APPENDIXES OF PART 2: EXPERT CONSULTATION BACKGROUND DOCUMENTS AND PRESENTATIONS

APPENDIX 2.A: INVENTORY OF HIGH SEAS DEEPWATER RESOURCES AND FISHERIES

by

Alexis Bensch[1]

1. INTRODUCTION

In 2003, an international conference on deep-sea fisheries was organized to address the growing issues related to the exploitation of deep-sea fishery resources. The outcomes of conference were presented at the 26th session of the FAO Committee of Fisheries (COFI) in 2005. COFI made recommendations for future FAO activities, in particular concerning the collection of information on past and present deep-sea fisheries and the inventory of deepwater stocks.

In 2003, FAO published the "Strategy for Improving Information and Status and Trends of Capture Fisheries (Strategy-STF)". One of the required actions recommended by the Strategy-STF is the global inventory of fish stocks and fisheries. In 2004, FAO launched the Fishery Resources Monitoring System (FIRMS), a partnership of international organizations and regional fishery bodies. In addition, a project specifically designed to implement the Strategy-STF was initiated the same year under the FAO FishCode program, referred in this document as FishCode-STF.

Under these two initiatives, a methodology has been developed for the inventory of marine resources and fisheries and the data collection phase started together with the fine-tuning of the methodology.

This document introduces the inventory methodology and the FIGIS tools available for the management and dissemination of the data collected by the inventory. The current status and geographical coverage of this global inventory are also presented. In the last section, actions are proposed in order to incorporate the deep-sea fisheries and resources in this global initiative.

2. FAO GLOBAL INVENTORY OF MARINE RESOURCES AND FISHERIES

2.1. Objectives

The global inventory of marine resources and fisheries is one of the required actions identified by the Strategy for Improving Information on Status and Trends of Capture Fisheries, with the following main objectives:

- Help identifying gaps in fisheries management, and responsibility for managing fisheries (coastal States, high seas, or both).
- Help estimating the contribution of these un-monitored fisheries and promote policy-making taking into account the communities depending upon these fisheries.
- Provide the skeleton for a more systematic collection of fisheries related indicators.
- Provide the backbone to characterize fisheries management and its effectiveness: governance systems, management measures, scientific advice and related management actions, and response of fisheries resources.

[1]The views expressed in this paper are solely those of the author, Alexis Bensch, FAO Fisheries Department, Fisheries Information Officer, FAO, Rome, Italy, alexis.bensch@fao.org

2.2. Inventory methodology

The FAO methodology for the inventory of marine resources and fisheries has been elaborated analysing reports produced by different fisheries organizations and taking in consideration different geographical scales of reporting and purposes (management, scientific studies, etc.).

In order to develop a comprehensive inventory with information originated from different sources, produced at different geographical scales (national, regional or global) and from experts with different backgrounds, a preliminary step has been to work on definitions and to develop a standardized but flexible structure for the description of the fishery and resource units inventoried. A following step has been the design of an inventory format including the modelling of relationships between inventoried units.

2.2.1. Definitions

Fishery: A fishery is an activity leading to the harvesting of fish, within the boundaries of a defined area. The fishery concept fundamentally gathers indication of human fishing activity, including from economic, management, biological/environmental and technological viewpoints.

Marine Resource: Biotic element of the marine ecosystem, including genetic resources, organisms or parts thereof, populations, etc. with actual or potential use or value (sensu lato) for humanity.

Whereas *Marine Resource* is primarily a biological concept covering the description of marine species populations within defined geographic areas and including ecological and assessment aspects (*Stock* being a particular case of *Marine Resource*), the *Fishery* concept puts emphasis on the human aspects, including fishing activity, exploitation, socio-economic issues and management.

2.2.2. Structured description of inventoried units

In order to get to a practical inventory with a minimum level of homogeneity authorizing advanced queries and comparisons and to encompass at the same time different view points, flexible but standardized structures have been designed for the description of marine resources and fisheries. In both cases, the reporting structure includes:

- A set of key attributes which identity the inventoried unit. A marine resource is always identified by a species (or a species group) and a geographical area. Capture fisheries are identified by a geographical area and other attributes related to the fishing activity. Target species or gear used are often part of the key attributes for a fishery (e.g. Atlantic Northern Bluefin longline fishery.), but other attributes like vessel nationality, exploitation form or fishing season might be utilised (e.g. Senegalese industrial shrimp fishery).
- A set of thematic topics which document the inventoried unit. Depending on the topic, information is collected only as a text, or additionally by valuing specific qualitative attributes with standardized term or quantitative indicators (e.g. fleet size, annual catches, etc.).

Table 1 presents the key attributes and main thematic topics used for *Marine Resources* and *Fisheries*. Examples of qualitative attributes are provided in Table 2.

Table 1 – Key attributes and main reporting topics for the description of a marine resource or fishery.

Marine Resource	**Fishery**
Key attributes - Species or group of species - Area of distribution Main reporting topics - Habitat and Biology - Geographical distribution - Water Area Overview - Exploitation (fishery overview) - Biological Assessment - Management Overview - Biological state and trend	Key attributes - Fishing Area - Other key descriptor of the fishing activity Main reporting topics - Fishery area overview - Fishing activity (target species, gear, vessel, etc.) - Harvested resource - Production system - Socio-economic assessment - Post-harvest use - Management - Status and trends

Table 2 – Standardized attributes for the description of a Fishery fishing ground.

Attribute	**List of possible values**
Climatic Zone	Polar, Temperate, Tropical
Depth Zone	Coastal Shelf, Slope Abyssal, Seamount
Bottom type	Soft bottom, Seagrass, Hard bottom, Coral reef
Horizontal Distribution	Estuarine, Littoral, Neritic, Oceanic
Vertical Distribution	Demersal/benthic, Pelagic

The geographic component

Geo-referencing of information is a key point of the inventory of fisheries (fishing area) and marine resources (distribution area). The FIGIS system includes referencing and mapping tools of the geographical systems used by the data providers (e.g. spatial management units used by RFBs, global systems like EEZs, FAO statistical areas, Large Marine Ecosystems, etc.).

2.2.3. Inventory format and modelling of relationships between inventoried units

Both marine resources and fisheries can be defined at various geographical scales or levels of aggregation. At regional or national scales, the number of marine resources or fisheries inventoried may vary according to the level of aggregation. The basic principle of the inventory is that a marine fishery or a resource is included as long as it is recognized as a specific operational unit for monitoring, management or other purposes.

Hierarchies

In many situations, it is found that different sets of criteria might be successively applied to decompose *fisheries* into sub-fisheries: each partitioning stage is usually driven by a distinct thematic approach and the resulting set of fisheries constituting the inventory is organised in a hierarchical tree (see Table 3).

Table 3 - Example of hierarchical relationship between three inventoried fisheries.

Geo-reporting standpoint	Fishery Name	Thematic approach
Mexico	Shrimp fishery - Pacific Ocean	Resource
Mexico	Industrial Shrimp fishery - Pacific Ocean	Production system
Mexico	Artisanal Shrimp fishery - Pacific Ocean	Production system

Overlaps

Following the principal that any fishery or marine resource used as a unit by stakeholders has a place in the inventory, it may occur that two units overlap. For example, the inventory might include two distinct fisheries targeting the same resource or operated by vessels belonging to the same fleet. This is notified in the inventory by cross-referencing the fisheries under a specific attribute "Related Fisheries".

Relationship between marine resources and fisheries inventories

A given resource or stock may be exploited by many fisheries (e.g. a longline and a purse seine fishery may both exploit Yellowfin tuna), and a single fishery may exploit many stocks at the same time (e.g. multi-species trawl fisheries). The template used for the inventory includes the possibility to set relationships between marine resources and fisheries

2.3. Data entry, management and dissemination

Specific spreadsheet templates and guidelines have been designed for the inventories of marine resources and fisheries.

Once validated, data are imported into the FIGIS system. Each inventoried unit is assigned a unique identifier and referenced in the system. The information collected on each reference through the inventory is recorded as an “Observation” belonging to a data owner, with a reporting date. Under this model, further information may be provided on a referenced unit by adding new observations.

The FIGIS system has been designed to facilitate web-based data management and dissemination. The FIRMS partnership web site[2] is an example of the application of this technology. Marine resources inventoried by the member organizations might be retrieved through a query panel or through a tree browser (see Figure 1). The information collected on each inventoried unit is visualized through a standardized “fact sheet” (see Figure 2). On-line data editing is also possible, with access restricted to the data owners.

[2] http://firms.fao.org

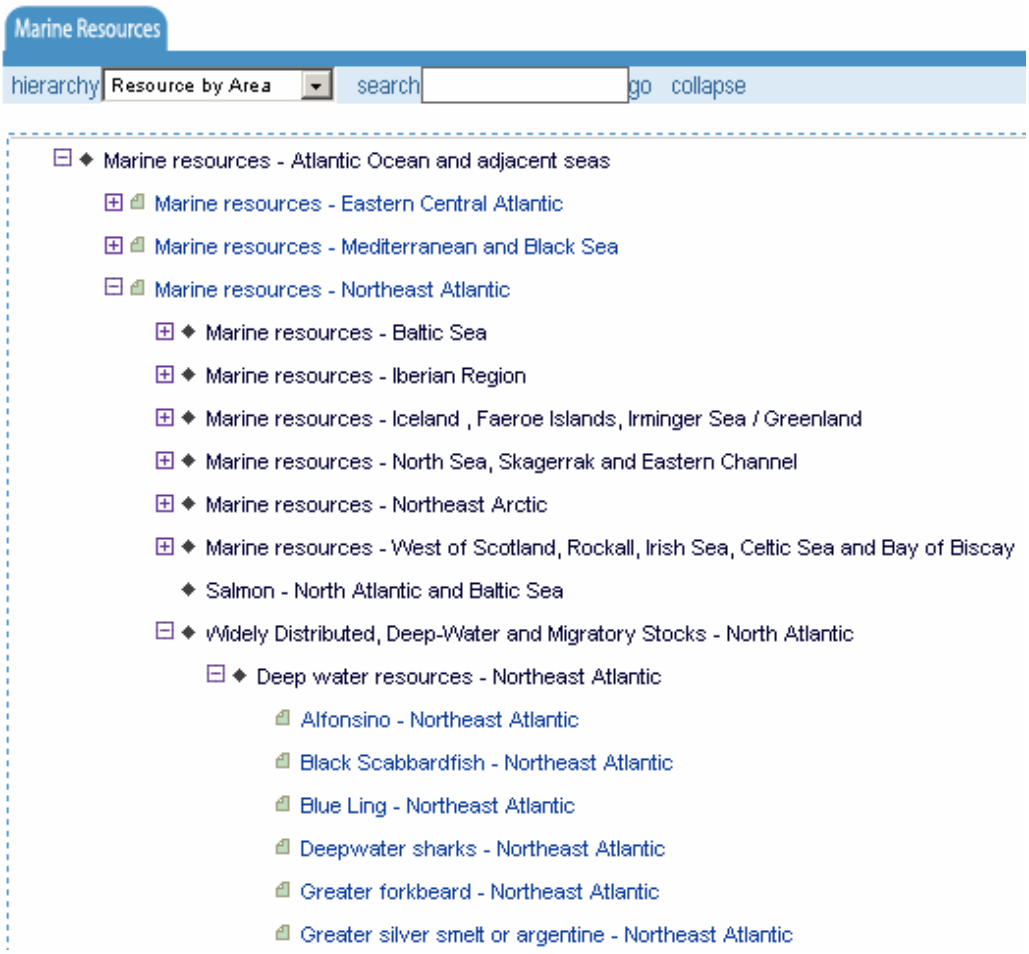


Figure 1 – FIGIS component: the FIRMS Marine Resources Inventory browser.

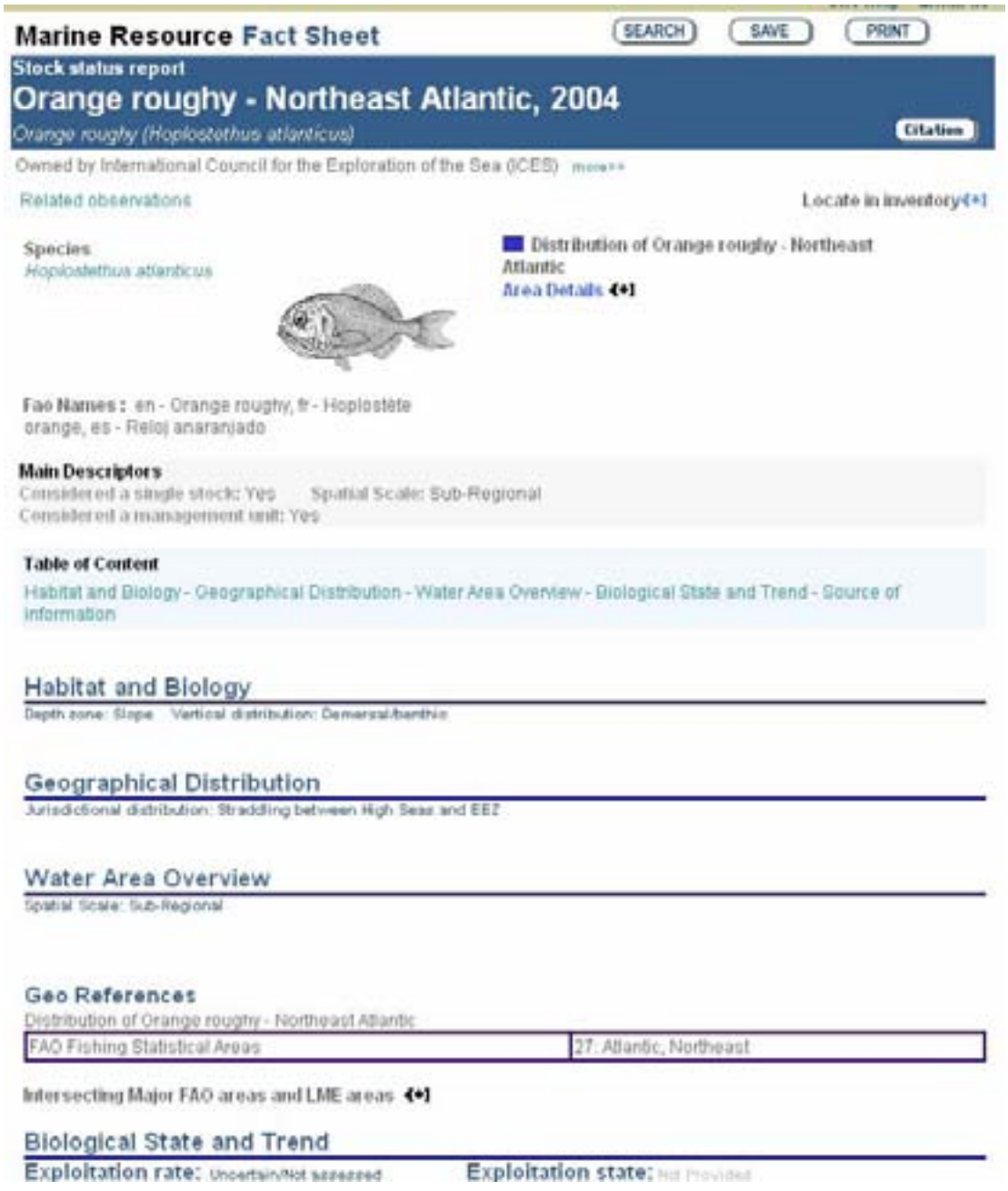


Figure 2 – FIGIS component: the FIRMS Marine Resource Fact Sheet.

2.4. Implementation process and status regarding high seas deepwater fisheries

The global inventory of marine resources and fisheries has been initiated by the FAO Fisheries department through three main channels for data collection:

- inventories performed by FIRMS partners, including FAO regional fishery bodies (e.g. CECAF);
- inventories resulting from a direct collaboration established between FAO and national or regional organizations (e.g. Bureau of Rural Sciences in Australia, National Marine Fishery Service in the USA); and
- regional inventories elaborated by FAO consultants. This third category concerns essentially developing countries where the FishCode STF project is implementing some activities related to the improvement of fishery data collection systems. A preliminary inventory is first elaborated by the project, based on the literature and other internet resources available. National or regional consultants are hired in a second step to revise and complete the inventory. Inventories are finally validated by FAO experts.

The inventory of high seas deepwater resources overlap with these three sources, but will require a complete review. In particular:

- In the latter stage, inventories made by FIRMS partners mainly focus on marine resources, but not fisheries, except in a few regions (ICES in the North East Atlantic, CCAMLR is the Southern Seas).
- FIRMS partnerships don't have global coverage for deepwater resources (see Figure 3).
- Many high seas deepwater fisheries are marginal, sometimes not managed and might not have been identified or well documented in the inventories completed at that stage.
- Most of the inventories covered by the FishCode STF project concern developing countries. Even if many of these countries do have fisheries targeting straddling deep-sea resources, they are not the main states concerned by the exploitation of high seas deepwater discrete fish stocks.
- Until now, inventories of fisheries undertaken by FAO have concentrated on current active fisheries, and might not include the past deepwater fisheries which were not sustainable and are no longer active.
- Many high seas deepwater fisheries are unmanaged and unregulated, and consequently under documented.

Figure 3 - Competence areas of the current FIRMS partners (excluding Tuna commissions).

3. ROADMAP FOR THE INVENTORY OF HIGH SEAS DEEPWATER RESOURCES AND FISHERIES

The FAO global inventory of marine resources and fisheries offers a valuable framework for the inventory of high seas deepwater resources and fisheries, in terms of methodology, but also data already collected and tools for data management and dissemination.

The main data sources to be considered would be:

- Fisheries science literature
- Fisheries and marine resources already included in the FAO global inventory
- Deepwater resources databases
- Seamount information systems
- Geo-referenced information: EEZs, bathymetry (see Figure 4)
- FAO fisheries country profiles
- FAO catch statistics database
- FAO database on discards
- The High Seas Vessels Authorization Record (HSVAR)
- FISH INFO network and FAO Globefish database (trade information)
- Regional Fishery Bodies (e.g SEAFO)
- Administrations of fishing nations (fisheries, coast guards, etc.)
- The fisheries industry (e.g. International Coalition of Fishery Associations, ICFA)
- NGOs (e.g. IUCN, WWF, Greenpeace, etc.)

This activity could be coordinated by the FAO project "Promotion of sustainable fisheries: support for the Plan of Implementation of the World Summit on Sustainable Development (II)" (GCP/INT/942/JPN) but would require some external financial support to cover:

- data management and dissemination of the inventory under the FIGIS system, and
- services of national/regional experts to validate the inventories

A regional approach is recommended for this inventory. Particular attention should be put on the collection of the status of each fishery and other quantitative indicators like the fleet size and annual catches.

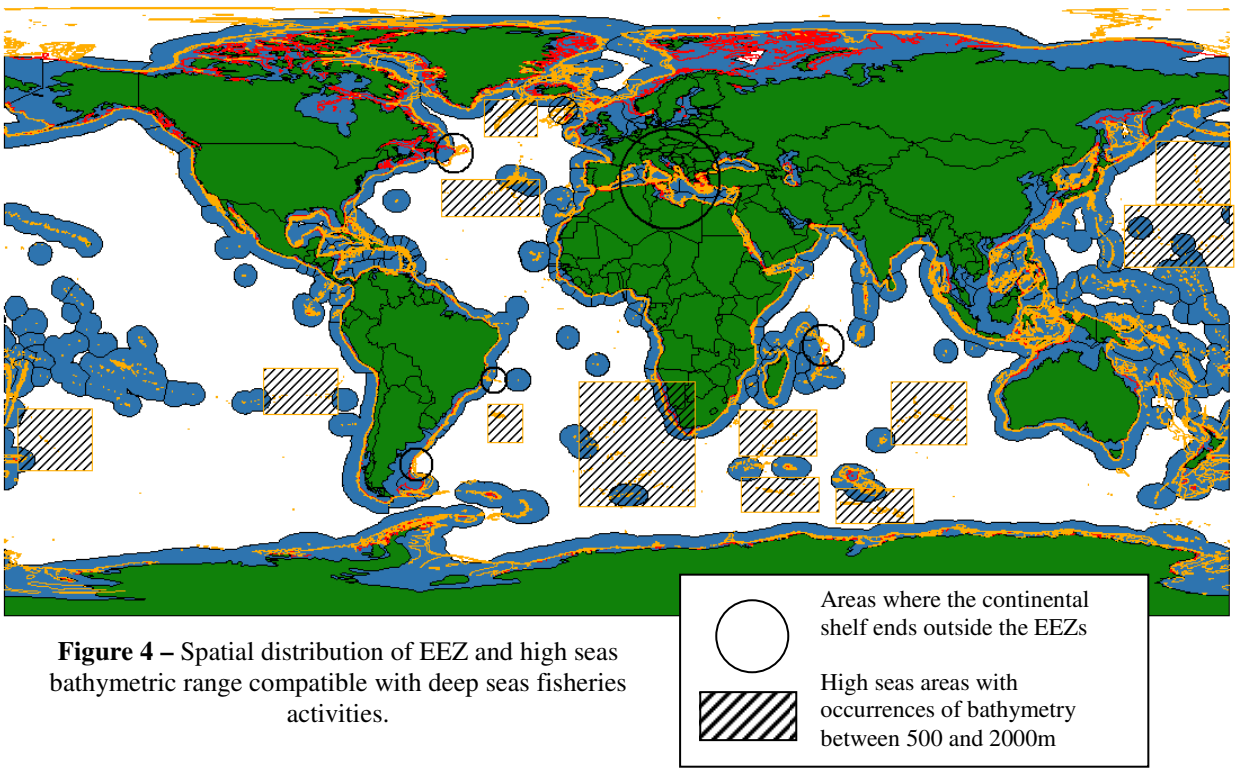


Figure 4 – Spatial distribution of EEZ and high seas bathymetric range compatible with deep seas fisheries activities.

REFERENCES

FAO. Report of the twenty-sixth session of the Committee on Fisheries. Deep-sea fisheries. Rome, 7-11 March 2005. *FAO Fisheries Report*. No. 780. Rome, FAO. 2005. 88p.

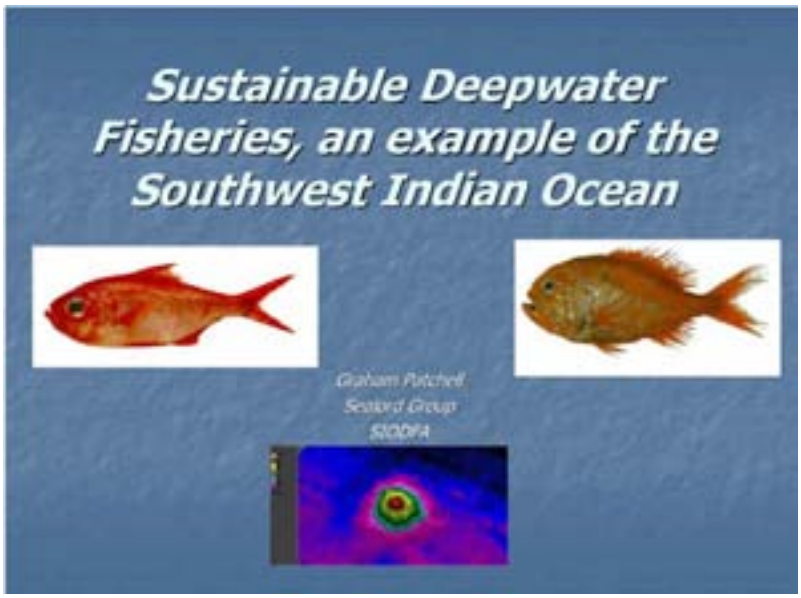
FAO. Report on DEEP SEA 2003, an International Conference on Governance and Management of Deep- Sea Fisheries. Queenstown, New Zealand 1–5 December 2003. *FAO Fisheries Report*. No. 772. Rome, FAO. 2005. 84p.

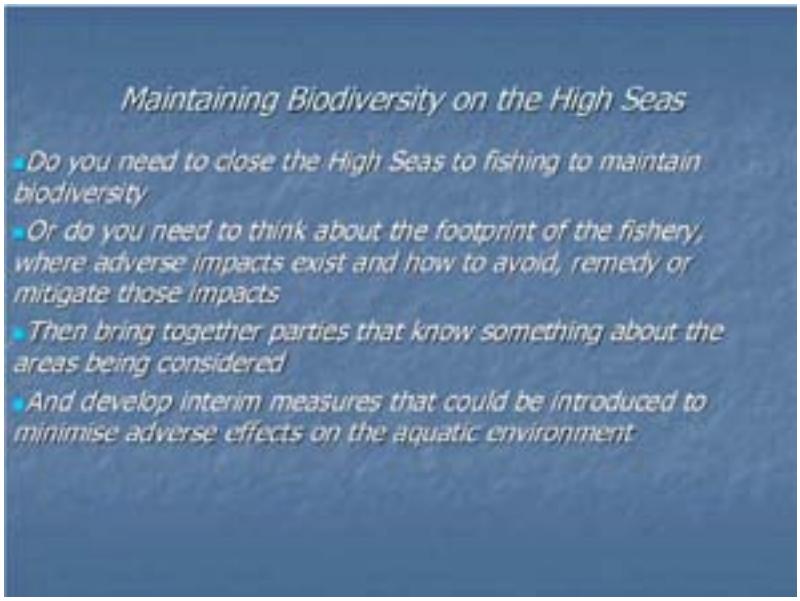
FAO. Strategy for Improving Information on Status and Trends of Capture Fisheries. Stratégie visant à améliorer l'information sur la situation et les tendances des pêches de capture. Estrategia para mejorar la información sobre la situación y las tendencias de la pesca de captura. Rome/Roma, FAO. 2003. 34p.

APPENDIX 2B: PRESENTATION ON BENTHIC PROTECTED AREAS IN THE SOUTHWEST INDIAN OCEAN

by

Graham Patchell, Sealord Grp, SIODFA



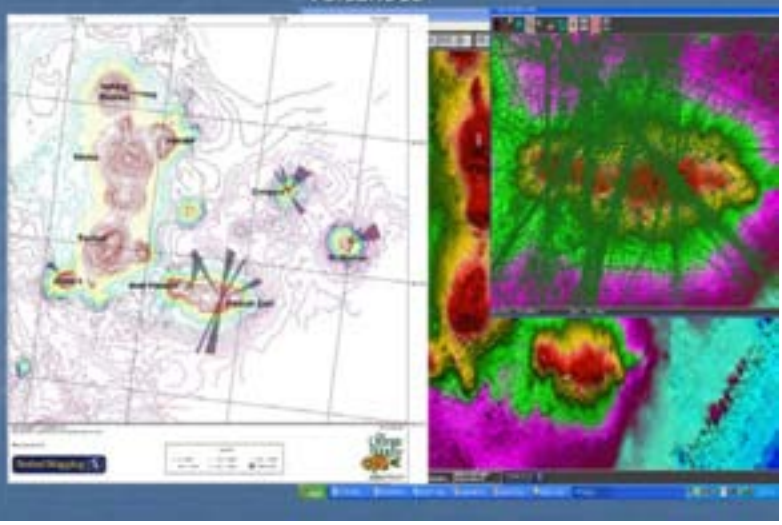


What does a seamount look like, where can you trawl?

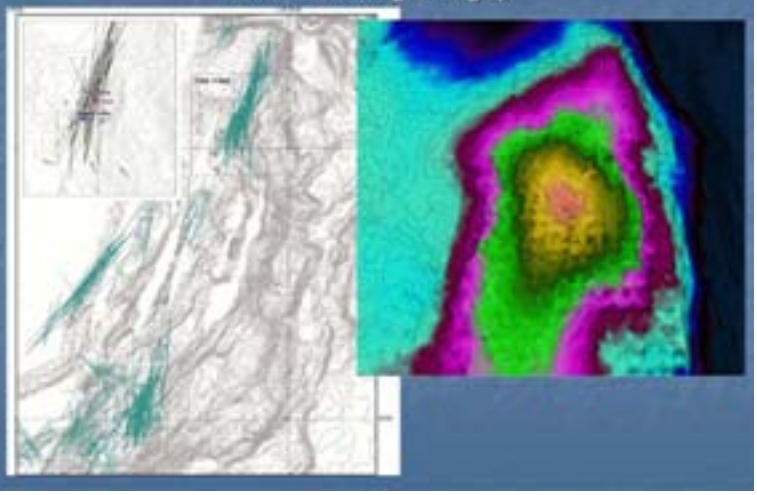
How much of the habitat is really fished on with bottom trawls?

- Within existing RFMO's on the high seas
  - Large areas
- Within EEZ's
  - Northern Hemisphere substantial
  - Southern Hemisphere much less
- South Hemisphere High Seas?
  - Less than 1% trawled on

Example, the New Zealand Eastern Chatham Rise Volcanoes



Or Ritchie Hill, New Zealand, with a catch over 80,000 tonnes of orange roughy



The Current Indian Ocean Fishery 2006

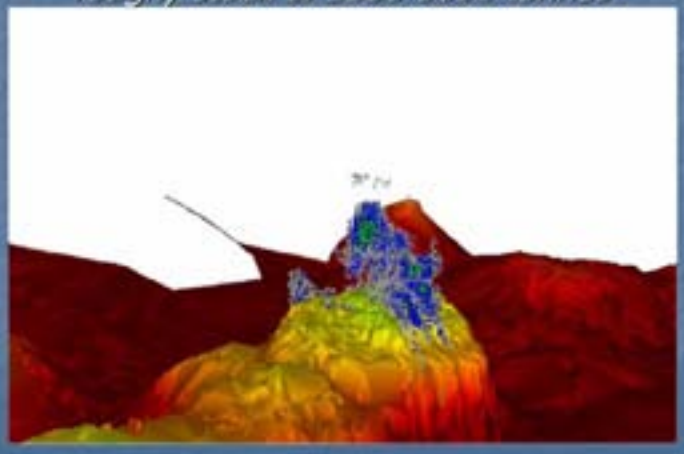
- 4-5 trawlers in the deepwater fishery during 2003-2006.
- Unsubsidised, mixed species fishery, deepwater species bottom trawling and midwater trawling for alfonsino and boarhead.
- Most operators in the fishery failed, (more than 40 vessels in 2000) the stocks did not!
- Our research indicates the fishery is sustainable at current effort levels. Highly valuable IP, in an unregulated fishery.


FISHING NEWS International

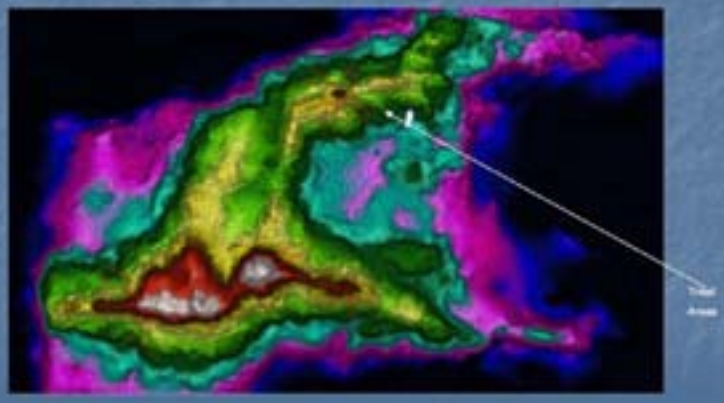
UTZON

ROUGHY BONANZA IN INDIAN OCEAN

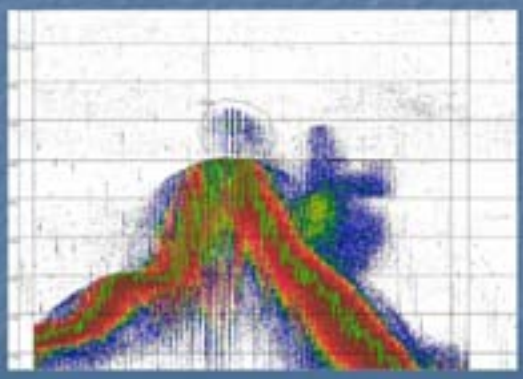
Sustainable Fisheries- an unfishable orange roughy stock of 3000-5000 tonnes



Heavily fished seamount on Southwest Indian Ridge



Sustainability? 2006 status 50%Bo

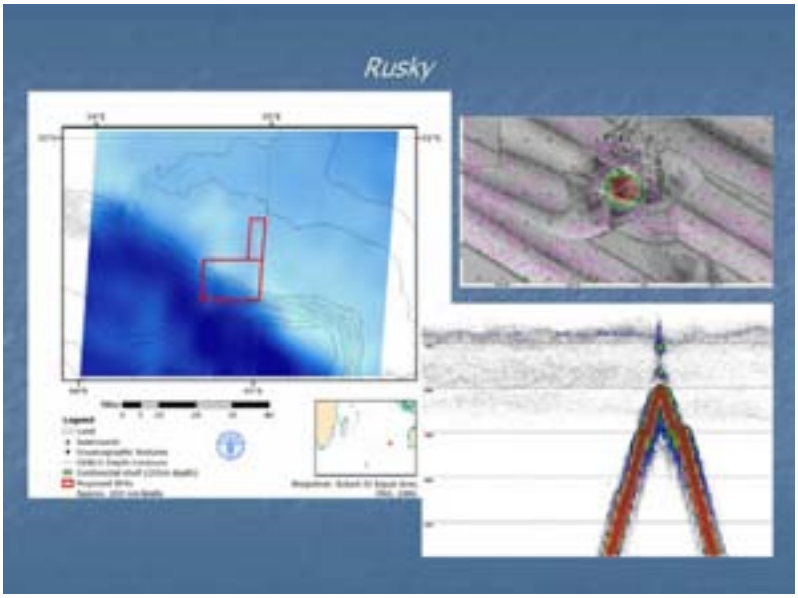


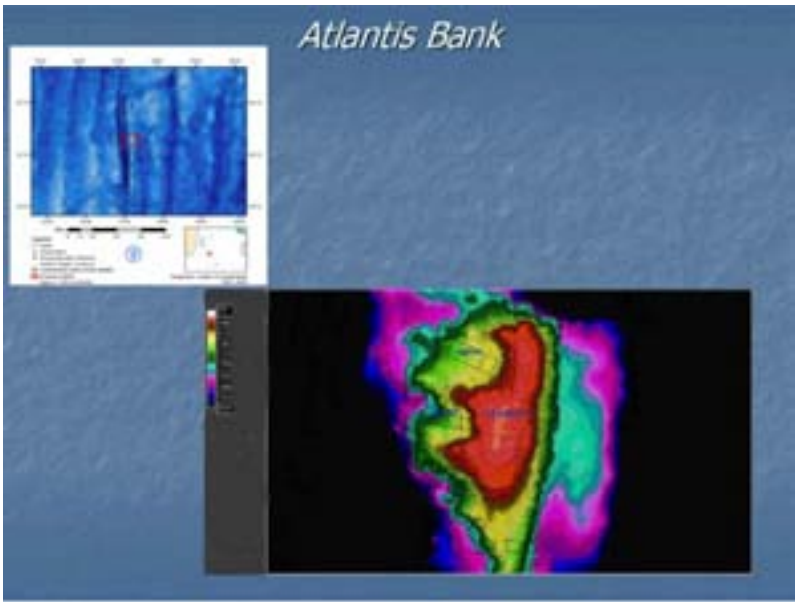
South Indian Ocean Benthic Protected Areas

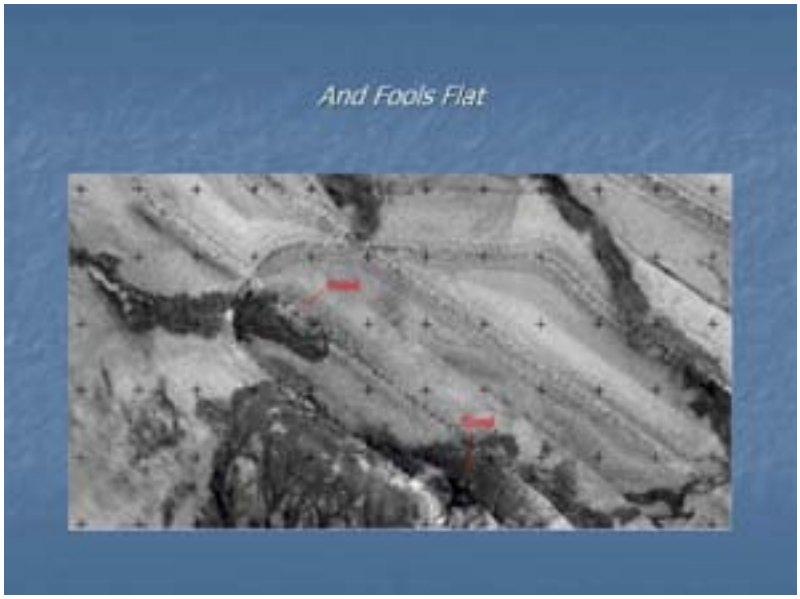
What are they?

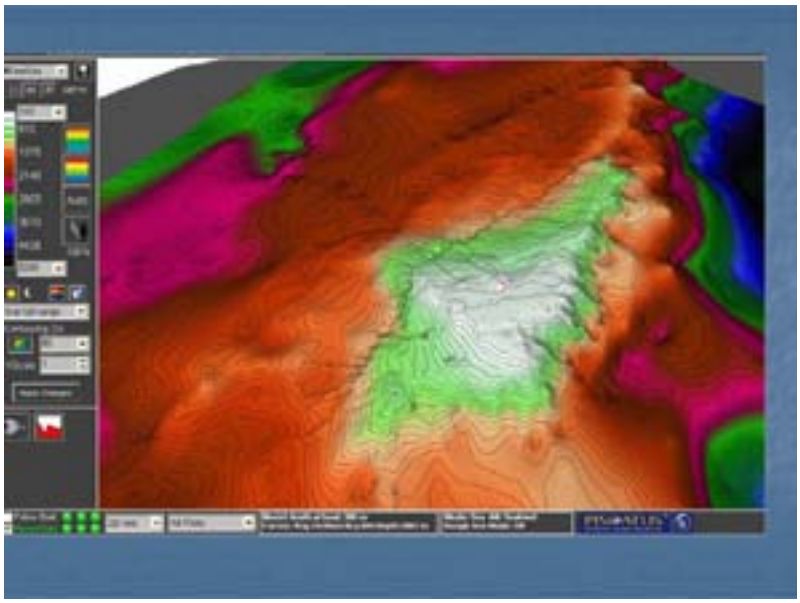
- Regions where bottom trawling and dredging is prohibited.
- BPAs provide for the maintenance of representative benthic habitats for the preservation of biodiversity.
- Midwater trawling may be permitted: SIODFA members have agreed that no trawling (mid-water or demersal) will occur in SIODFA BPAs.
- SIODFA cannot talk for other users.

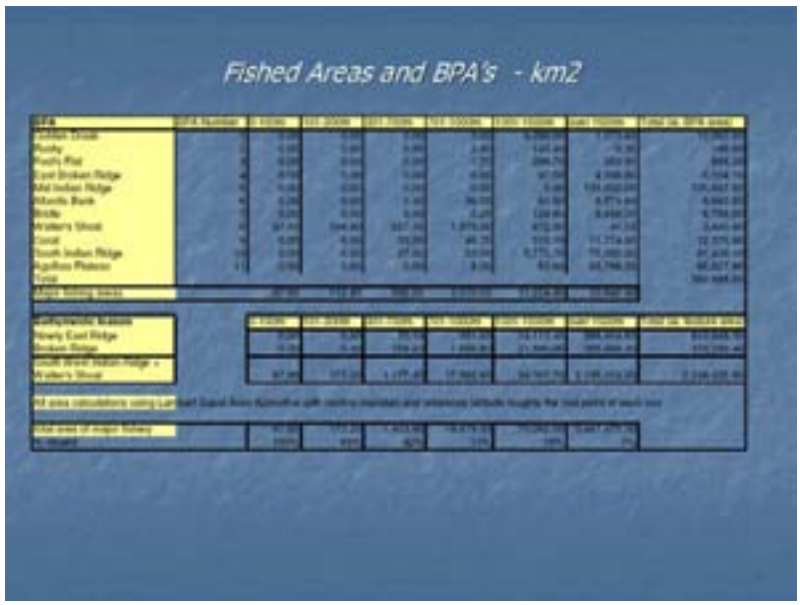

SIODFA Benthic Protected Areas


Rusky


Atlantis Bank


And Fools Flat




Fished Areas and BPA's - km2

SIODFA and Resource Management

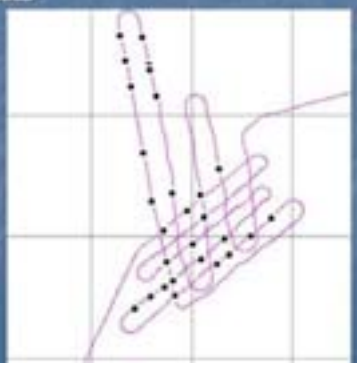
- BPA's must be complemented by effective resource management
  - Fisheries data collection
  - Database compilation
  - Data analysis
  - Provision of resource management advice
  - Annual management plans
  - Compliance

Extensive swath mapping of habitat 1996, 2001

SIODFA Members have undertaken extensive research activities since 1996 in the Indian Ocean

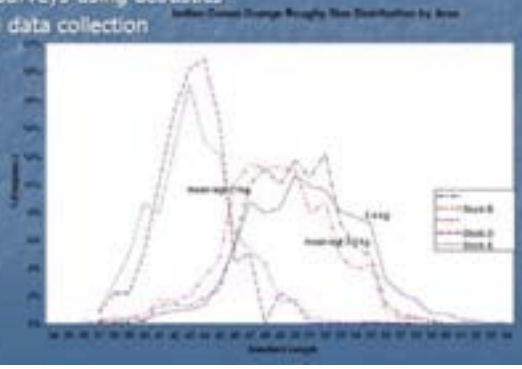
- Swath mapping of habitat
- Biomass surveys using acoustics

Stock Assessment using commercial vessel acoustics and Splash surveys



SIODFA Members have undertaken extensive research activities since 1996 in the Indian Ocean

- Swath mapping of habitat
- Biomass surveys using acoustics
- Biological data collection



2006 SIODFA Research programme for all vessels in the fishery

Adopted by all SIODFA operators for the 2006 season.

- **Manuals provided to vessels include:**
  - **Acoustic data logging protocols**
  - **Biological Sampling of Orange Roughy**
  - **Coral reporting form**
  - **Shark reporting form**
- **Briefing of all skippers and factory managers in the fishery**

APPENDIX 2C: PRESENTATION ON CONSERVATION OF MEDITERRANEAN DEEP-SEA ECOSYSTEMS

by

François Simard, The World Conservation Union (IUCN)

IUCN
The World Conservation Union

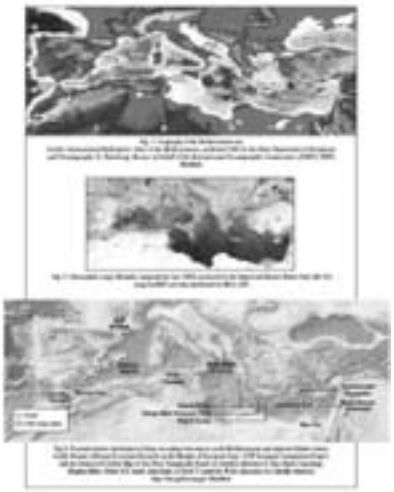
Conservation of the Mediterranean Deep-sea Ecosystems

François Simard
Marine Programme Coordinator
Advisor for Fisheries and Maritime Affairs

IUCN Center for Mediterranean Cooperation
IUCN Global marine Programme

FAO Expert Meeting on Deep-sea Fisheries, 21-13 November

IUCN
The World Conservation Union

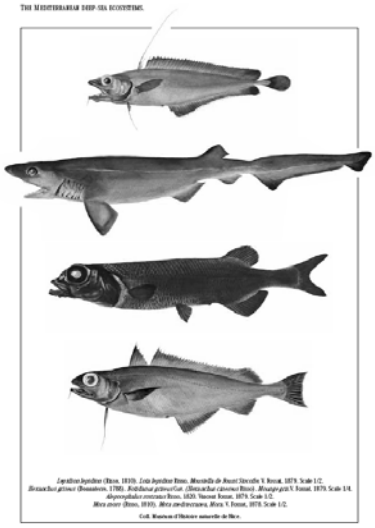


1- What is the Mediterranean deep sea ?

- ► An almost closed sea (few exchanges with the ocean, very slow vertical water circulation).
- ► Important depth down to 3000 m. in the western basin and 5000 m. the eastern basin.
- ► A constant temperature of 12°C due to its peculiar geology formation (depths in the oceans are around 2-3 °C).
- ► High biodiversity and endemism rates
- ► A number of special features: sea mounts, submarine canyons, cold seeps, brine pools, cold water corals.
- ► A large High sea (80 % of the whole) due to non declaration of EEZ by riparian states.

FAO Expert Meeting on Deep-sea Fisheries, 21-13 November

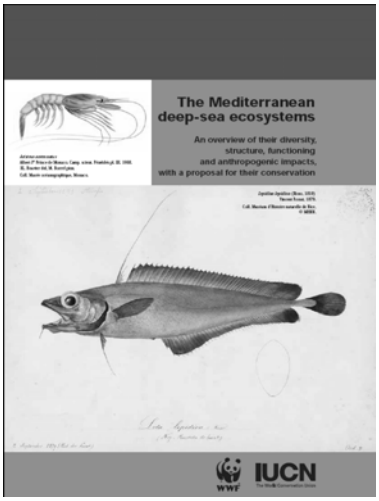
IUCN



2- What is the issue ?

- Very poor knowledge of the ecosystems and of the biodiversity (according experts 5-7% of the existing ecosystems are described).
- Increasing pressure from fisheries. Since most Med fisheries are small scale and traditional, deep sea fisheries are not developed for the time being.
- Increasing land based pollution, and accumulation of debris and toxic products on the bottom due to rivers and sea currents.
- Still poor international cooperation in the High seas.

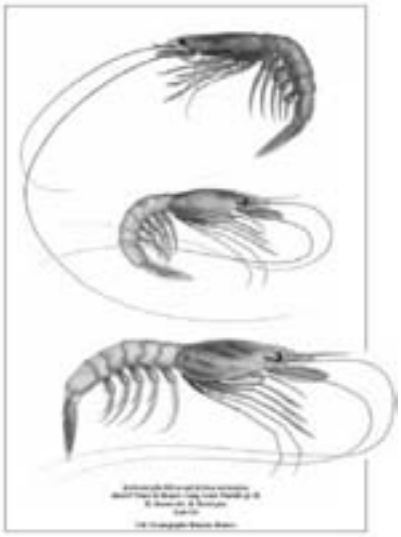
IUCN



3. IUCN action

- Conducting a study in cooperation with IUCN members and partners
  - WWF Mediterranean Programme,
  - Marine Sciences Institute of Catalonia
- Presenting the results and conducting consultation with the relevant organisations
  - International Commission for the Scientific Exploration of the Mediterranean Sea -CIESM-,
  - Scientific Advisory Committee of the General Fisheries Commission for the Mediterranean -GFCM-
- Presenting the two proposals to the relevant international bodies
  - European Commission, Fisheries Directorate;
  - General Fisheries Commission for the Mediterranean – GFCM-

IUCN
The World Conservation Union

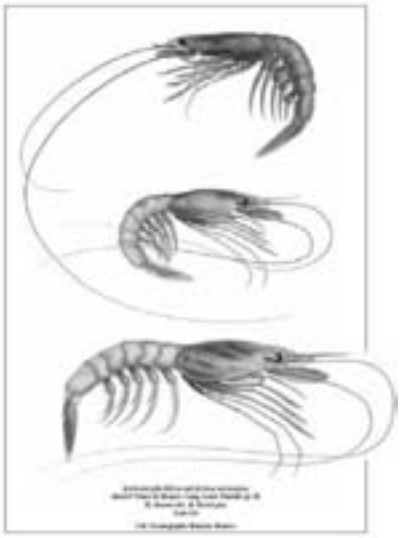


4. Conclusions of the report

The proposal presented in detail in the document is structured on two levels:

- A general approach based on preventing an extension of fishing practices beyond 1000 m. depth as a precautionary measure, by seeking the agreement of stakeholders and implementing the CBD recommendations, and
- A site-based approach aiming at the creation of a network of Marine Protected Areas encompassing unique habitats, such as submarine canyons, cold seeps, brine pools, deep-water coral reefs and seamounts

IUCN
The World Conservation Union



4. Why 1000 metres?

- No fisheries are developed deeper than 1000 metres
- Few populations of commercial value below this depth
- Presence of interesting biological communities below this depth
- Important concentration of juvenile shrimps

IUCN
The World Conservation Union


IUCN

Mediterranean Conservationists and Fishermen Work Together to Protect Deep Seas

5. Results

At its 29th session, in Roma, the GFCM discuss one of the proposal of the IUCN/WWF reports and considering its importance and validity:

- *ADOPTS*, in conformity with the provisions of Article V of GFCM Agreement that :The Members of the GFCM shall prohibit the use of towed dredges and trawl nets fisheries at depths beyond 1000 m of depth.

IUCN
The World Conservation Union

RECOMMENDATION GFCM/2006/3
ESTABLISHMENT OF FISHERIES RESTRICTED AREAS IN ORDER TO PROTECT THE DEEP SEA SENSITIVE HABITATS

The General Fisheries Commission for the Mediterranean (GFCM),

ADOPTS, in conformity with the provisions of paragraph 1 (b) and (h) of Article III and Article V of the GFCM Agreement that :

1. Fishing with towed dredges and bottom trawl nets shall be prohibited in the areas bounded by lines joining the following coordinates:

2. For the same areas, Members shall call the attention of the appropriate authorities in order to protect these areas from the impact of any other activity jeopardizing the conservation of the features that characterize these particular habitats.

a) Deep Sea fisheries restricted area "Lophelia reef off Capo Santa Maria di Leuca"
39°19.08' N18°41.04'E
39°47.34' N18°58.80'E
39°42.24' N18°33.00'E
39°13.80' N18°31.44'E

b) Deep Sea fisheries restricted area "The Nile delta area cold hydrocarbon seeps"
31° 30.00' N, 33° 10.00' E
31° 30.00' N, 34° 00.00' E
32° 00.00' N, 34° 00.00' E
32° 00.00' N, 33° 10.00' E

c) Deep Sea fisheries restricted area "The Eratosthemes Seamount"
33° 00.00' N, 32° 00.00' E
33° 00.00' N, 33° 00.00' E
34° 00.00' N, 33° 00.00' E
34° 00.00' N, 32° 00.00' E

IUCN
The World Conservation Union

6. Next steps

- Continuing to support research efforts on Mediterranean deep sea ecology, and disseminating results and info
- Pursuing the second proposal of the IUCN/WWF study: the creation of a network of MPA encompassing deep sea unique habitats
- Documenting the sites and proposing to the concerned states a conservation status
- Strengthening the existing experts network in supporting the WCPA Marine Mediterranean Specialist Group
- Organising discussion forums for improvement of Mediterranean High sea governance

Deep-sea fisheries, as a result of technological development and market demand, are, in many areas, being exploited at increasingly unsustainable rates and, in some cases, with considerable damage to benthic habitats. This has lead to increasing concern on the part of many States over the conservation, management and governance of deep-sea fisheries.

The Expert Consultation on Deep-sea Fisheries in the High seas sought to further address issues in deep-sea fisheries and was held in Bangkok, Thailand, from 21 to 23 November 2006. The Consultation built off the results and request of other international fora such as the DEEP SEA 2003 and the FAO Committee on Fisheries. Presentations and discussion revolved around four main aspects of deep-sea fisheries in the high seas, including: the overall resource, management of the resource, legal issues and high seas marine protected areas.

ISBN 978-92-5-105822-0 ISSN 0429-9337

9 789251 058220

TR/M/A1341E/1/10.07/1500