand).

It was indicated that the proposed terms of reference were an interim arrangement while the sub-group was in place, that these terms of reference did not prejudice negotiations around the agreement text, and that they may need to be revised once the text of the agreement has been finalised and the final working groups are established.

A desire was expressed for there to be a strong scientific basis for the deliberations of the sub-group and for research programmes that were developed, with support for permanent scientific staff to be provided to assist with the sub-group's functions. The Interim Secretariat responded by indicating the limited resources available to it and that therefore it was unlikely that permanent scientific staff could be supported, at least in the interim period.

The draft terms of reference were adopted without further amendment (Annex 2).

In addition to considering the terms of reference a request was made for a limit on the frequency of meetings to no more than two per year, to keep meeting costs down. This was agreed with the provision for additional specific purpose workshops to be held if necessary and agreed. This view was noted as a general procedural rule of the sub-group rather than an additional element of the terms of reference.

4. Progress with the development of the Jack Mackerel Stock Structure Research Programme.

An update on some out-of-session discussions among members of the Task Team (Dr Rodolfo Serra, Chile and Dr Glubokov) was provided by Dr Serra, which reiterated the multi-disciplinary nature of the proposed research programme. A written version of the presentation was provided and is recorded as document number SPRFMO-V-SWG-13.

It was highlighted that it is important that standardized protocols be used for the collection, preservation, processing and analysis of samples. The standardized protocols are particularly necessary if the same technique will be applied by different countries in order to obtain comparable results. The finalization and distribution of these standardized protocols was viewed as an urgent matter.

It was also identified as important that data for different analytical techniques should preferably be obtained from the same individual fish to reduce the effect on the analyses of individual variability.

A Chilean effort with the financial support of the Chilean National Fund of Fisheries with common objectives of the proposed programme, was started during 2007. Samples are being collected from different locations, in Ecuador, Peru, Chile and New Zealand.

One of the big challenges is the collection of samples from the central regions of the South Pacific. Chile is able to obtain samples up to the 90ºW, but a high cost is involved in the collection of samples from more remote regions particularly when it is desirable to conduct simultaneous sampling. The EC and Faroe Islands indicated that their vessels could assist in the collection of samples up to 110 degrees W.

Dr Glubokov provided a presentation and report ("Recent Genetic studies of Pacific jack mackerel *Trachurus murphyi* in Russia" by E.A. Shubina, E.V. Ponomareva, and A.I. Glubokov) on the results of some recent genetic analyses using samples of Jack Mackerel collected by the Dutch vessel "Jan Maria" in 2007. Samples were collected from waters close to the Chilean EEZ (between 37º48' and 38º28' S and 80º49' and 84º28' W). A written version of the presentation was provided and is recorded as document number SPRFMO-V-SWG-12.

The undertaken activities were of preliminary nature and their objective was to elaborate methodological aspects for search of genetic polymorphous markers of population level. The main conclusions from this work were,

1. Mitochondrial DNA is not characterized by sufficient polymorphism in respect of intraspecific jack mackerel's groups.

2. Allozyme analysis is quite perspective, however requires selection of enzymatic systems with more moderate polymorphism in respect of Jack mackerel's populations.

3. At present developing of specific microsatellite markers, the number of nucleotides of which equals to 4 and over, is the most perspective tendency of jack mackerel's population genetic research. However, such research activities require significant temporal and financial inputs.

4. The Single Strand Conformational Polymorphism - analysis is perspective for separation of jack mackerel's populations.

Considerable additional biological sampling was also reported to have been undertaken by observers on Chinese vessels fishing for Jack Mackerel. A report on this work has been written but an English translation is not currently available.

Biological data has also been collected aboard Faroese vessels, although the sampling methods employed may not have been entirely consistent with the protocols being developed by the Task Team. The Faroes expressed a willingness to assist with proposed standard sampling protocols and to allow suitably trained observers aboard their vessels to secure samples.

Chile offered to have sampling protocols translated and made available to all particpants. In addition the desirability to have the detailed sampling requirements, priorities and a budget available was expressed. It was agreed that the standard sampling protocols be finalised and distributed as soon as possible.

5. Progress with arrangements for the Jack Mackerel Stock Structure and Assessment Workshop.

Progress on the regional joint research programme proposal on the stock structure of jack mackerel was outlined (SPRFMO-V-SWG-14). The FAO has agreed to provide partial financial support and the use of its building and facilities in Santiago. The Chilean government has also agreed to assist with the organisation of the workshop. The EC has also promised financial support for the workshop. Nevertheless, a small shortfall remains in the expected level of funding needed to conduct the workshop. Those with an interest in attending the workshop were urged to give an early indication to the organizers of any additional financial support that they may be able to provide.

The workshop will be held from 30 June to 4 July 2008 at the FAO headquarters located in Santiago, Chile. A copy of the draft workshop programme is attached as Annex 3 to this report.

The participation of three international experts in: Stock structure, Dr. Pablo Abaunza from Spain (Leader of the HOMSIR project in the EU), Acoustic surveys, Dr. Tore Stroemme from the IMR, Norway and, Stock Assessment, Dr. James Ianelli from NOAA, USA is assured. The invited experts will participate as keynote speakers and contribute to the discussion on critical issues in their respective areas of expertise.

For the workshop it is important for all papers presented to be clear about the limitations of the data used and whether the intention was to conduct assessments or investigate stock structure.

This workshop is important for providing guidance on future stock assessments for jack mackerel, noting that the SWG will be required to provide advice on the status of pelagic fish stocks in 2009.

The final arrangements to call for papers and the workshop program will be available on the website of the SPRFMO.

6. Assessment of the status of Jack Mackerel

Chile presented a comprehensive update considering information up to 2007 of the stock assessment conducted by the use of a statistical catch-at-age model (SPRFMO-

V-SWG-11). The Chilean Jack Mackerel stock in the area from the northern Chilean border to 45ºS within the EEZ and out 105ºW between 35ºS and 45ºS was considered. A written version of the presentation was provided and is recorded as SPRFMO-V-SWG-11.

The assessment reported declining trends in the estimated ratio of current to projected unexploited spawning biomass , recruitment, together with an increasing trend in the exploitation indexes. The assessment also reported a declining trend in the spawning biomass ratio to 30%, well below the management target of 40%.These trends indicate a scenario of increasing risk for the stock and the fishery. These conclusions suggest a rather pessimistic perspective for the stock.in the area of the study.

There were questions concerning the possible influence of decadal cycles in climate and oceanographic conditions on recruitment and hence on the abundance of Jack Mackerel and fishery production. It was noted that the abundance of Jack Mackerel will be influenced by both environmental conditions and the fishery,.

In the discussion the importance of understanding stock structure in determining an appropriate management response was noted.

There is agreement that there is a need to conduct further stocks structure studies between Chile, Peru and the other fishing nations.

Russia reported that VNIRO researchers were using ISVPA to also undertake some assessment work on the status of Jack Mackerel in the southeast Pacific Ocean and expected to report the results in a paper at the forthcoming workshop in Santiago.

The delegation from Ecuador made a presentation on research on Jack Mackerel between 1989 and 2007 and an overview of trends in the Ecuadorian fishery for Jack Mackerel. A copy of the presentation was provided and is recorded as document number SPRFMO-V-SWG-15.

The Jack Mackerel landings represented decreasing trends over time; Nevertheless, a minimum increase was observed in landings for 2001. Fluctuations in the sea surface temperature (SST) and ocean conditions during 1997-1998 period (El Niño Southern Oscillation - ENSO) probably influenced landings. During 2001, Jack Mackerel catches represented 30.8 % of the total landings of small pelagic fishes. In contrast, in 2002 , a very significant decrease (0.3 %) was recorded. In the 2003 and 2004, there was no recorded catch of Jack Mackerel. In 2007 catches of around 0.4% of the total landing were recorded. During 1989, catches consisted mostly of young fish. In 1996, catches included a higher proportion of individuals over 30 cm TL. For the 1999 -2000 period the length distributions was from 23 to 35 cm TL, showing a modal group (26 cm TL).

The delegation from Peru made a presentation on recent research on Jack Mackerel and an overview of the trends in the Peruvian fishery for Jack Mackerel. In relation to the biological behaviour it was indicated that, in the study area, a spawning area is located between southern Peru and northern Chile. The regulation of the minimum size of catch is based on fecundity studies. Changes occur in the distribution of schools of jack mackerel in the central and south Peruvian coast, as a result of climatic changes in the cold period. Finally regarding the stock structure of jack mackerel, Peru presented a hypothesis of the existence of a minimum of two stocks in the study area of the South East Pacific based on the marine currents and waters masses. This hypothesis could be discussed in the next workshop.

Annex 1 to the JM Sub-Group Report

AGENDA - JACK MACKEREL SUB-GROUP
Guayaquil, Ecuador, 3 - 5 March 2008

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1. **Opening of the Meeting**
2. **Nomination of Rapporteur**
3. **Terms of reference for Jack Mackerel Sub-Group**
4. **Progress with the development of the Jack Mackerel Stock Structure Research Programme**
5. **Progress with arrangements for the Jack Mackerel Stock Structure and Assessment Workshop**
6. **Updated stock assessment for Jack Mackerel**
7. **Other Business**
8. **Adoption of the Report**

Annex 2 to the JM Sub-Group Report

Jack Mackerel Sub-Group Terms of Reference

The Jack Mackerel Sub-Group shall:

i) Develop research programmes, and coordinate research activities, on jack mackerel (*Trachurus murphyi*) and related species in the SPRFMO area, where related species will be considered to be either biologically similar species, or ecologically related species, or species caught in association with jack mackerel, or species caught in jack mackerel fisheries.

ii) Review the results of these research programmes and activities and assess the status and trends of the stocks of jack mackerel and related species in the SPRFMO area.

iii) Provide advice to the Science Working Group on the status of the stocks, and evaluate conservation and management options, for jack mackerel and related species in the SPRFMO area.

iv) Consider any other matter related to research and assessment of stocks of jack mackerel and related species referred to it by the Science Working Group.

Annex 3 to the JM Sub-Group Report

Chile / FAO Jack Mackerel Stock Structure and Assessment Workshop Proposal

Objectives

The proposed objectives for this workshop are:

- To review all available information for south Pacific jack mackerel, and to develop a working hypothesis / hypotheses regarding jack mackerel stock structure in the region.
- To review available data and information available for use in jack mackerel stock assessments, and to agree on data inputs, biological parameters and assumptions to use in joint stock assessments of the jack mackerel stocks discriminated under the working hypotheses developed at the workshop.
- To review and finalise the project proposal prepared by the Jack Mackerel Stock Structure Task Team.

Venue & Dates

The workshop will be held in FAO-Building, Santiago, Chile. From 30 June to 4 July.

Inputs to the Workshop

For the workshop to meet the proposed objectives and produce the required outcomes, participants will be expected to bring the following contributions to the workshop:

- Invited independent experts will be invited to present keynote addresses on stock structure discrimination and stock assessment approaches for *Trachurus* and other similar mackerel species.
- Depending on participation, other key participants may be invited to present key papers on international case studies of mackerel species stock structure and assessment.
- Other scientific experts from participants in the SPRFMO negotiations will be invited to contribute papers on *Trachurus* species biology, distribution, migration, fishery histories, stock structure and assessment, particularly for the Pacific region.
- Participants representing parties to the SPRFMO negotiations will be required to ensure that detailed historic catch and effort data are submitted to the interim SPRFMO secretariat, and made available to the workshop, in terms of the historic data submission template adopted at the 3rd SPRFMO negotiations.

Workshop Sections & Sessions

The workshop will be conducted as a five day technical workshop, with emphasis on preparing for and conducting actual working sessions to evaluate the available information and data on jack mackerel stock structure and assessment (see Annex A). Proposed sessions are summarised below:

Day 1 : Jack Mackerel Stock Structure

Session	Topic
09h00 - 10h30	● Overview of the objectives of the workshop and aspects to be addressed at each workshop session. ● Keynote address on stock structure differentiation in mackerel species. ● Presentation of other papers on international experiences in stock-structure of jack mackerel species.
11h00 - 12h30	● Presentation of papers on biology, distribution and stock structure of *Trachurus murphyi*.
14h30 - 16h00	● Continued presentation of papers on biology, distribution and stock structure of *Trachurus* murphyi.
16h30 - 18h00	● *Discussion Session*: Development of working hypotheses on south Pacific jack mackerel stock structure, with summary of supporting evidence for proposed hypotheses.

Evening work: Drafting of summary section on south Pacific jack mackerel stock structure hypotheses by a nominated task team.

Day 2 : Jack Mackerel Stock Assessment &Surveys

Session	Topic
09h00 - 10h30	● Keynote address on stock assessment approaches for mackerel species, including consideration of implications of multiple stocks. ● Presentation of other international case studies on *Trachurus* assessments.
11h00 - 12h30	● Presentation of papers on assessment of south Pacific jack mackerel, with specific consideration of implications of multiple stocks.
14h30 - 16h00	● *Jack Mackerel Acoustic Surveys*: Detailed consideration of available information and data on jack mackerel acoustic surveys, based on presentations
16h30 - 18h00	● *Jack Mackerel Others Surveys,* like mid-water trawl, Egg Production. Detailed consideration of available information and data on jack mackerel surveys, based on presentations

Day 3 : Stock Assessment approach

Session	Topic
09h00 - 12h30	● Pacific jack mackerel stock assessment approaches, including underlying assumptions, biological parameters, catch and effort data and survey results, under the stock structure hypotheses developed at the workshop.
14h30 - 18h00	● Detailed evaluation of available data for use in stock assessments, selection of appropriate assessment methods for these data and specification of inputs to jack mackerel assessments using the proposed methods. See doc SPRFMO-SWG-25.

Day 4 : Working Sessions

Session	Topic
09h00 - 12h30	● Preparation of recommendations on assessment approaches for Pacific jack mackerel, including specification of inputs, under the stock structure hypotheses developed at the workshop.
	Jack mackerel research programme
14h30 - 16h00	● Presentation of draft *Jack Mackerel Stock Structure Research Programme* proposal by co-convenors of the inter-sessional task team. ● Discussion and critical review of the various draft research programme proposal components.
16h30 - 18h00	Continued discussion and review of the various draft research programme proposal components. ● Preparation of revised final research programme proposal.

Day 5 : Jack mackerel research programme

Session	Topic
09h00 - 10h30	● *Discussion Session*: Wrap-up of workshop; concluding overviews and remarks by independent experts; summary of conclusions by the Chair and final discussion of conclusions.
11h00 - 12h30	● Preparation of workshop report: Consideration and comment on draft report sections; discussion of proposed additional report sections; designation of contributors and setting of submission deadlines.

Workshop Outcomes & Products

The initial end product of the workshop will be a Workshop Technical Report. It is intended that this will then be published as a FAO technical report. This report would include sections on:

- Brief summaries of keynote addresses and key papers presented under each workshop section.
- Improvements in biological, catch and effort databases in the region, and critical scientific summary and review of biological information, catch and effort data relevant to understanding South Pacific Ocean jack mackerel distribution patterns and stock structure.
- Explicit statements, together with summaries of the supporting information and scientific rationale, of the stock structure hypotheses developed at the workshop.
- Detailed recommendations on appropriate and robust stock assessment approaches for Pacific jack mackerel, including assessment methods, underlying assumptions, biological information, catch and effort data to be used in stock assessment inputs
- Detailed research plan of medium- and long-term research requirements for improving jack mackerel distribution and stock structure, and summary of specific recommendations on the design of the proposed *Jack Mackerel Stock Structure Research Programme*.

Proposed rapporteurs / authors for the various report sections will be designated as part of preparing for the workshop.