



**SOUTH EAST ATLANTIC FISHERIES ORGANIZATION (SEAFO)**

**REPORT OF SEAFO SCIENTIFIC COMMITTEE  
2008**

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## **1. Opening of the Meeting**

The 4th Annual Meeting of the SEAFO Scientific Committee (SC) was convened on 2-3 October 2008 at the Safari Hotel, Windhoek, Namibia. The Meeting was opened by the Chairperson of the Scientific Committee, Mr. Philip A. Large who extended a warm welcome to attending participants. He highlighted the importance of the work of the Committee and expected outcomes of the Meeting.

## **2. Adoption of the agenda and arrangements**

The agenda was accepted and adopted without any change and is appended as Annex I.

The Executive Secretary informed the Meeting of practical organisation and arrangements.

## **3. Appointment of rapporteurs**

The Chair proposed to the Meeting that all participants should contribute to the writing of the report and as such there is no need to appoint a rapporteur. The Meeting accepted the Chair's suggestion.

## **4. Introduction of participants**

In response to the Chair, participants introduced themselves. A total of sixteen scientists representing Angola, EU and Namibia. Observers from Japan and Brazil were also present. Participants and their addresses are listed in Annex II.

## **5. Report of the SSC**

Mr. Titus Iilende, who chaired the Scientific Sub Committee (SSC) presented its report. Considerable time was spent to examine the report, section by section. The report is attached as Annex III.

## **6. Consideration of the report of SSC**

The Scientific committee acknowledged the work done by the SSC regarding the limited information available for the Sub-Committee for answering the TORs in a proper way.

In general, the quality and quantity of data available was of still poor although a slight improvement was observed, particularly in relation to VMS data and summaries of research surveys recently carried out in the SEAFO Convention Area (CA). However, there is still a need for improvement.

The terms of reference for the SSC are given in the report (Annex III). The Sub-Committee responded to all points except two (ToR e. Complete FIRMS information fisheries sheets and ToR f. Norwegian proposal on bottom fishing activities) due to lack

of time. These were addressed by SC and progress is described below. In this report, the SSC response to the remaining ToRs is summarised.

#### **a. Compilation and analysis of catch and CPUE data**

Historically, the quality and quantity of data remain poor. There is no distinction between landings and catches, and discard information is not available. For most countries, spatial information has only been supplied at the SEAFO Division level and seasonal information is lacking. There is also a general lack of fishing effort and biological (length, sex ratio, and maturity) data. In contrast, landings, effort and biological data supplied by Korea and Japan (excluding biological data) for 2008 are relatively comprehensive.

Historically, the following countries are known to have been fishing in the SEAFO Area viz. Spain, Portugal, Russia, Cyprus, Mauritius, Japan, Korea, Poland, Norway, South Africa and Namibia. The only new data for 2007 were supplied by the EU. In 2008, the only countries known to have provided landings data for the SEAFO Area are Japan and Korea.

Catch analyses were made on the most recent catch statistics provided to the Secretariat. Most countries have provided incomplete statistics over years and therefore an estimate of total annual catches is currently not possible with the available data. It is also not known if historical data are of catches or landings; the latter is most likely. The amount of Illegal, Unreported and Unregulated (IUU) fishing in the Area is unknown.

For the first time, the Scientific Sub-Committee was in a position to present a summary of available VMS data for SEAFO licensed vessels. These data are available for 2007 and 2008 and have been anonymised so that Contracting Parties and individual vessels cannot be identified.

The only biological data available were length frequency distributions of toothfish landings from two Korean longline vessels fishing in the SEAFO area in 2008.

#### **b. Main SEAFO species and by-catch and evaluation of trends in the total catches**

The commercially most important species in the SEAFO Area are Patagonian toothfish, orange roughy, alfonsino and deep-sea red crabs. Last year it was decided to remove mackerel and pelagic sharks from the SEAFO species list, since these were considered to be the responsibility of ICCAT. However, on checking with ICCAT, mackerel is not an ICCAT species and has therefore been re-admitted to the SEAFO species list (Table 1).

**Table 1.** Main commercial species in the revised SEAFO Species List.

FAO 3 Alfa Code	Species	Latin Name	Transboundary
TOP	Patagonian toothfish	<i>Dissostichus eleginoides</i>	Yes
ORY	Orange Roughy	<i>Hoplostethus spp</i>	Unknown
ALF	Alfonsino	<i>Family Berycidae</i>	Unknown
CGE	Deep-sea Red Crab	<i>Chaceon spp.</i>	Unknown
MAC	Mackerel	<i>Scomber scombrus</i>	Unknown
EDR	Armourhead	<i>Pseudopentaceros spp.</i>	Unknown
BOC	Boarfish		Unknown
ORD	Oreo dories	<i>Family Oreosomatidae</i>	Unknown
CDL	Cardinal Fish	<i>Epigonus spp.</i>	Unknown
OCZ	Octopus	<i>Family Octopodidae</i>	Unknown
SQC	Squid	<i>Family Ommastrephidae</i>	Unknown
WRF	Wreckfish	<i>Polyprion americanus</i>	Unknown
SKA	Skates	<i>Family Rajidae</i>	Unknown
SKH	Sharks (deep-sea)	<i>Order Selachomorpha</i>	Unknown

Catch statistics for the SEAFO Area are incomplete. A table with the available data from 1995 to 1998 was listed in the report of the 1<sup>st</sup> annual meeting of the commission (2004), Appendix III (Table II). The Sub-Committee recommends that effort should be made by the various countries to obtain the outstanding information to be able to complete the tables with the required information.

**c. Reference points for deep sea fish resources.**

Last year, the Sub-Committee agreed to categorise the commercially most important species in the SEAFO Convention Area into two categories (A and B) on the basis of available information of life history characteristics, perceived vulnerability to fishing and the fishing gear used. The Sub-committee in 2008 has reviewed this information and revised the vulnerability to fishing of toothfish, wreck fish and red crab from low to high. Table 11 of the Sub-Committee report shows life history characteristics and vulnerability to fishing of commercially important species.

Last year, the Sub-Committee attempted to identify reference points for all species. The only data available for use were LPUE data and these were sparse for most species and were considered unreliable especially where species were taken as bycatch.

An alternative option available was to develop reference points based on catch thresholds and this approach has again been used this year. However, while there was agreement that these should be precautionary it was not possible to agree thresholds for all species.

For Patagonian toothfish, the Sub-Committee took account of current CCAMLR Conservation Measure 41-04 from 2006 relating to toothfish. For toothfish in SEAFO

Division D, it was agreed to maintain a precautionary approach and keep a catch limit of 260 tonnes.

For deep-sea red crab spp., the Sub-Committee agreed to maintain a precautionary approach and keep a catch limit of 200 tonnes in Sub-Division B1 (average of recent catch levels) and 200 tonnes in the remainder of the SEAFO Area until such time as when additional information becomes available.

#### **d. Sampling protocols and requirements including fish identification keys**

Sampling protocols and requirements including identification keys have not been developed for the SEAFO area as yet. Attached at Appendix IV of the SSC Report are revised SEAFO sampling forms for catches and other fishing details (including discards/benthos/seabirds/mammals) to be recorded by observers. Also, a SEAFO observer summary form has been developed based on CCAMLR protocols and this is given in Appendix V.

Critically, there are no identification keys available for benthos (e.g. corals, sponges etc.). Ideally, a simple pictorial identification key should be developed.

#### **e. Complete FIRMS information fisheries sheets**

The Sub-Committee considered FIRMS stock inventories and referred the issue to the SC for further consideration.

SC completed the forms using the guidance sheets provided by FAO. However, the guidance provided was somewhat unclear.

The SEAFO Secretariat forwarded the forms to FAO and the initial feedback was positive.

#### **f. Norwegian proposal on bottom fishing activities**

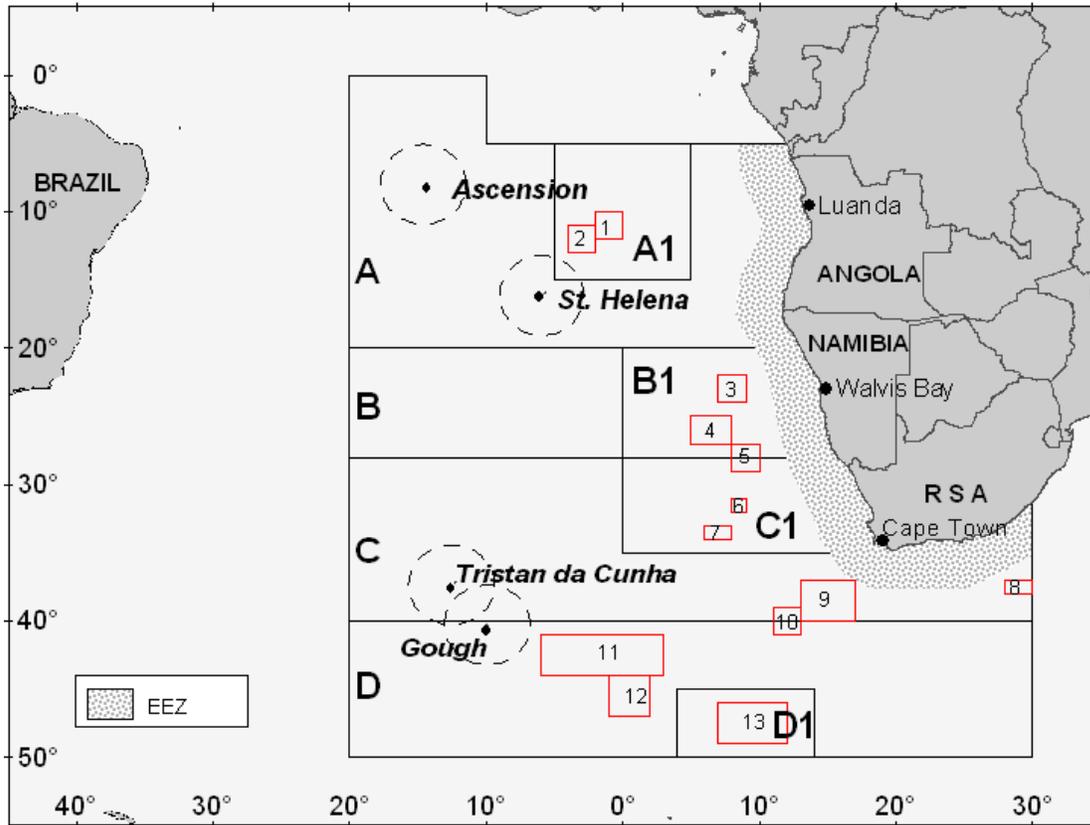
The Sub-Committee considered the Norwegian proposal and referred the issue to the SC for further consideration.

SC responded as follows:-

The 2006 UN General Assembly Resolution on Sustainable Fisheries (A/RES/61/105) calls for regulation by regional fisheries management organizations (RFMOs) of bottom fisheries that have significant adverse impacts (SAIs) on vulnerable marine ecosystems (VMEs).

In 2006, following recommendations from the SEAFO Scientific Committee (SC), SEAFO took a precautionary approach and introduced closed areas to protect VMEs (considered to comprise largely corals) likely to occur on 13 seamount assemblages in the

SEAFO CA. The SEAFO Fisheries Commission (SFC) implemented closure areas around 10 of these assemblages that were considered to be, on the basis of available information, either unexploited or mostly lightly exploited.



**Figure 1.** The SEAFO convention area with divisions and subdivisions and indications of areas with seamounts (Areas 3, 4 and 13 remain open).

These 10 areas are closed until 2010 to all types of fishing gear catching species on the SEAFO Species List. This approach has been applauded in many international fora and SEAFO is regarded as a very progressive RFMO taking measures well in advance of FAO guidelines and requirements.

Regarding the Norwegian proposal, it would have been useful if this had been drafted in a scientific format accompanied by a simple flow diagram of proposed procedures, particularly as time available to discuss this in SC plenary was limited.

A fundamental concern is a lack of clarity insofar as it is not clearly stated if the proposal relates to the entire SEAFO CA (i.e. including existing closed areas) or just the remainder of the SEAFO CA outside existing closed areas.

In 2007, SFC requested the SC to recommend areas that could be fished within each closed area. The SC replied that given the lack of information available on the spatial distribution of vulnerable habitats and fishing activity on individual seamounts within

existing closed areas, it would be inappropriate to recommend areas that could be opened to fishing. The SFC endorsed the SC view that mapping be a condition for the resumption of fishing.

This remains the view of the SC. Fishing, even of an exploratory nature, should not be allowed until mapping work has been carried out and the results analysed and presented to SSC for scrutiny. This multibeam and seismic mapping work should be augmented by other non-destructive methods such as grabs, quantitative image-based sampling systems (ROV) surveys etc.

Consequently, if the Norwegian proposal is intended to also apply to existing closed areas the SC is unable to support it.

If, however, the proposal is to apply to the remainder of the SEAFO CA outside the closed areas, the SSC wishes to put forward a number of suggestions and concerns.

The proposal is based on similar proposals submitted to other RFMOs that manage relatively data-rich and long established fisheries, and, relative to the SEAFO, have substantial information available on VMEs e.g. NAFO and NEAFC. The SEAFO CA is considered to be largely unfished and many of the instruments of fisheries management and regulation (e.g. VMS monitoring) have been introduced only recently (2007). Consequently, available information which could be used to establish a bottom fishing footprint is largely not available. It is therefore likely that much of the SEAFO CA will be classed as “new bottom fishing areas” and would be subject, at least in the interim, to the proposed Exploratory Bottom Fishing protocol for New Fishing Areas (Annex 1 of the Norwegian Proposal).

The SC is of the view that this protocol lacks clarity in several respects. It is unclear what is meant by a “harvesting plan” and by the statement “area and effort restrictions shall be considered to ensure fisheries occur on a gradual basis in a limited geographical area”. What is meant by gradual in this context? Critically, there is no attempt to identify what are VMEs in the SEAFO CA.

It is proposed that CPs forward a harvesting plan to the SEAFO Secretariat for circulation to all CPS and the SC. The SC is of the view that any plans for exploratory fishing should be scrutinized by SSC who will make recommendations to the SFC, where a decision will be made as whether the exploratory fishing should be allowed to proceed. Point 5 in Article 3 is unclear as to whether this will occur.

Regarding the Interim VME Data Collection Protocol (Annex 2), there is no definition of VMEs and there are likely to be problems bringing some VME species ashore because of CITES coral regulations. Transporting samples to the scientific authority of the CP will be problematic if the ship lands in another country. Preservation techniques other than freezing may be necessary for some species.

Regarding Article 5, how is an encounter defined? There is also an absence of operational procedures in the interim until these have been developed by SC.

In conclusion, SC is of the view that this is a useful proposal that should be further developed at a dedicated SEAFO bottom fishing/VME Workshop to be held shortly before the SC meeting in 2009 (see SC Recommendations). It is recommended that scientists from all CPs attend.

**g. Examining assessments and research done by neighbouring assessments and management organisations**

The research results obtained by various Commissions and other research & management organizations were considered as far as possible in the course of the meeting. These results were used to attempt to reach solutions for various problems and tasks at hand. For example, adopting the CCAMLR observer summary reports.

ICCAT was consulted during the course of the meeting and it was identified that mackerel is not an ICCAT species and as such was added to the SEAFO species list.

The BCC will cooperate closely with SEAFO through their scientific and environmental working groups and that both Commissions will formally establish links. The Executive Secretaries of each Commission will be represented on the respective management boards.

**h. Reviewing the distribution of reported catches of benthic organisms**

The only new information was provided by a survey report presented by Spanish/Namibian collaboration, which included some information on the potential areas of bio-constructions which may comprise corals. A summary of this work is presented under TOR i below.

**i. Reviewing of the submitted SEAFO research documents**

**i(1). EU (Portugal) exploratory survey targeting deep-water crab at central and south Atlantic**

A summary of the results from an exploratory trap survey targeting deep-water crab was conducted by a Portuguese commercial fishing vessel during the 2<sup>nd</sup> half of 2007. The Portuguese fisheries institute (IPIMAR) was responsible for the survey design and scientific support. The main objectives of the survey were: identification of deep-water crab species (family Geryonidae), determination of their distribution area, estimation of abundance/biomass indexes by crab species and estimation of diversity indexes. The geographical locations of the fishing hauls are presented Figure 8 of the SSC report. A full report will be made available on the SEAFO web site.

## **i(2). A joint Spain/Namibia multidisciplinary research cruise on the Walvis Ridge Seamounts**

The *Instituto Español de Oceanografía* (IEO) of Spain and the National Marine Information & Research Centre (NatMIRC) of Namibia conducted a multidisciplinary survey on some Walvis Ridge seamounts onboard the Spanish R/V Vizconde de Eza from February to March 2008. This survey was designed as an exploratory study to localize and identify bioconstructions (e.g. corals) associated with seamounts as potential vulnerable marine ecosystems. Two study sites were identified to survey on the Walvis Ridge and surroundings namely Ewing seamount and Valdivia Bank (Figure 9 of the SSC report).

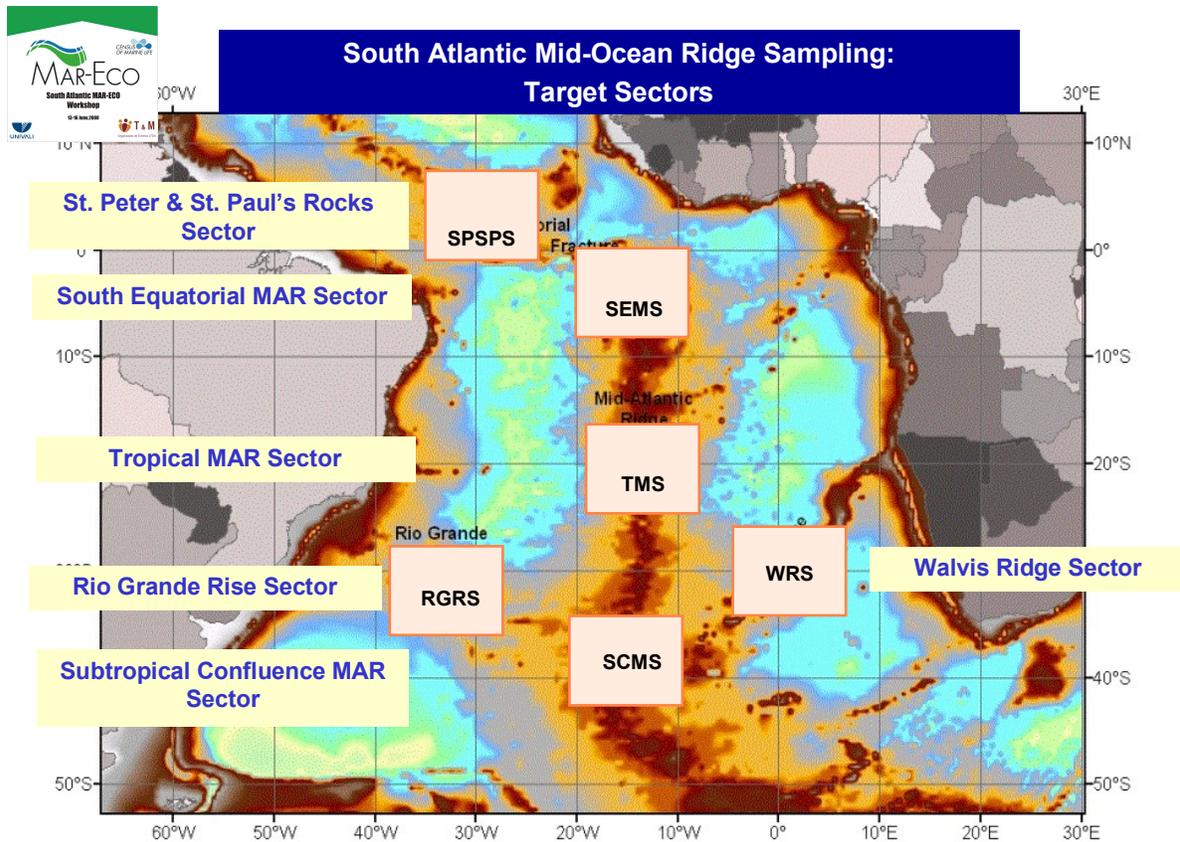
The survey should be seen as a first attempt of developing the methodology to be applied in the SEAFO area for these type of studies. A series of future acoustic and geophysical work have been proposed for specific sites of interest in this region, specifically to categorize the sedimentary body and bottom type more precisely. A full report will be made available on the SEAFO web site.

## **7. South Atlantic Mar-Eco Project**

The development of the South Atlantic MAR-ECO Project (*Census of Marine Life*) was presented to the Sub-Committee including the basic concepts, general questions addressed, strategy and planning activities. It was remarked that the process of building a general science plan has been hampered by the poor participation of scientists from the African continent, particularly considering the vast area of interest (southern Mid-Atlantic ridge and adjacent seamount ridges). In that sense this area has been divided into six target-sectors within which sampling activities should be planned independently by regional teams of committed scientists under the coordination of the South Atlantic MAR-ECO Steering Group (Fig. 1). This Steering Group supported the participation of the chair in the 4<sup>th</sup> SEAFO Scientific Committee as a strategy to:

- a) to attract African scientific partners to the project and integrate them with South American scientists,
- b) to commit a group of scientists from Africa (and other areas as well) to elaborate a science plan for the Walvis Ridge sector (and perhaps other sectors),
- c) to find sources for Data Mining including existing sampling programs in the Walvis Ridge and MAR sectors, reports of previous programs, data and publications and
- d) to explore shiptime opportunities.

The latter issue has been remarked as critical to the development of a field phase. Opportunities have been explored with Brazilian Navy, the FAO – Nansen Project and other existing sampling programs both within and outside the umbrella of the *Census of Marine Life*.



**Figure 2.** Six target-sectors within which sampling activities should be planned independently by regional teams of committed scientists under the coordination of the South Atlantic MAR-ECO Steering Group.

**Any other matters**

The Chairperson gave a presentation on a EU Framework 7 Project – TOXTX (Technical eXperts Overseeing Third country eXpertise). The primary objective is to contribute to a coherent approach to the management of marine resources, particularly in the international or third country context. TOXTX will collaborate with the Fisheries Partnership

**Coordinator WP2  
Imperial College London  
(ICL)**

**2.1**  
Tuna RFMOs  
ICCAT  
IOTC  
WCPFO  
  
Coordinator AZTI  
  
+AZTI (ICCAT, WCPFC-spc)  
+SFA (IOTC)

**2.2**  
Third Country Agreements  
FPAs  
CECAF/WECAF  
  
Coordinator ICL  
  
+ICL, INRH (W. Africa)  
+UOS (E. Africa)  
+NFDS (S. Africa)  
+IFOP (S. America)

**2.3**  
Other treaties/  
RFMOs  
NAFO, NEAFC, CCAMLR,  
NASCO, SEAFO, SIOFA  
GFCM, ICES  
  
Coordinator Cefas  
  
+Cefas (Northern Oceans, GCFM)  
+UCT (Southern Oceans)

management. The basic approach and likely participating organizations are described in Figure 3.

**Figure 3.** TXOTX- Participating fisheries management organisations.

The Project will also develop recommendations on how to improve cooperation with third parties in order to enhance research and resource status, reinforce social and economic welfare from exploitation of fishing resources and where practical to strength frameworks for Monitoring, Control and Surveillance (MCS) in order to counteract Illegal, Unreported and Unregulated (IUU) fishing.

The general approach will be to extract information from the websites of the various fisheries management bodies and to submit a questionnaire to the respective RFMO Secretariats and Scientific Councils/Committees which will be supported by direct face-to-face interviews, for example at the Scientific Committee for SEAFO. A similar approach will be adopted for Third Countries.

Workshops will then be held to disseminate the knowledge gleaned from to the wider audience of policy-makers, stakeholder, media and the general public.

TXOTX will liaise closely with different RFMOs, International organizations such as FAO, as well as the Commission, in order to communicate best practice within different regions/areas and the needs for further research.

The SEAFO SC and Secretariat agreed to participate in TXOTX, subject to approval by SEAFO FC.

## 8. Advice and recommendations to the Commission

As last year, the SC has identified the responsible entities to take action under each recommendation. These should not be interpreted as instructions, but are provided to facilitate responses and needs in a non-prescriptive manner.

- a. SC welcomes the Mar-Eco proposal to have a dedicated study area on the Walvis Ridge but suggests this area includes as many of the SEAFO closed areas 1, 2, 3, 4, 5, 6 and 7 as possible: **ACTION: Mar-Eco Steering Committee**
- b. SC notes that there remains a strong requirement for funding for ship time (e.g. RV F. Nansen) in the South Atlantic Mar-Eco Project and recommends CPs give consideration to providing funding, particularly as the work carried out will provide mapping information of VMEs in SEAFO closed areas. SC notes the excellent survey work carried out on VMEs by NATMIRC (Namibia) and Ieo (Spain) supported by the Secretaria General Del Mar in Spain. **ACTION: Contracting Parties and Non-contracting Parties.**
- c. SC recommends that the proposed bottom fishing/VME Workshop (Recommendation g, below) include a ToR to facilitate the further development of Mar-Eco research plans and collaboration between scientists. **ACTION: Commission**
- d. SC is of the view that if substantial fisheries develop in the SEAFO CA it is likely that they will be for orange roughy and alfonsino. Fisheries for these species are currently unregulated in the SEAFO CA. Experience from other orange roughy fisheries around the world (New Zealand, west of Ireland etc) suggests that sustainable catches are of the order of 2-3% of virgin biomass, which for the fishery to the west of Ireland is around 200-300t. Given this, and the unknown size of any orange roughy populations that may exist in the SEAFO CA, SC recommends a precautionary catch limit of 100 tonnes for orange roughy in the SEAFO CA until such time as when additional information becomes available to identify sustainable fishing levels. Alfonsino is not a long-lived, slowly growing species but is vulnerable to fishing because fisheries mostly target aggregations. Experience in the NAFO region suggest that, as with orange roughy, fishing often takes the form of short-term “mining” which can lead to sequential depletion of populations which even for alfonsino may take 15-20 years to recover. SC recommends a precautionary catch limit of 200 tonnes for alfonsino in the SEAFO CA until additional information becomes available to identify sustainable fishing levels. **ACTION: Commission**
- e. Most deep-water sharks are long-lived, slow growing and have low fecundity, and as such can only sustain very low levels of fishing. SC recommends that no directed fisheries for deep-water sharks (i.e. all sharks outside ICCAT jurisdiction) take place in the SEAFO CA until additional information becomes available to identify sustainable fishing levels. **ACTION: Commission**

- f. SC again recommends that the Contracting Parties should fulfil their obligations and obtain and submit to the Secretariat the outstanding information required for assessments (e.g. presence or absence of fishing, total catches including zero catches, catches by species, discards, by-catch and effort). **ACTION: Commission, Contracting Parties and Non-contracting Parties**
- g. SC recommends that a 3-day bottom fishing/VME Workshop be held preliminary to the SSC meeting in 2009. The main objectives would be to further develop the Norwegian proposal on bottom fishing/VMEs and to provide a forum to facilitate the further development of Mar-Eco research plans regarding the mapping of VMEs in the SEAFO CA. **ACTION: Commission**
- h. SC recommends that the catch sampling forms (Appendix IV of the SSC Report) and the observer summary report form (Appendix 5) be adopted by the Commission and in the future be used by Contracting Parties. **ACTION: Commission and Contracting Parties**
- i. The SC recommends that all proposals for scientific surveys in SEAFO closed areas be submitted to SC for scrutiny and comment before consideration for approval by FC. SC recommends that SEAFO should respond within a prescribed time set by the FC. **ACTION: Commission, Contracting Parties and Non-contracting Parties**
- j. SC reaffirms that exploratory fishing should not be allowed in existing closed areas. **ACTION: Commission**
- k. For toothfish (which is a longline fishery) the SC recommends that a catch limit of 260 tonnes be maintained for the whole SEAFO CA. The SC took account of current CCAMLR Conservation Measure 41-04 from 2006 relating to toothfish. **ACTION: Commission**
- l. For deep-sea red crab spp. (which are caught with traps /pots), there is no evidence to suggest that this species is depleted. The SC recommends a catch limit of 200 tonnes in Sub-Division B1 (Figure 1) (average of recent catch levels) and 200 tonnes in the remainder of the SEAFO Area until such time as when additional information becomes available. **ACTION: Commission**
- m. Given the increasing importance of VMEs, the SC recommends that a simple pictorial identification key be developed for benthos including corals and sponges. There is no expertise in this field available at Scientific Institutes in the region and SC therefore recommends that FC contract a consultant to develop an identification key and work with regional Scientific Institutes to develop local expertise. **ACTION: Commission**

- n. Concern was again expressed at the paucity of observer data submitted to the Secretariat. The SC again recommends that each Contracting Party appoint 'designated scientist/s' responsible for the following:-
- I. Establishment of sampling protocols and requirements, including fish identification keys, consistent with the agreed SC format.
  - II. Monitoring the performance of the scientific observer system, including the quality of data produced.
  - III. Provision of all historical fisheries data.
  - IV. Electronic transmission to the Secretariat of all observer data required for stock assessments, consistent with the agreed SC formats and deadlines.

Further to this, SC recommends that Parties independently forward observer reports to the Secretariat. **ACTION: Contracting Parties**

## **9. Future work Programme**

- a. Source, analyse and compile catch, cpue and biological data for the main fish stocks (e.g. orange roughy, alfonsino, armourhead, deep sea red crab, Patagonian toothfish) in terms of quantity and geographical positions for the SEAFO region using all existing information including observer data
- b. Evaluate trends in the total catches and where possible cpue for the stocks as outlined under point, and undertake stock assessments when appropriate.
- c. Examine, where appropriate, assessments and research done by neighbouring assessment and management organisations (such as BCC, CCAMLR, GCLME, ICCAT, SWIOFC).
- d. Evaluate and suggest reference points for deep-sea fish resources.
- e. Review the distribution of reported catches of benthic organisms (corals, sponges etc.).
- f. Undertake review of submitted SEAFO research documents.
- g. Establishment of sampling protocols and requirements, including fish identification keys.
- h. Review progress regarding the Mar-Eco Project.

## **10. Budget for 2009**

The meeting recommended that the Commission approve an allocation to cater for a 3-day workshop on VMEs/bottom fishing, the 3-day Sub-Committee meeting and for the 2-

day Scientific Committee meeting in 2009. A small allocation is also required to contract a consultant to develop a pictorial benthos/coral/sponge identification key.

### **11. Cooperation with other organisations**

Recognising the importance of cooperation with other organisations in respect of information exchange on fisheries and environment, the SC again recommends that this cooperation should be promoted.

### **12. Adoption of the Report**

The report was presented and adopted by the meeting.

### **13. Date and Venue of Next Meeting**

A 3-day workshop on VMEs/bottom fishing will take place from 26-28 September 2009 followed by a 2-day meeting of the Sub-Committee on 29-30 September 2009. The annual meeting of the SC will be on 1-2 October 2009. All meetings will be held in Windhoek.

### **14. Closure of Meeting**

On Friday 3rd October at 16h05 the Chairperson declared the closure of the meeting after all items have been completed. In his closing remarks, the Chair expressed his satisfaction for the work accomplished and thanked all participants for their valuable contributions.

## **ANNEX I**

### **Agenda for the 4<sup>th</sup> Annual Meeting of the SEAFO Scientific Committee**

1. Opening and welcome remarks by the Chairperson, Mr. Phil Large
2. Adoption of the agenda and arrangements
3. Introduction of participants
4. Appointment of rapporteurs
5. Report by the Chair of the Sub-Committee
6. Consideration of the report of Sub-Committee
7. South Atlantic Mar-Eco Project
8. Advice and recommendations to the Commission
9. Future work program
10. Budget for 2009
11. Cooperation with other organisations
12. Any other matters
13. Adoption of the report
14. Date and place of the next meeting
15. Closure of the meeting

## Annex II

### List of Participants to the 4th Annual Meeting of SEAFO Scientific Committee

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## **Annex III**



**REPORT OF THE SUB-COMMITTEE OF SEAFO SCIENTIFIC COMMITTEE**

**29 SEPTEMBER – 1 OCTOBER 2008**

**SAFARI HOTEL  
WINDHOEK, NAMIBIA**

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b. Evaluate trends in the total catches and where possible CPUE for the stocks as outlined under point (a), and undertake stock assessments when appropriate.	
c. Evaluate and suggest reference points for deep-sea fish resources.	
d. Establishment of sampling protocols and requirements including fish identification keys.	
e. Complete FIRMS information fisheries sheets.	
f. Norwegian proposal on bottom fishing activities.	
g. Examine, where appropriate, assessments and research done by neighbouring assessment and management organisations (such as BCLME/BCC, CCAMLR, GCLME, ICCAT, SWIOFC).	
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### 1. INTRODUCTION

As recommended by the Scientific Committee (SC), the Commission decided during its 3<sup>rd</sup> Annual Meeting in 2006 to establish a Sub-Committee of the SC. The main objective of the Sub-Committee is to carry out, among others, the analyses of existing fisheries data within the SEAFO Convention Area (CA).

The meeting in 2008 took place at the Safari Hotel in Windhoek, Namibia from 29 September to 1 October, and was chaired by Titus Iilende (Namibia). The meeting was attended by 15 scientists from Angola, EU (Portugal, Spain and UK) and Namibia. Observers from Japan and Brazil were also present. A list of participants is given in Appendix I.

## **2. WORKING PROCEDURE**

The Chairperson opened the meeting by welcoming all the participants. The agenda (Appendix II) was adopted after the Sub-Committee decided to work as a single group. The Sub-Committee agreed to work from 09:00hrs to 17:30hrs each day. The Chair presented terms of reference (listed below) after which the meeting agreed on the working procedure. The first day was spent on reviewing the existing data, identifying gaps as well as addressing the terms of reference. Specific assignments on data review and analyses were allocated to participants and reported back to the Group.

### **Terms of Reference for the Scientific Sub-committee**

- a. Source, analyse and compile catch and CPUE data for the main fish stocks (e.g. orange roughy, alfonsino, armourhead, deep sea red crab, Patagonian toothfish) in terms of quantity and geographical positions for the SEAFO region using all existing information including observer data.
- b. Evaluate trends in the total catches and where possible CPUE for the stocks as outlined under point (a), and undertake stock assessments when appropriate.
- c. Evaluate and suggest reference points for deep-sea fish resources.
- d. Establishment of sampling protocols and requirements including fish identification keys.
- e. Complete FIRMS information fisheries sheets.
- f. Norwegian proposal on bottom fishing activities.
- g. Examine, where appropriate, assessments and research done by neighbouring assessment and management organisations (such as BCLME/BCC, CCAMLR, GCLME, ICCAT, SWIOFC).
- h. Review the distribution of reported catches of benthic organisms (corals, sponges etc.).
- i. Undertake review of submitted SEAFO research documents

## **3. ADDRESSING THE TERMS OF REFERENCE**

The terms of reference are addressed below in the same order as they appear above.

**a. Source, analyse and compile catch and CPUE data for the main fish stocks (e.g. orange roughy, alfonsino, armourhead, deep sea red crab, Patagonian toothfish) in terms of quantity and geographical positions for the SEAFO region using all existing information including observer data**

Historically, the quality and quantity of data remain poor. There is no distinction between landings and catches, and discard information is not available. For most countries, spatial information has only been supplied at the SEAFO Division level and seasonal information is lacking. There is also a general lack of fishing effort and biological (length, sex ratio, and maturity) data. In contrast, landings, effort and biological data supplied by Korea and Japan (excluding biological data) for 2008 are relatively comprehensive.

Historically, the following countries are known to have been fishing in the SEAFO Area viz. Spain, Portugal, Russia, Cyprus, Mauritius, Japan, Korea, Poland, Norway, South Africa and Namibia. The only new data for 2007 were supplied by the EU. In 2008, the only countries known to have provided landings data for the SEAFO Area are Japan and Korea.

Catch analyses were made on the most recent catch statistics provided to the Secretariat. Most countries have provided incomplete statistics over years and therefore an estimate of total annual catches is currently not possible with the available data. It is also not known if historical data are of catches or landings; the latter is most likely. The amount of Illegal, Unreported and Unregulated (IUU) fishing in the Area is unknown.

**EU (Spain):**

Revised landings data were provided for the years 2001-2007. Apart from 2006, catch positions were not provided. The reported species composition changed from year to year. From 2001 to 2003, landings were small with the exception of around 100 tonnes of Patagonian toothfish (*Dissostichus eleginoides*). In 2006, landings comprised 11 tonnes of toothfish, and, in 2005, 72 tonnes of alfonsino (*Beryx* spp.). In both years landings were by a single Spanish vessel. Fishing effort, discard and biological information (length data, sex ratios, maturity) was not available for all years.

**EU (Portugal):**

Landings data were provided for 2004 to 2007. Data for 2007 includes landings from an exploratory trap survey, part of which was in the SEAFO Area. Catch positions, discard, fishing effort and biological data (length data, sex ratios, maturity) were not provided. Wreckfish (*Polyprion americanus*) landings of 0.5 tonnes were recorded in 2004, 6 tonnes in 2005 and 9 tonnes in 2007.

**Japan:**

Landings data were provided from July 2005 to June 2008. In 2005, 234 tonnes of deep-sea red crab and 73 tonnes of Patagonian toothfish were landed. In 2006, 390 tonnes of crab (*Chaceon* spp.) and 157 tonnes of toothfish were landed. Landings records for 2008 have been reported in SEAFO format and include fishing effort. In 2007, 509 tonnes of crab and 16 tonnes of toothfish were reported. Landings data from one long liner were provided from April to June 2008 and comprised 84 tonnes of toothfish and 5

tonnes of *Macrourus* spp. No detailed catch positions were provided, but only as caught in Division D of the SEAFO area. The average CPUE for toothfish was 122 kg per 1000 hooks. The total number of fishing days was 62.

#### **Republic of Korea:**

The only landings data provided were those for 2003, when 245 tonnes of Patagonian toothfish was landed, and for 2008 when the main species landed was again toothfish (76 tonnes). According to the FAO database, 10 tonnes of toothfish were caught in 2005 in Fishing Area 47 but the division was not reported. Only approximate catch positions were provided for toothfish in the past. No effort and bycatch information was made available. Information supplied for 2008 was in the CCAMLR reporting format and included some biological information (length frequency data).

#### **Namibia:**

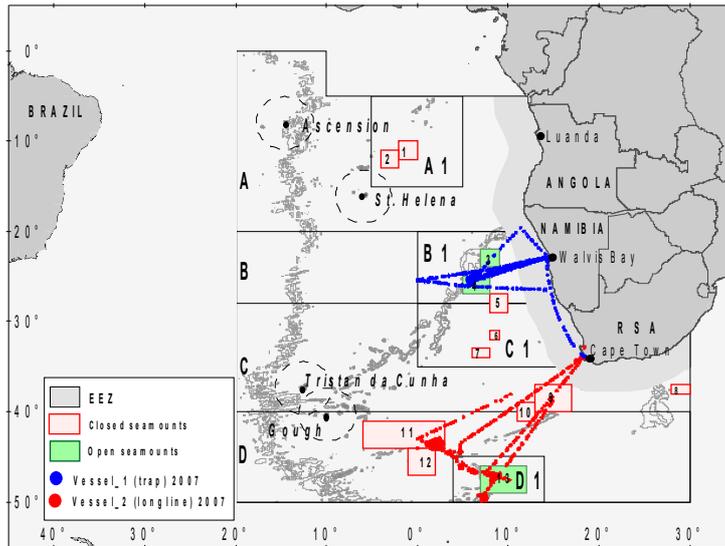
Detailed landings information for orange roughy and alfonsino fishing by the Namibian registered orange roughy vessels was provided from 1995-2005. This includes bycatch species such as oreo dory (*Family Oreosomatidae*), cardinal fish (*Epigonus* spp.) and armourhead (*Pseudopentaceros* spp.). No orange roughy (*Hoplostethus atlanticus*) fishing has taken place in the SEAFO Area since 2005. Data on crab fishing by one vessel in 2005 and 2007 have been provided. One Namibian fishing vessel is reported to be fishing in September 2008, but 5-day reports of catches etc have not been received by the SEAFO Secretariat.

#### **Foreign catches landed in Namibia:**

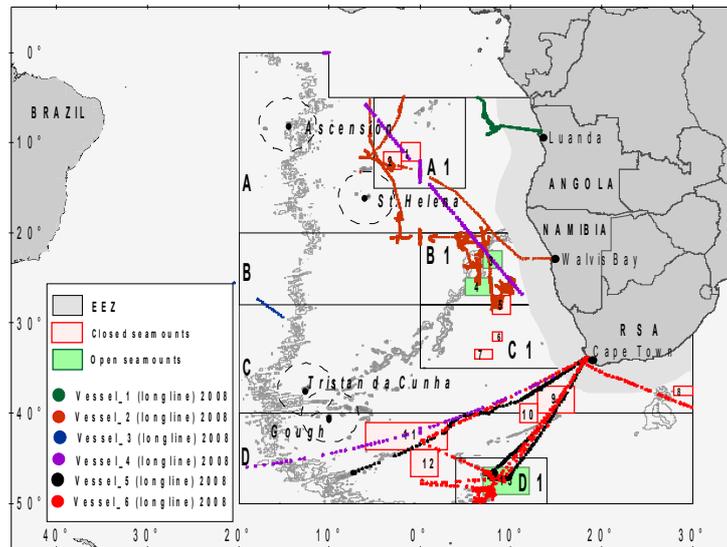
Russian, Mauritian and Cyprian flagged vessels offloaded in Walvis Bay in 2004. Collectively they caught 969 tonnes of alfonsino (*Beryx* spp.), 217 tonnes of squid, 46 tonnes of boarfish species. and 23 tonnes of amourhead. A great number of species not normally expected to occur in the SEAFO Area were reported at 10 tonnes or more; horse mackerel (*Trachurus* spp.)(97 tonnes), hake (*Merluccius* spp.)(64 tonnes), ruby fish (72 tonnes), large eye dentex (*Dentex macrophthalmus*) (39 tonnes), kingklip (*Genypteres capensis*) (25 tonnes) and rockcod (*Sebastes* spp.) (23 tonnes). No data for recent years are available. Whether this is the result of no fishing is unknown.

#### **VMS data**

For the first time, the Scientific Sub-Committee was in a position to present a summary of available VMS data for SEAFO licensed vessels. These data are available for 2007 and 2008 and have been anonymised so that Contracting Parties and individual vessels cannot be identified. These data are presented in Figures 1 and 2.



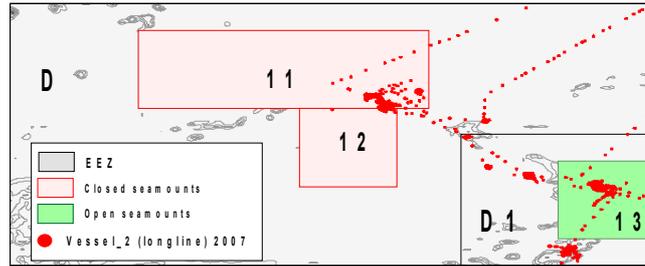
**Figure 1.** VMS tracks for a longliner fishing for toothfish and a trap vessel fishing for deep-water crab, both in 2007.



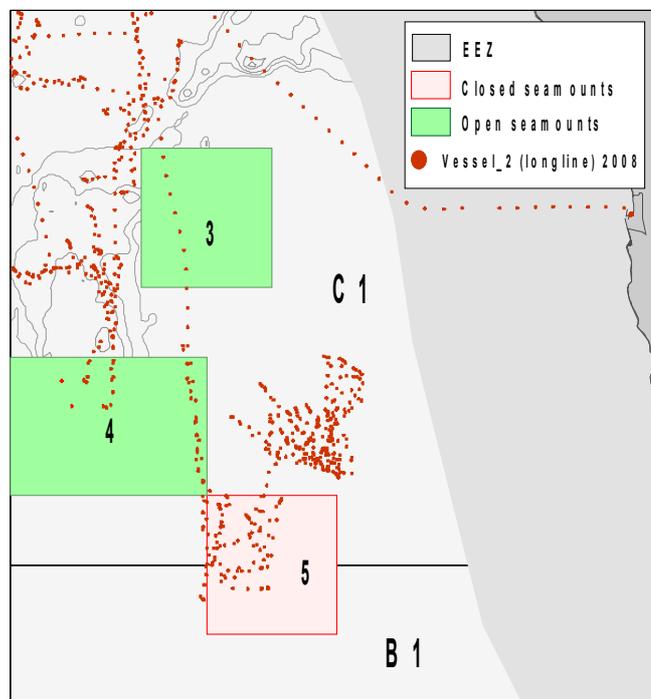
**Figure 2.** VMS tracks for longliners fishing in 2008 for a range of species.

It has not been possible to exclude VMS signals when vessels are steaming so transit tracks are present in the plots. However, these vessels are using static gears and from scrutinising areas of intense VMS activity it is possible to identify likely fishing activity.

There is some evidence of fishing activity in closed areas 5 (Molloy seamount), 11 (Discovery, Junoy and Shannon Seamounts) and 12 (Schwabenland and Herdman Seamounts) (Figures 3 and 4). However, it is possible that this may reflect fishing for non-SEAFO species.



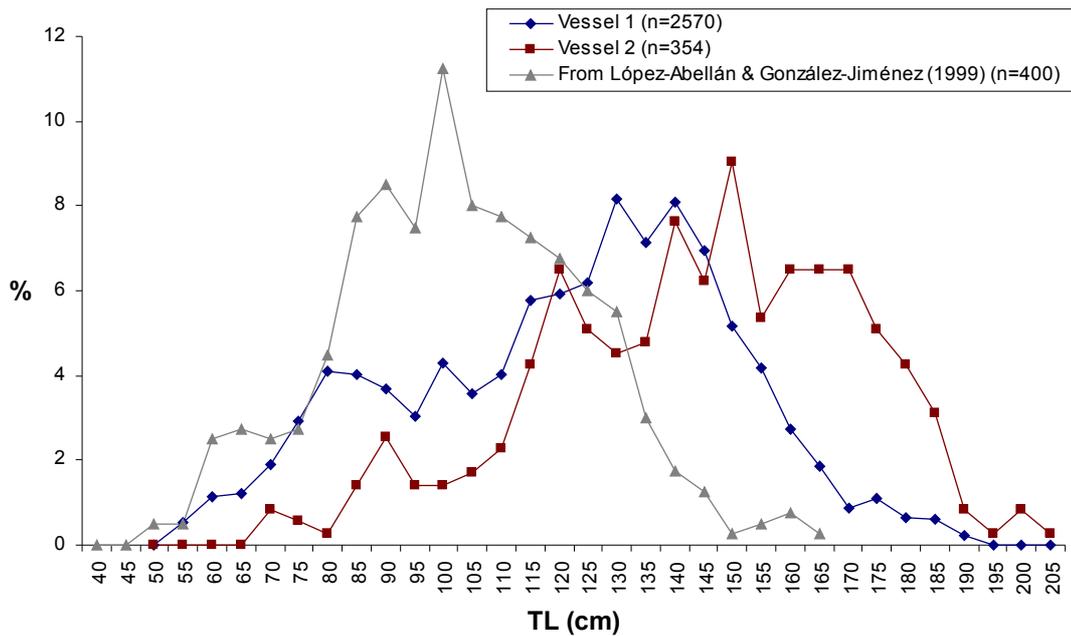
**Figure 3.** VMS tracks for a longliner possibly fishing in Closed Area 11 (Discovery, Junoy and Shannon Seamounts) and 12 (Schwabenlan and Herdman Seamounts) in 2007.



**Figure 4.** VMS tracks for a longliner activity in Closed Area 5 (Molloy Seamount) in 2008.

### Biological data

Figure 5 presents length frequency distributions of toothfish landings from two Korean longline vessels fishing in the SEAFO area in 2008. This figure also includes the length frequency distribution obtained for this species in the Meteor seamounts during a Spanish research survey conducted in 1997 (López and González, 1999).



**Figure 5.** Length frequency distributions of toothfish landings from two Korean longline vessels fishing in 2008 and from a Spanish longline research survey conducted on the Meteor seamounts during 1997 (López and González, 1999).

- b. Evaluate trends in the total catches and where possible CPUE for the stocks as outlined under point (a), and undertake stock assessments when appropriate.**

The commercially most important species in the SEAFO Area are Patagonian toothfish, orange roughy, alfonsino and deep-sea red crabs. Last year it was decided to remove mackerel and pelagic sharks from the SEAFO species list, since these were considered to be the responsibility of ICCAT. However, on checking with ICCAT, mackerel is not an ICCAT species and has therefore been re-admitted to the SEAFO species list (the main commercial species of which are shown in Table 1 and Appendix III). According to the available data, octopus and squid seem to be minor bycatch species. Wreckfish can be found in the SEAFO Area, but have only been caught in very small quantities. The revised main commercial species in the SEAFO species list are given in Table 1.

**Table 1.** Main commercial species in the revised SEAFO Species List.

<b>FAO 3 Alfa Code</b>	<b>Species</b>	<b>Latin Name</b>	<b>Transboundary</b>
TOP	Patagonian toothfish	<i>Dissostichus eleginoides</i>	Yes
ORY	Orange Roughy	<i>Hoplostethus spp</i>	Unknown
ALF	Alfonsino	<i>Family Berycidae</i>	Unknown
CGE	Deep-sea Red Crab	<i>Chaceon maritae</i>	Unknown
MAC	Mackerel	<i>Scomber scombrus</i>	Unknown
EDR	Armourhead	<i>Pseudopentaceros spp.</i>	Unknown
BOC	Boarfish	<i>Capros aper</i>	Unknown
ORD	Oreo dories	<i>Family Oreosomatidae</i>	Unknown
CDL	Cardinal Fish	<i>Epigonus spp.</i>	Unknown
OCZ	Octopus	<i>Family Octopodidae</i>	Unknown
SQC	Squid	<i>Family Loliginidae</i>	Unknown
WRF	Wreckfish	<i>Polyprion americanus</i>	Unknown
SKA	Skates	<i>Family Rajidae</i>	Unknown
SKH	Sharks (deep-sea)	<i>Order Selachomorpha</i>	Unknown

Catch statistics for the SEAFO Area are incomplete. A table with the available data from 1995 to 1998 was listed in the report of the 1<sup>st</sup> annual meeting of the commission (2004), Appendix III (Table II). These data were based on a report by Japp (1999). Landings for the four main species are listed by country in Tables 2-5, as well as fishing method and management Area in which the catch was taken. Tables 6-8, list the bycatch species. A lot of information is still outstanding. In cases where it is known that fishing did not take place that year, it is indicated in the tables. The Sub-Committee recommends that effort should be made by the various countries to obtain the outstanding information to be able to complete the tables with the required information.

Some data were derived from the “1975-2005 FAO Southeast Atlantic capture production database” and added to the tables on landings. These are printed in bold. Only data from the oceanic divisions and for SEAFO species were taken into consideration.

**Table 2:** Landings in tonnes of Patagonian toothfish by Spain, Japan and Rep. of Korea (values in bold are from FAO).

<b>Main species</b>	<b>Patagonian toothfish</b>			
<b>Management Area</b>	D1	D1	D1	
<b>Nations</b>	Spain	Japan	Korea	
<b>Fishing method</b>	Longline	Longline	Longline	
	Landings	Landings	Landings	Effort (1000 hooks)
1976				
1977				
1978				
1993				
1994				
1995				
1996				
1997				
1998				
1999				
2000				
2001				
2002	18.28			
2003	100.54		245.19	
2004	6.12			
2005		72.65	<b>10</b>	
2006	11.51	157		
2007		15.76		
2008 (provisional)		83.79	75.66	1134.76

**Table 3:** Landings (tonnes) of orange roughy made by Namibia, Norway and RSA. Values in italics are taken from the Japp (1999).

Main species	Orange roughy			
	Management Area	B1	A1	B1?
Nations	Namibia	Norway	RSA	
Fishing method	Bottom trawl	Bottom trawl	Bottom trawl	
1976				
1977				
1978				
1993				
1994				
1995	39.3	No fishing	<i>1.18</i>	
1996	7.9	No fishing	<i>0.04</i>	
1997	5.2	22	<i>27.30</i>	
1998	No fishing	12		
1999	0.3	No fishing		
2000	74.6	0		
2001	93.9	No fishing		
2002	9.0	No fishing		
2003	27.4	No fishing		
2004	14.7	No fishing		
2005	18.1	No fishing		
2006	No fishing	No fishing		
2007	No fishing	No fishing		

**Tables 4a, b** (below): Landings (tonnes) of alfonsino made by various countries. Values in italics are taken from the Japp (1999). Values in bold are from FAO.

Main species	Alfonsino ( <i>Beryx</i> spp.)				
	Management Area	B1	A1	Unknown	
	Nations	Namibia Bottom trawl	Norway Bottom trawl	Russia Bottom trawl	Portugal Ukraine
Fishing method					
1976				252	
1977				2972	
1978				125	
1993				?	172
1994					
1995		1.2	No fishing		
1996		368	No fishing		747
1997		208	836	2800	392
1998		No fishing	1066	69	
1999		0.60	No fishing		3
2000		0.05	242		1
2001		0.63	No fishing		7
2002		0.00	No fishing		1
2003		0.00	No fishing		5
2004		6.45	No fishing	210.44	
2005		0.71	No fishing	54	
2006			No fishing		0.3
2007			No fishing		

Main species	Alfonsino (contd)					
	Management Area		unknown	unknown	Unknown	B1?
	Nations	Spain	Poland	Cook Island	Mauritius	Cyprus
Fishing method	MWT /BLL		Bottom trawl	Bottom trawl	Bottom trawl	trawl
Catches						
1976						
1977						
1978						
1993						
1994						
1995						59.705
1996						109.181
1997		186				124
1998		402				
1999						
2000						
2001		1.96				
2002						
2003		2.34				
2004		4.16		141.55	114.88	436.97
2005		72.34				
2006						
2007						

**Table 5.** Landings (tonnes) of deep-sea red crab made by Namibia and Japan.

Management Area	B1	B1	A
Nations	Japan	Namibia	Spain
Fishing method	Pots	Pots	Pots
<b>Landings</b>			
1976			
1977			
1978			
1993			
1994			
1995			
1996			
1997			
1998			
1999			
2000			
2001			0.07
2002			
2003			5.10
2004			23.84
2005	234.34	54.33	
2006	390		
2007	509	4.1	35
2008 (provisional)			

**Table 6.** Landings (tonnes) of armourhead. Values in italics are taken from the Japp (1999). Values in bold are from FAO

Bycatch species	Armourhead					
	B1	B1	Unknown	B1	B1	Unknown
	Namibia	Russia	Ukraine	RSA	Spain	Cyprus
Fishing method	B. trawl	B. trawl	B. trawl	B. trawl	B. trawl & longline	B. trawl
<b>Catches</b>						
1976		<i>108</i>				
1977		<i>1273</i>				
1978		<i>53</i>				
1993		<i>1000</i>	<b>435</b>			
1994						
1995	<i>3</i>		<i>49</i>	<i>529.581</i>		
1996	<i>212</i>		<i>281</i>	<i>201.184</i>		
1997	<i>546</i>		<i>18</i>	<i>12</i>		
1998						
1999						
2000						
2001						
2002						
2003						
2004						
2005						
2006						
2007						22

**Table 7:** Landings (tonnes) of boarfish and oreo dories.

By-catch species	Boarfish				Oreo dories
Management Area					
Nations	Russia	Cyprus	Mauritius	Namibia	Namibia
Fishing method				Bottom trawling	Bottom trawling
<b>Landings</b>					
1976					
1977					
1978					
1993					
1994					
1995				5.36	0.459
1996				71.67	0
1997				12.784	35.21
1998				No fishing	No fishing
1999				0	3.17
2000				79.19	32.853
2001				20.115	13.642
2002				0	0.5
2003				0	0.95
2004	0.081	21.312	25.164	4.4	0
2005				0	3.79
2006					
2007					

**Table 8.** Landings (tonnes) of wreckfish .

Management Area	A
Nations	Portugal
Fishing method	Longline
<b>Landings (bycatch)</b>	
1996	
1997	
1998	
1999	
2000	
2001	
2002	
2003	
2004	0.5
2005	
2006	6
2007	9

### Orange roughy

To date, only the Namibian orange roughy dataset for Sub-Division B1 provided enough information to attempt to analyse trends. The fishery started in 1995, did not fish in 1998, but continued until 2005. During these 9 years, 7 Namibian vessels (Table 9) were fishing in the SEAFO Area for orange roughy and in total 1270 trawls were made and about 1000 tonnes of deep-sea species were landed. A total of 290 tonnes of

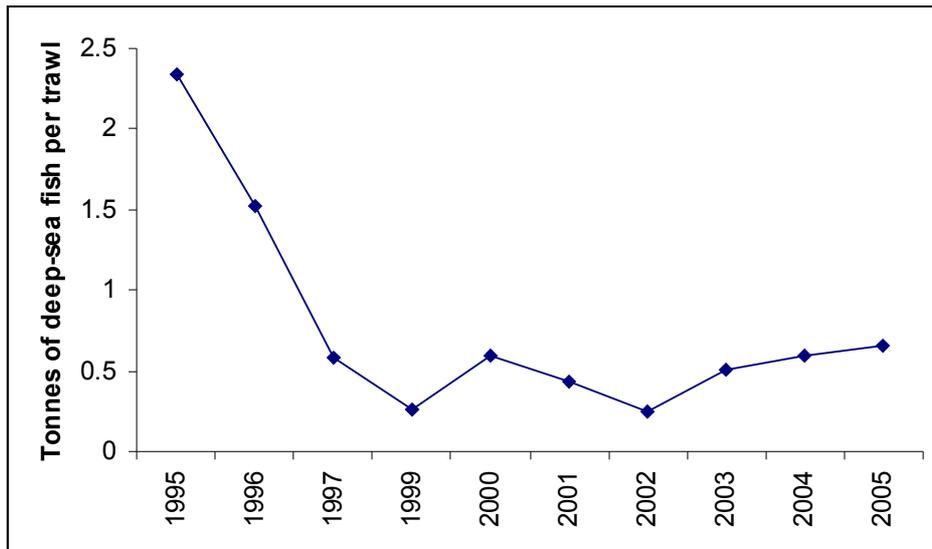
orange roughy and 303 tonnes of alfonsino were landed over this time period. The total annual effort in number of trawls and the total number of deep-sea fish (orange roughy, alfonsino, boarfish, oreo dory, and cardinal fish) landed is illustrated in Table 10. The LPUE was the highest in 1995 and thereafter decreased rapidly to reach the lowest LPUE in 1999. Since then the LPUE seems to have stabilized at a low level (Figures 6 and 7). The Scientific Sub-Committee recommend that since these LPUE trends are based on very limited data, caution should be taken in the interpretation of these results.

**Table 9.** Orange roughy/alfonsino: Fleet information, Sub-Division B1.

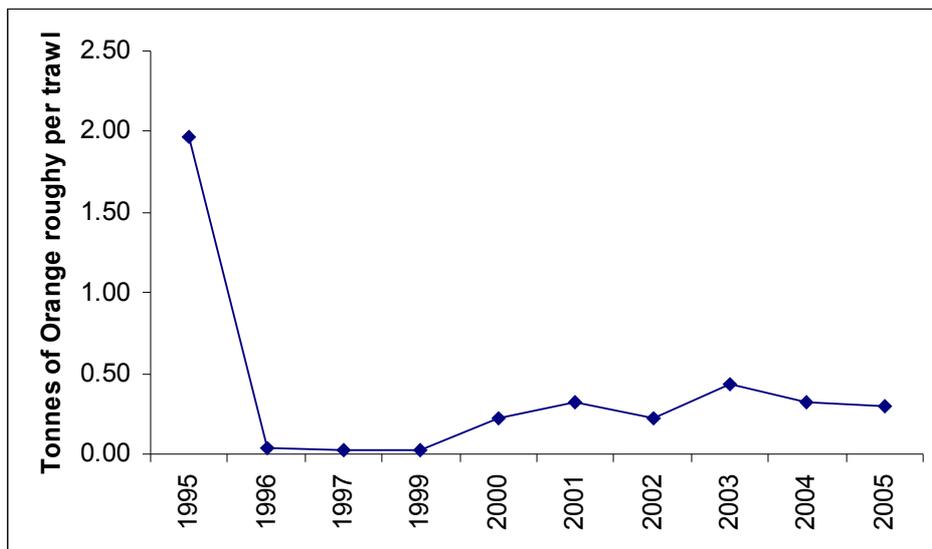
Flag	ID	Name	Length	GRT	Built	HP	IRCS
Nam	L737	Southern Aquarius	54		01/01/1974	3000	V5SH
Nam	L913	Emanguluko	31	483.00	01/01/1990	1850	V5SD
Nam	L892	Petersen	43	650.00	01/01/1979		V5RG
Nam	L861	Will Watch	69	1587.00	01/01/1972	2116	ZMWW
Nam	L918	Hurinis	37	784.00	01/01/1987	1680	V5SW
Maur	L1159	Bell Ocean II	57	1899.00	01/01/1990	3342	3BLG
Nam	L830	Seaflower	92	3179.75	01/01/1972	4800	V5HO

**Table 10.** Number of trawls made per year and the total landings of deep-sea species taken by the orange roughy fleet in Sub-Division B1.

	No of trawls	Landings (t)
1995	20	47
1996	223	340
1997	188	110
1999	16	4
2000	327	196
2001	295	130
2002	40	10
2003	63	32
2004	46	28
2005	61	40
2006	0	0
Total	1279	937



**Figure 6.** LPUE for the total deep-sea catch (all species) per trawl from 1995 to 2005 in Sub-Division B1.



**Figure 7.** LPUE of orange roughy in tonnes per trawl in Sub-Division B1.

### Stock Assessments

In view of the lack of data, stock assessments cannot be attempted now and in the foreseeable future.

#### **c. Evaluate and suggest reference points for deep-sea fish resources.**

Last year, the Sub-Committee agreed to categorise the commercially most important species in the SEAFO Convention Area into two categories (A and B) on the basis of available information of life history characteristics, perceived vulnerability to fishing and the fishing gear used. The Sub-committee in 2008 has reviewed this information and revised the vulnerability to fishing of toothfish, wreck fish and red crab from low to

high. Table 11 shows life history characteristics and revised vulnerability to fishing of commercially important species.

**Table 11.** Major life history characteristics and vulnerability to fishing for commercially most important species in the SEAFO Area (mostly using data presented in SEAFO 2006 Scientific Committee Report).

Species	Longevity (circa)	Growth rate	Aggregations	Vulnerability to fishing	Bottom fishing gears
Orange roughy	150 years	Very slow	Yes	High	trawl
Oreo dories	150 years	Very slow	Yes	High	trawl
Alfonsino	17 years	Moderate	Yes	High	trawl/gill nets
Armourhead	14 years	Moderate	yes, in adult phase	High – but low fishing activity	trawl/gill nets
Patagonian toothfish	45 years	Slow	No	High	longline
Cardinal fish	100 years	Very slow	Yes	High – but low fishing activity	trawl
Wreckfish	80 years	slow	No	High	longline
Deep-sea red crab spp.	30 years	Slow	Only sporadically	High	traps

**Category A** - considered to be long-lived, slow-growing and vulnerable to fishing

Orange roughy (*Hoplostethus atlanticus*)  
 Oreo dories (*Oreosomatidae* spp)  
 Alfonsino<sup>1</sup> (*Beryx splendens*)  
 Patagonian toothfish (*Dissostichus eleginoides*)  
 Wreckfish (*Polyprion americanus*)  
 Deep-sea red crab (*Chaceon* spp)  
 Cardinal fish (*Epigonus* spp)  
 Armourhead (*Pseudopentaceros richardsoni*)

**Category B** - considered to be moderate/short lived, faster-growing and less vulnerable to fishing.

None of above species were identified in Category B.

Last year, the Sub-Committee attempted to identify reference points for all species. The only data available for use were LPUE data and these were sparse for most species and were considered unreliable especially where species were taken as bycatch.

An alternative option available was to develop reference points based on catch thresholds and this approach has again been used this year. However, while there was agreement that these should be precautionary it was not possible to agree thresholds for all species.

<sup>1</sup> Although not long-lived or slow growing, alfonsino was placed in category A because fisheries on this species are mainly on aggregations associated with seamounts and historical data suggests that large catches have been taken and that these aggregations may have been fished out.

For Patagonian toothfish, the Sub-Committee took account of current CCAMLR Conservation Measure 41-04 from 2006 relating to toothfish. For toothfish in SEAFO Division D, it was agreed to maintain a precautionary approach and keep a catch limit of 260 tonnes.

For deep-sea red crab spp, the Sub-Committee agreed to maintain a precautionary approach and keep a catch limit of 200 tonnes in Sub-Division B1 (average of recent catch levels) and 200 tonnes in the remainder of the SEAFO Area until such time as when additional information becomes available.

**d. Establishment of sampling protocols and requirements including fish identification keys**

Sampling protocols and requirements including identification keys have not been developed for the SEAFO area as yet. Attached at Annex IV are revised SEAFO sampling forms for catches and other fishing details (including discards/benthos/seabirds/mammals) to be recorded by observers. Also, a SEAFO observer summary form has been developed based on CCAMLR protocols and this is given in Appendix V.

Critically, there are no identification keys available for benthos (e.g. corals, sponges etc.). Ideally, a simple pictorial identification key should be developed.

**e. Complete FIRMS information fisheries sheets**

The Sub-Committee considered FIRMS stock inventories and referred the issue to the SC for further consideration.

**f. Norwegian proposal on bottom fishing activities**

The Sub-Committee considered the Norwegian proposal and referred the issue to the SC for further consideration.

**g. Examine where appropriate assessment and research done by neighbouring assessment and management organization (such as BCLME/BCC, CCAMLR, GCLME, ICCAT, SWIOFC)**

The research results obtained by various Commissions and other research & management organizations were considered as far as possible in the course of the meeting. These results were used to attempt to reach solutions for various problems and tasks at hand. For example, adopting the CCAMLR observer summary reports.

ICCAT was consulted during the course of the meeting and it was identified that mackerel is not an ICCAT species and as such was added to the SEAFO species list.

The BCC will cooperate closely with SEAFO through their scientific and environmental working groups and that both Commissions will formally establish links. The Executive Secretaries of each Commission will be represented on the respective management boards.

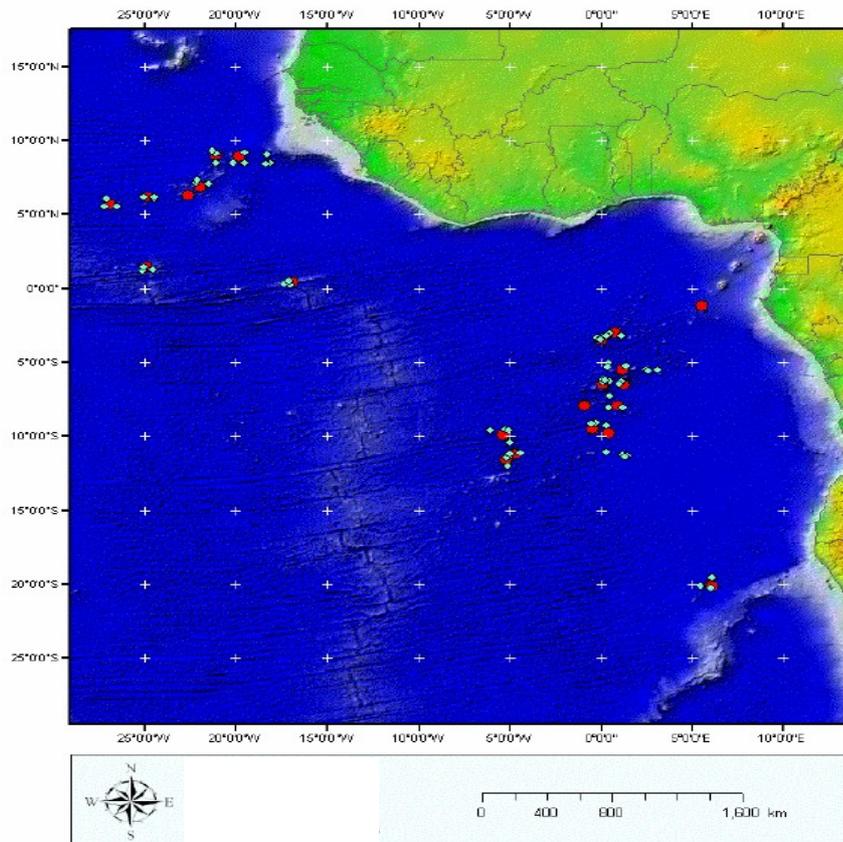
## **h. Reviewing the Distribution of Reported Catches of Benthic Organisms (corals, sponges etc.)**

The only new information was provided by a survey report presented by Spanish/Namibian collaboration, which included some information on the potential areas of bio-constructions which may comprise corals. A summary of this work is presented under TOR i below

## **i. Undertake review of the Submitted SEAFO Research Documents**

### **EU (Portugal) exploratory survey targeting deep-water crab at central and south Atlantic**

An exploratory trap survey targeting deep-water crab was conducted by a Portuguese commercial fishing vessel during the 2<sup>nd</sup> half of 2007. The Portuguese fisheries institute (IPIMAR) was responsible for the survey design and scientific support. The main objectives of the survey were: identification of deep-water crab species (family Geryonidae), determination of their distribution area, estimation of abundance/biomass indexes by crab species and estimation of diversity indexes. The geographical locations of the fishing hauls are presented in Figure 8.

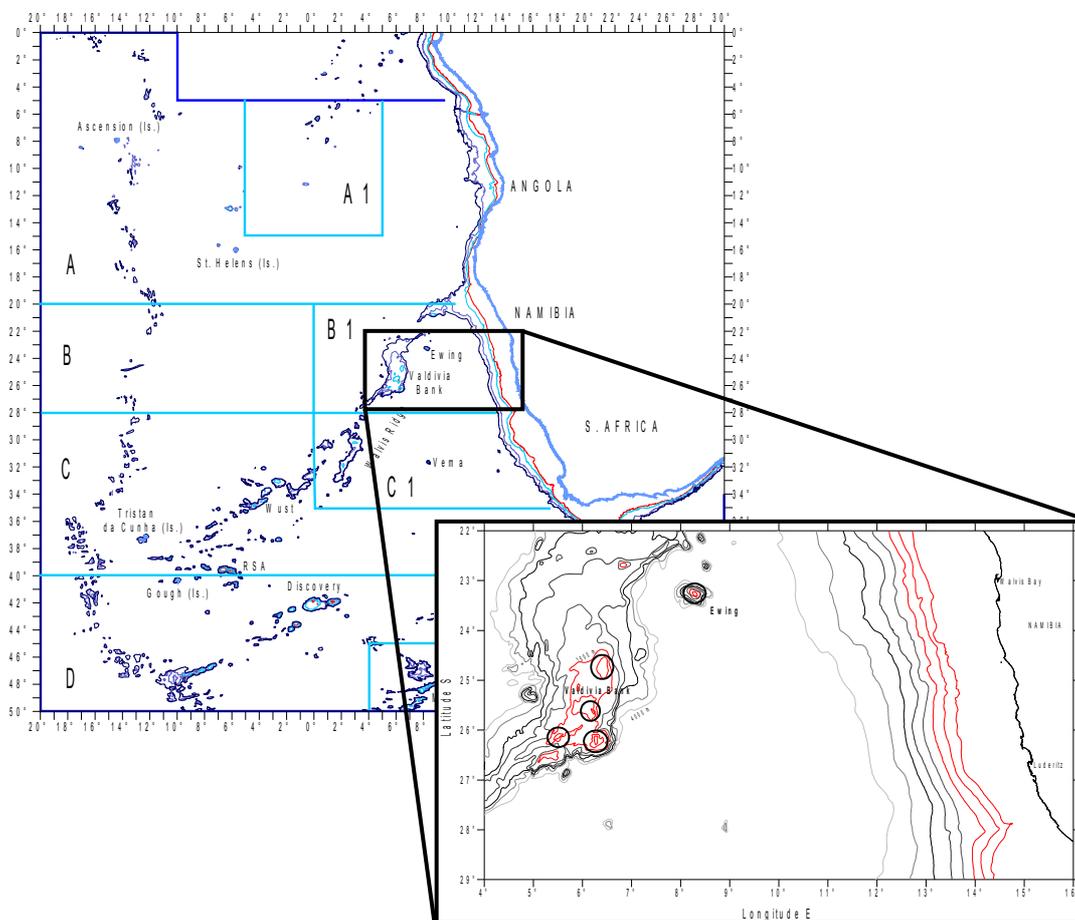


**Figure 8.** - Fishing haul locations are represented by red bullets

## Preliminary report of a multidisciplinary research cruise on the Walvis Ridge Seamounts (South-east Atlantic, SEAFO)

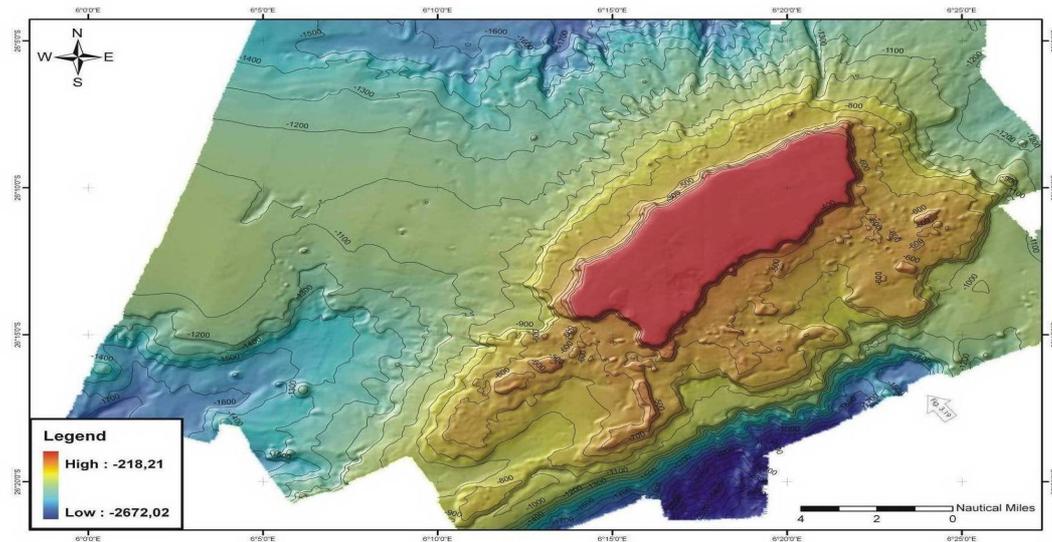
The *Instituto Español de Oceanografía* (IEO) of Spain and the National Marine Information & Research Centre (NatMIRC) of Namibia conducted a multidisciplinary survey on some Walvis Ridge seamounts onboard the Spanish R/V Vizconde de Eza from February to March 2008. This survey was designed as an exploratory study to localize and identify bioconstructions (e.g. corals) associated with seamounts as potential vulnerable marine ecosystems.

Two study sites were identified to survey on the Walvis Ridge and surroundings namely Ewing seamount and Valdivia Bank (Figure 9).

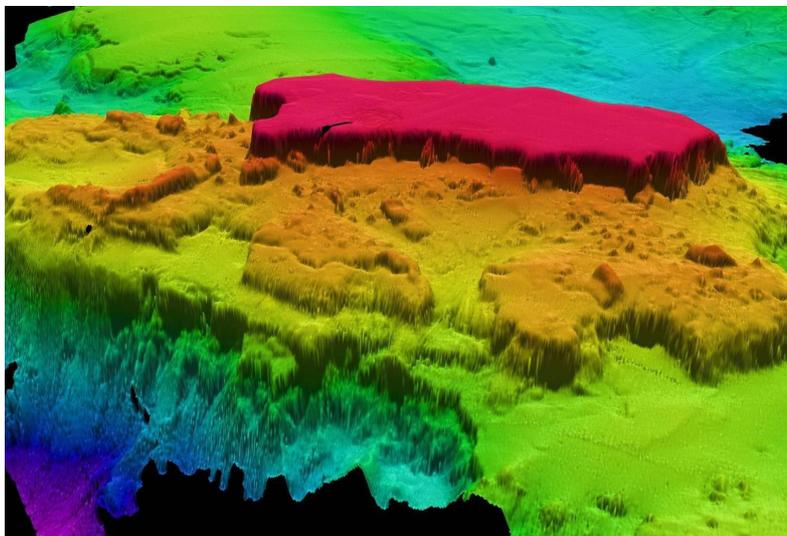


**Figure 9.** Location of the areas surveyed (initial bathymetry obtained from GEBCO data).

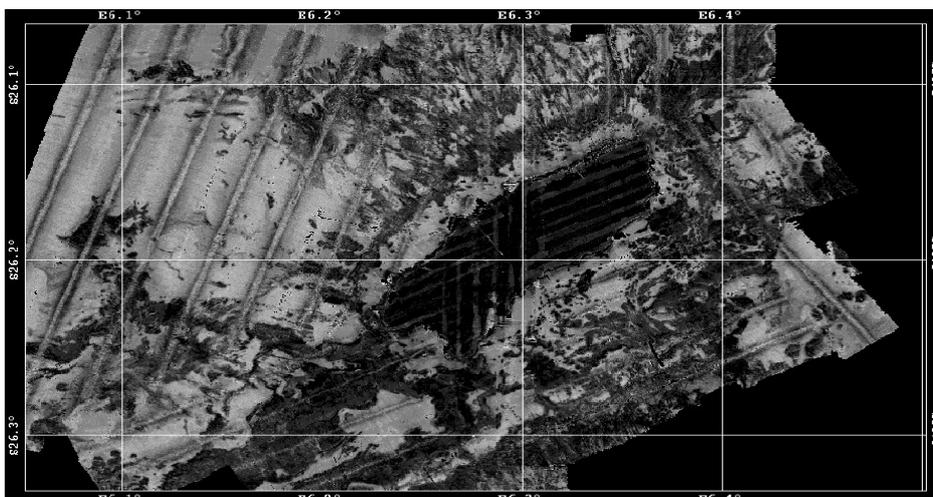
A total of 10285 Km<sup>2</sup> (2780 Nm<sup>2</sup>) were covered using the multibeam echosounder, 1381 km<sup>2</sup> on the Ewing seamount and 8904 km<sup>2</sup> on the Valdivia Bank. The bathymetric maps were generated from digital models of depth (Figure 10), 3D blocks (Figure 11) and the reflectivity mosaics (Figure 12). The study area was divided into the following zones: Ewing, Valdivia North, Valdivia Central, Valdivia West and Valdivia South. As an example, results from the Valdivia South seamount are presented.



**Figure 10.** Bathymetric map of the Valdivia South seamount.

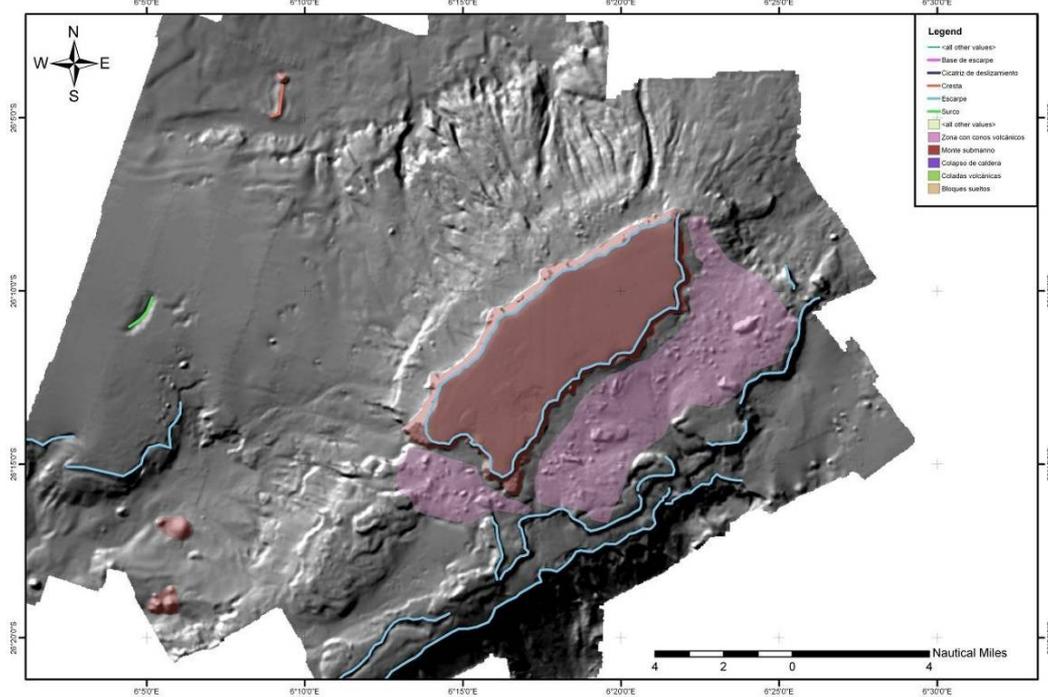


**Figure 11.** Valdivia South seamount 3D block.



**Figure 12.** Valdivia South seamount reflectivity map.

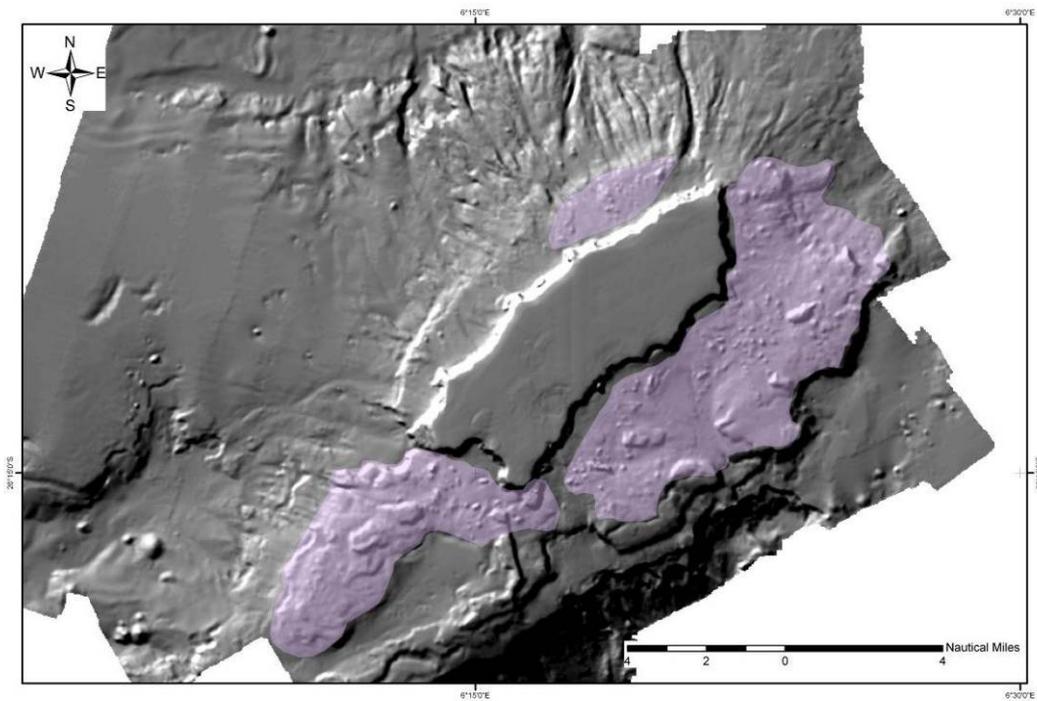
The Valdivia South seamount is located between 26°05'S - 26°20'S and 006°10'E - 006°27'E. The depth ranges between 218 m at the outcrop in the SE sector and 2700 m in the southern part. This is associated with a fracture in the NE-SW direction, with an approximately 1000 m of detachment in the fault, which is placed to the south of the mount. Also, the top of the mount is further from the zone of the fracture than in the case of Valdivia North, Central and West seamounts (Figure 13).



**Figure 13.** Main geomorphologic features in the Valdivia South seamount.

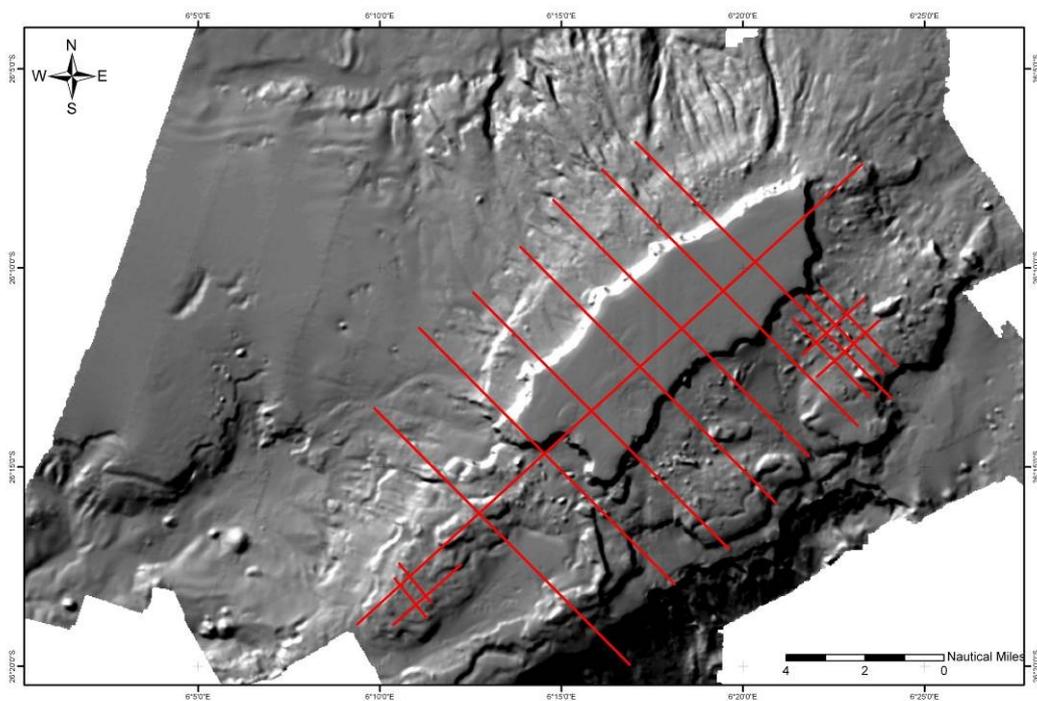
The top is completely flat so it might be that no volcanic episodes occurred at the top of the mount after the rise in sea level.

Between the top of the fault and the escarpment, at between 500 and 800 m depth, a zone occurs with a very gradual morphology associated with volcanic cones, free-standing structures and possible bioconstructions. From a biological perspective, an extraordinary richness and variety of the benthos in this zone may be expected given their morphologic complexity and because of the geological stability as no indications of avalanches were detected (Figure 14).



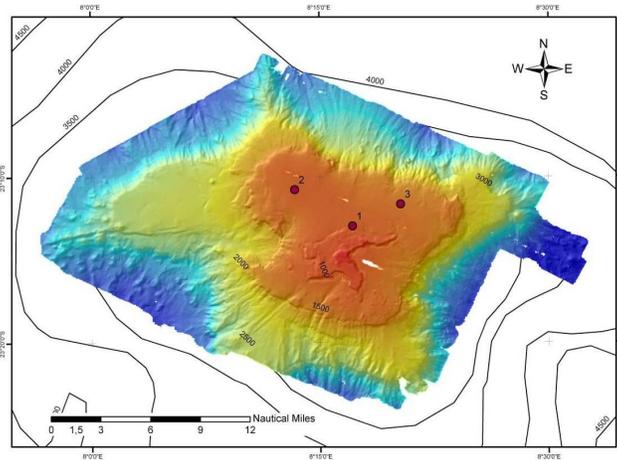
**Figure 14.** Zones of interest to be studied (in future) to localize possible bioconstructions in the Valdivia South seamount.

After the acoustic and geophysical studies, a series of future exploratory work have been proposed at specific interesting sites in this region to obtain a more precise description of the sediment characteristics and the bottom type (Figure 15).



**Figure 15.** Navigation lines designed for seismic exploration of the Valdivia South seamount using parametric sounding (TOPAS).

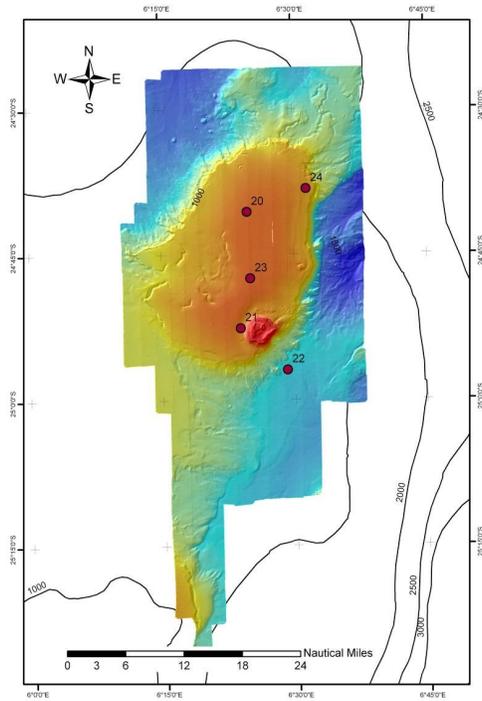
In addition to the mapping work described above fauna and sediment samples were obtained by carrying out 30-minute trawls using a LOFOTEN bottom trawl net. A total of 24 trawls were carried out (Figures 16, 17 and 18).



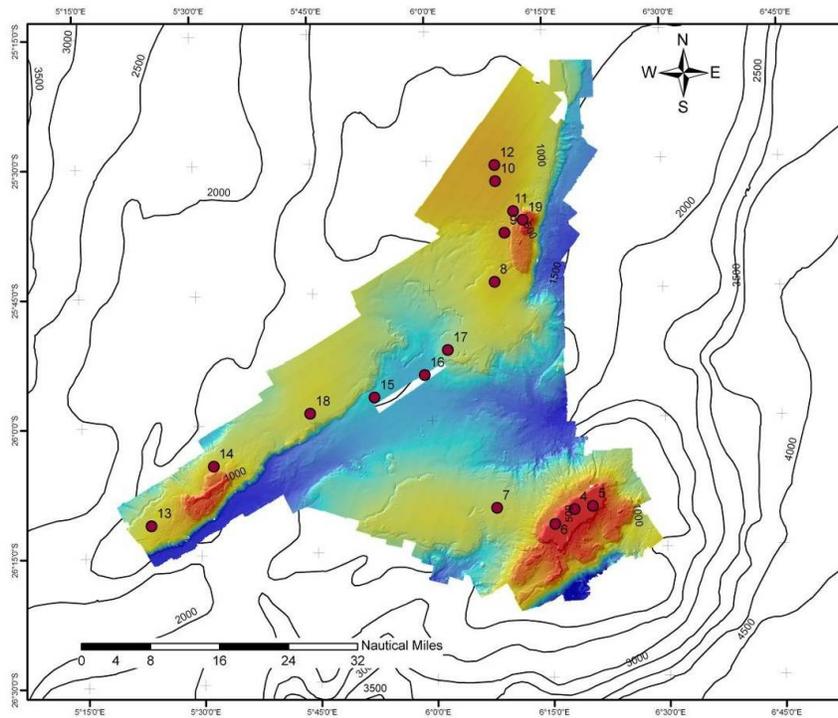
**Figure 16.** Location of trawls in the Ewing seamount.

The benthos samples from Ewing seamount show three common species occurring in the zone: *Hygrosoma petersii*, a sea urchin of the Echinothuridae family, a group which is quite common at those depths; and the zoantharia *Epizoanthus paguriphilus*, always associated with the hermit crab *Parapagurus pilosimanus* and also common in the deep sea. Specimens of Hydrozoa, Gorgonacea of the Isidiidae family (bamboo corals), and Echinoidea were present in the samples. Pteropoda were also observed in the sediment.

Similar to Ewing, there were species that appeared in all the samples from the Valdivia Bank: the Hydrozoa colonies being the most abundant, Actinaria of the Hormathiidae family primarily, and Asteroidea as *Echinaster reticulatus*. Considering the weight of the specimens, the Actinaria of the Hormathiidae family stand out as well as the presence of the demosponge *Pachastrella monilifera* found in two hauls and the Echinoidea regularia of *Echinus* genus. A scleractinia was found in only one sample (n = 24).



**Figure 17.** Location of trawls in the Valdivia North seamount.



**Figure 18.** Location of trawls in the Valdivia Central, Valdivia West and Valdivia South seamounts.

A total of 138 species of fish, 24 crustaceans and 15 cephalopods were collected. The most representative fish species in the catches (by weight) of the survey were: *Pseudopentaceros richardsoni* (40%), *Allocyttus verrucosus* (14%), *Alepocephalus productus* (13%), *Rouleina attrita* (9%), *Cetonurus globiceps* (8%), *Helicolenus dactylopterus dactylopterus* (5%) and *Notopogon xenosoma* (3%). Considering the abundance (by number) in the catches, the most representative species were: *Notopogon xenosoma* (31%), *Cetonurus globiceps* (17%), other fishes (15%), *Pseudopentaceros richardsoni* (10%), *Allocyttus verrucosus* (9%), *Alepocephalus productus* (8%), *Rouleina attrita* (6%) and *Helicolenus dactylopterus dactylopterus* (4%).

The most representative crustacean species in the catches (by weight) of the survey were: *Chaceon* spp. (84%), *AcanthePHYra eximia* (6%), *Austropenaeus nitidus* (4%), *Nematocarcinus longirostris* (3%) and other species (n=23; 3%). Considering the abundance (by number) in the catches, the most representative species were: *Austropenaeus nitidus* (22%), *Chaceon* spp. (21%), *Nematocarcinus longirostris* (18%) and *AcanthePHYra eximia* (17%).

The scarcity of cephalopods and the absence of skates in the catches is unusual.

From samples obtained by trawls size compositions were calculated, as were the general statistics (length-weight relationship, sex-ratio, gonadosomatic index, condition factor and maturity ogives) for the more abundant bony fish species or those of commercial interest: *Pseudopentaceros richadsoni*, *Helicolenus dactylopterus dactylopterus*, *Hoplostehus atlanticus*, *Allocyttus verrucosus*, *Alepocephalus productus*, *Rouleina attrita*, *Cetonurus globiceps* and *Notopogon xenosoma*. Cartilaginous fish species were grouped by taxonomic families but were biologically sampled individually. The length composition of catches and general statistics (length-weight relationship and reproduction) are presented. The size composition of crustaceans catches was calculated and also their the general statistics (length-weight relationship and sex-ratio) for the more abundant species of commercial interest namely *Austropenaeus nitidus*, *Chaceon* spp. and *AcanthePHYra eximia*.

The type of trawl net used did not allow for trawling in zones with steep slopes which are generally between 300 and 800 meters depth. This therefore excluded the study of these zones and therefore any recording of the fauna associated with these types of substrate. Thus, the survey excluded one important depth stratum which are the seamount cliffs in the area which is e.g. the habitat of species of the Berycidae (alfonsino) and Centrolophidae (Pompano) fish families.

Two species of commercial importance were found in the shallower depth strata namely *Pseudopentaceros richadsoni* and *Helicolenus dactylopterus dactylopterus*; and for the deepest strata *Hoplostehus atlanticus* (orange roughy), *Allocyttus verrucosus*, *Chaceon* spp. and possibly the Aristeidae *Austropenaeus nitidus*. As mentioned previously, no data are available for the intermediate depth strata.

Four assemblages have been identified that correspond to the following criteria:

- 1 - Shallower assemblage (200-500 m) from Valdivia Bank.
- 2 - 800 - 1100 m assemblage from Valdivia Bank.
- 3 - 900 - 1300 m assemblage from Ewing and Valdivia Bank.
- 4 - Deeper assemblage (1300 – 1700 m) from Valdivia Bank.

### **Conclusions**

The survey should be seen as a first attempt of developing the methodology to be applied in the SEAFO area for these type of studies. The current study areas were chosen because they were nearest to the land, taking into account that the available ship's time only allowed for a first stage of such a study. Great progress was made even though only a few conclusive results were obtained. Therefore, a series of future acoustic and geophysical work have been proposed for specific sites of interest in this region, specifically to categorize the sedimentary body and bottom type more precisely.

### **Reference**

López Abellán and J.F. González Jiménez, 1999. Results of a longline survey on semounts in the Southeast Atlantic and CCAMLR Subarea 48.6 (Atlantic Ocean) and division 58.4.4 (Indian ocean). CCAMLR Science, Volume 6, 99-160.

### **4. ANY OTHER MATTERS**

A reference list (639 documents) regarding bottom fish and crab resources (1970 – 2003) in the SEAFO area was made available by the Japanese observer.

A new chairman was elected for the SC Sub-Committee, Mr. Kumbi Kilongo (Angola) for a period of two years (2009 – 2010)

There were no other matters raised

### **5. ADOPTION OF THE REPORT**

The report was presented and adopted by the meeting.

### **6. DATE AND PLACE FOR THE NEXT MEETING OF THE SUB-COMMITTEE**

### **7. CLOSURE OF THE MEETING**

On Wednesday at 17:30hrs October 1, the Chairperson declared the closure of the meeting after all items have been completed. In his closing remarks, the Chair expressed his satisfaction for the work accomplished and thanked all participants for their valuable contributions.

## APPENDIX I

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### LIST OF PARTICIPANTS

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## APPENDIX II

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### AGENDA FOR THE SUB-COMMITTEE OF THE SC

**Date:** 29 SEPTEMBER – 1 OCTOBER 2008

**Venue:** Safari Hotel, Windhoek.

1. Opening Welcome by Mr. Titus Iilende, Chairperson of the Sub-Committee
2. Adoption of the Agenda and Arrangements
3. Appointment of Rapporteur
4. Introduction of Participants
5. Review of the Terms of Reference for the Sub-Committee by the Chairperson
6. Working Sessions to Address the Terms of Reference
7. Any other Business
8. Consideration and Adoption of the Report
9. Date and Place of the Next Meeting of the Sub-Committee
10. Closure of the Meeting

#### Terms of Reference for the Scientific Sub-Committee

- a. Source, analyse and compile catch and CPUE data for the main fish stocks (e.g. orange roughy, alfonsino, armourhead, deep sea red crab, Patagonian toothfish) in terms of quantity and geographical positions for the SEAFO region using all existing information including observer data.
- b. Evaluate trends in the total catches and where possible CPUE for the stocks as outlined under point (a), and undertake stock assessments when appropriate.
- c. Evaluate and suggest reference points for deep-sea fish resources.
- d. Establishment of sampling protocols and requirements including fish identification keys.
- e. Complete FIRMS information fisheries sheets.
- f. Norwegian proposal on bottom fishing activities.
- g. Examine, where appropriate, assessments and research done by neighbouring assessment and management organisations (such as BCLME/BCC, CCAMLR, GCLME, ICCAT, SWIOFC).
- h. Review the distribution of reported catches of benthic organisms (corals, sponges etc.).
- i. Undertake review of submitted SEAFO research documents.

## APPENDIX III

### SEAFO SPECIES LISTS

Table I: Main commercial species in the revised SEAFO species list.

FAO 3 Alfa Code	Species	Latin Name	Transboundary
TOP	Patagonian toothfish	<i>Dissostichus eleginoides</i>	Yes
ORY	Orange Roughy	<i>Hoplostethus spp</i>	Unknown
ALF	Alfonsino	<i>Family Berycidae</i>	Unknown
CGE	Deep-sea Red Crab	<i>Chaceon maritae</i>	Unknown
MAC	Mackerel	<i>Scomber scombrus</i>	Unknown
EDR	Armourhead	<i>Pseudopentaceros spp.</i>	Unknown
BOC	Boarfish	<i>Capros aper</i>	Unknown
ORD	Oreo dories	<i>Family Oreosomatidae</i>	Unknown
CDL	Cardinal Fish	<i>Epigonus spp.</i>	Unknown
OCZ	Octopus	<i>Family Octopodidae</i>	Unknown
SQC	Squid	<i>Family Loliginidae</i>	Unknown
WRF	Wreckfish	<i>Polyprion americanus</i>	Unknown
SKA	Skates	<i>Family Rajidae</i>	Unknown
SKH	Sharks (deep-sea)	<i>Order Selachomorpha</i>	Unknown

Table II: Review of catch data from SEAFO Area (from Japp, 1999).

	1995	1996	1997	1998	
Country	Outside EEZ	Outside EEZ	Outside EEZ	Outside EEZ	Comments
RSA	600	312		400	Alfonsino/Oroughy/Amourhead
Namibia	100	624	970	200	Alfonsino/Oroughy/Amourhead
Russ. Fed.			2800		Alfonsino/Oroughy/Amourhead
Spain	1069	372.8	280.1	682.3	Alfonsino/Oroughy/Amourhead
Japan		1008	=2171	700	Crab mostly/some groundfish
Portugal	62.7	38.1	137.5	154	Var. Sp., Octopus, wreckfish
Korea	268	6110	636		Large pelagics
Norway			863.9	1085.3	Alfonsino/Oroughy/Amourhead
Iceland			466	126	Alfonsino/Oroughy/Amourhead
<b>Total</b>	<b>2100</b>	<b>8519</b>	<b>8502</b>	<b>3348</b>	
Average annual catch 1995 – 1998 = 5617t					

**APPENDIX IV**

**Revised SEAFO sampling forms for catches and other fishing details (including discards/benthos/seabirds/mammals) to be recorded by observers.**

# TRAWL FORM

South East Atlantic Fisheries Organization

Vessel name	
-------------	--

**Effort measurement**

GRT	
Fishing days	
Horsepower	

**Fishing operation**

Date		Targeted species	
------	--	------------------	--

Trawl number <sub>1</sub>		D/M/P <sub>2</sub>	
---------------------------	--	--------------------	--

	Start <sub>3</sub>	End <sub>4</sub>
Time		
Position (Latitude) <sub>7</sub>		
Position (Longitude) <sub>7</sub>		
Bottom depth (m)		

Trawl speed (knots)		Vertical opening <sub>5</sub>		Door distance <sub>6</sub>	
---------------------	--	-------------------------------	--	----------------------------	--

**Catch information**

Total catch (Kg)		
	Species names of retained catch	Kg
1		
2		
3		
4		
5		
6		
7		
8		

	Discards (fish, benthos, seabirds, mammals)	Kg
1		
2		
3		
4		
5		
6		
7		
8		

**Instructions**

- |  |
|--|
| <ol style="list-style-type: none"> <li>1. Trawl number: the number of trawl during that day</li> <li>2. D = demersal trawl, M = midwater trawl, P = pelagic trawl</li> <li>3. Fishing time start ==&gt; time when the net has reached is intended fishing depth</li> <li>4. Fishing time stop ==&gt; time when the trawling is stopped and hauling begins</li> <li>5. Vertical opening (in meters): opening of the mouth of the trawl during trawling</li> <li>6. Door distance (in meters): distance between the doors during trawling</li> <li>7. <u>Latitude</u> and Longitude information should be given in degrees, minutes and seconds</li> </ol> |
|--|

# LONG-LINE FISHERY FORM

South East Atlantic Fisheries Organization

Vessel name	
-------------	--

## Effort measurement

GRT x fishing days	
Number of hooks	
soaking time	

## Fishing operation

Set number		Target species	
Type of bait		Number of hooks	
Hours deployed			

	Set	Hauled
Date		
Time		
Position (Latitude)		Longitude and latitude information must be given in degrees, minutes and seconds.
Position (Longitude)		
Bottom depth (m)		
Lost gear (Type/No)		

## Catch information

Total catch (Kg)	
Species names of retained catch	Kg
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Discards (fish, benthos, seabirds, mammals)	Kg
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

# CRAB FISHERY FORM

South East Atlantic Fisheries Organization

Vessel name	
-------------	--

## Effort measurement

GRT x fishing days	
No of traps deployed x total soak time	

## Fishing operation

Trap set number		Target species	
Type of trap		Number of traps	
Hours deployed			

	Set	Hauled
Fishing day		
Time set (m)		
Position (Latitude)		
Position (Longitude)		
Bottom depth (m)		

## Catch information

Total catch (Kg)	
Species names of retained catch	Kg
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Discards (fish, benthos, seabirds, mammals)	Kg
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

6		
7		
8		

## Instructions

Net-fishing: nets formed as a fence, standing motionless in the water, either on the bottom (standing nets), or positioned in midwater or close to the surface (drift nets or float nets). These kind of nets are often set as a long row of smaller nets detached to each other (total set). Latitude and longitude information should be given in degrees, minutes and seconds.

# LENGTH DISTRIBUTION FORM

Fishery: trawl, net, long-line or crab-trap

South East Atlantic Fisheries Organization

Vessel name	
-------------	--

Fishing operation

Date		Activity number	
------	--	-----------------	--

	Start	End
Time		
Position (Latitude)		
Position (Longitude)		
Bottom depth (m)		

Species	
---------	--

Number of fish per length group, total length (cm)

0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
0			0		
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
Number in sample:				Weight of sample:	

## Instructions

For crabs, - separate by sex, width of carapace (mm)  
 Note: The Observer can adopt a correct starting length/size based on the species being measured. For example, if size distribution of shark ranges from 70-100 cm, then the above scale can be adjusted accordingly.

## APPENDIX V



### SEAFO Observer Trip Report

*This Report is intended for use by observers on board fishing vessels.*

*If no observations were made please write 'no obs.', place a zero when an observation was made and nothing was found and 'N/A' for sections that are not applicable.*

<b>Trip Number:</b>	<b>Observer Name:</b>
<b>Vessel Name:</b>	<b>Call Sign:</b>
<b>Fishing Gear:</b>	

<b>SEAFO Division/Subdivision:</b>	
<b>Date from:</b>	<b>to:</b>

1. SCIENTIFIC OBSERVER AND VESSEL DETAILS

1.1 Scientific Observer Details:

Observer Name:	
Nationality:	
Employing Organization:	
Contact Address:	
Trip Dates:	From: _____ To: _____
Division/Subdivision:	

Observer Name:	
Nationality:	
Employing Organization:	
Contact Address:	
Trip Dates:	From: _____ To: _____
Division/Subdivision:	

1.2 Vessel Details:

Vessel Name:		Vessel Responsible:	
Port of Registration:		Flag State:	
Vessel Type:		Fishing Gear:	
Size (GRT)		Length (LOA)	
Blast Freezer Capacity		Hold capacity	
Onboard Acoustic Equipment:			
Position Fixing Equipment:			
Vessel Monitoring System			
Radar:			
Communications Equipment:			
Plotters:			

## 2. Trip Itinerary

First part of the Trip		Second part of the Trip	
Port of Departure:		Port of Departure:	
Date of Departure:		Date of Departure:	
Arrival on fishing grounds:		Arrival on fishing grounds:	
Start fishing:		Start fishing:	
End fishing:		End fishing:	
Depart fishing grounds:		Depart fishing grounds:	
Port of Return:		Port of Return:	
Date of Return:		Date of Return:	

## 3. FISHING OPERATIONS

### 3.1 Summary:

Total number of days in the fishing area:	
Total Number of days fishing:	
Target Species	
Total number of fishing haul:	
Number of hooks/pots set:	
Number of hooks/pots lost:	
Fishing depth range:	
Average fishing depth:	

Total number of fishing haul sampled	
Number of hooks/pots sampled	

Bait used	
species1	
species2	
species3	
Baiting efficiency (%)	
Bait ratio (species1/species2 %)	
Bait condition (%):	
Frozen	
Half thawed or thawed	

Comments:

### 3.2 Gear Description:

*Include photographs*

**Catch Details:**

Species	SEAFO Div./Sub	Landed		Discarded		Average daily catch		CPUE*
		Number	Total weight (kg)	Number	Total weight (kg)	Number	Total weight (kg)	

\*include fishing effort units used (e.g. kg/1000 hooks etc.)

**Comments:**

**3.4 Processing Details:**

Species	Type of Processing	Conversion Factor		Comments
		Vessel used	Observer estimates	

**Comments:**

4. SUMMARY OF BIOLOGICAL DATA COLLECTED

4.1 Biological data collection summary:

SEAF0 <i>Division/SubDivision</i>	Species Code	Number of specimens sampled						
		<i>Length</i>	<i>Weight</i>	<i>Sex</i>	<i>Maturity</i>	<i>Otoliths/Scales</i>	<i>1</i>	

Comments

**4.2 Biological Sample Storage Location:**

<i>Sample type / species</i>	<i>Number of samples collected</i>	<i>Contact name and address of where the samples are to be stored.</i>

**5. SUMMARY OF METEOROLOGICAL DETAILS**

**6. SUMMARY OF FISHING STRATEGY**

7. SEABIRD DATA

7.1 Streamer Line Details:

*Was a streamer line used during setting of the longline?*

*What was the percentage of sets where the streamer line was used?*

*Was there a spare line or the ability to make a spare streamer line?*

*Was more than one streamer line used at any one time?*

*If so, how many streamer lines were used?*


*Streamer line length:*

*Number of streamers attached:*

*Distance between streamers:*


*Attached height above water:*

*Streamers paired or single:*

*Length of streamers (min./max.):*




**7.3 Seabird Samples Retained:**

<b>Species</b>	<b>Type of sample (whole/head/leg )</b>	<b>Number of samples collected</b>	<b>Contact details of where the samples were sent.</b>

**7.4 Bird Observations:**

8. SUMMARY OF MARINE MAMMAL OBSERVATIONS

8.1 Marine Mammal Entanglements:

Date	Fishing gear	Species	Number of mammals		
			<i>Dead</i>	<i>Alive</i>	<i>Comments</i>

8.2 Mitigation Measures:

8.3 Fish Loss Due to Marine Mammals:

*Fish loss due to marine mammals directly observed?*

*If so, what species were observed taking fish?*

*Fish loss due to marine mammals but not directly observed?*


Comments:

9. SUMMARY OF BENTHOS OBSERVATIONS

Date	SEAFO Div./SubDiv	Fishing gear	Species	No. items per fishing haul	Comments

**10. DIFFICULTIES ENCOUNTERED**

**10.1 Operational Issues:**

**10.2 Observer Tasks:**

**10.3 Observers Logbook:**

**Comments**