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GENERAL FISHERIES COMMISSION FOR THE
MEDITERRANEAN

COMMISSION GÉNÉRALE DES PÊCHES POUR
LA MÉDITERRANÉE



**GENERAL FISHERIES COMMISSION FOR THE
MEDITERRANEAN**

SCIENTIFIC ADVISORY COMMITTEE

Tenth Session

Nicosia, Cyprus, 22-26 October 2007

**REPORT OF THE NINTH SESSION OF THE SUB-COMMITTEE
ON STOCK ASSESSMENT (SCSA)*
Kavala, Greece, 17–20 September 2007**

*** Available only in English**

1. OPENING OF THE MEETING

1. The ninth meeting of the Sub-Committee on Stock Assessment (SCSA) of the Scientific Advisory Committee (SAC) was held in Kavala, Greece, from 17 to 20 September 2007. It was attended by 22 experts from 12 countries. The list of participants is provided in Appendix B.

2. ADOPTION OF THE AGENDA

2. The agenda of the meeting was adopted with minor changes (Appendix A).

3. The meeting was chaired by Ms Constantina Karlou-Riga, Coordinator of the SCSA. Mr Henri Farrugio acted as rapporteur.

3. REVIEW OF THE SCIENTIFIC MANAGEMENT ADVICES

3.1. Conclusions and scientific advice addressed by the Working Group on Demersals

4. The report of the Working Group on Demersals was presented and discussed. This included assessments for 13 stocks covering 8 Geographical Sub-Areas (GSAs), 8 species, and 1 shared stock (Appendix C). Two types of documents were presented: (i) assessment documents and (ii) assessment related documents.

3.1.1 Demersal assessment documents.

5. The Sub-Committee reviewed and endorsed the conclusions and recommendations presented in 11 assessment documents as follows :

- Document n° 1: Assessment of Deep-water pink shrimp *Parapenaeus longirostris* from the trawl fishery off the geographical sub-area Northern Spain GSA - 06. J. L. Pérez-Gil, M. García-Rodríguez, A. Esteban , E.Barcala and N.Carrasco.

Description of fishery: Deep-water pink shrimp (*Parapenaeus longirostris*) is one of the most important crustacean species for the trawl fisheries developed along the GFCM geographical sub-area Northern Spain (GSA-06). This resource is an important component of commercial landings in some ports of the Mediterranean Northern Spain and occasionally target specie of the trawl fleet, around 260 vessels, which operate on the upper slope. During the last years, a sharp increase in landings was observed, starting in 1998 and reaching the maximum value in 2000, followed by a decreased trend during the period 2001-2006. In 2006 the annual landings of this species amounts at 51 tons in the whole area, which it has been the lowest value of the historical series.

Source of management advice: The state of exploitation was assessed for the period 2001-2006 for the GSA 06. A VPA tuned with standardised CPUE from commercial fleet and abundance indices from two trawl surveys, was carried out applying the Extended Survivor Analysis (XSA) method (Lowestoft program; Darby and Flatman, 1994) and FLR software (Fisheries Libraries in R) over the period 2001-2006. Both methods were performed from size composition of trawl catches (obtained from on board and on port monthly sampling) and official landings, transforming length data to age data by slicing (L2AGE software). Available CPUE data series, both of commercial fisheries, from Santa Pola fleet and scientific surveys (MEDITS, LEDER) were used.

Exploitation rate: Moderate fishing mortality

Stock abundance: Low abundance

Comments by the WG: In some sectors of the W Mediterranean the presence of *P. longirostris* in some years is scarce. This can be attributed to intrinsic population behaviour of the species probably linked to meso-scale oceanographic processes. Also *P. longirostris* population structure is very dependent on variation in recruitment success. In this assessment, all parameters of the resource status are the lowest values in the series. The current values of the assessment show lower values than 5 years ago. (R=2%, Total Biomass=8%; SSB=9%). The data series is too short to decide if the stock is depleted or not.

6. **SCSA Comments:** The Sub-Committee expressed its concern for the low levels of recruitment of the total biomass and of the spawning stock biomass of the Deep-water pink shrimp *Parapenaeus longirostris* from the trawl fishery off GSA 06. However, the Sub-Committee was not in a position to address whether this low abundance is due to the fishing effort or not.

7. It is advisable to exploit this stock in a more selective way to avoid overexploitation of juveniles.

- Document n° 2: Stock assessment of red shrimp (*Aristeus antennatus*) exploited by the Spanish trawl fishery (1996–2006) in the Geographical Sub-Area 06 (Northern Spain). M. García-Rodríguez, J. L. Pérez-Gil, A. Esteban, N. Carrasco and A. Carbonell.

Description of fishery: Throughout the time series landings fluctuated between 300 and 400 tonnes, decreasing below 300 t along the late 1990s. From 2002 landings recover the initial values over 300 tonnes. Females predominate in the landings nearly 80% of the total. Discards of the red shrimp are null. The number of harbours with red shrimp fleets is 14 for the whole area. The estimated effort figures was made based on daily vessels sale sheets information obtained through the National Sampling Programme available for the Santa Pola fleet. The CPUEs fluctuated around long-term average of 30 Kg/day. Effort data indices (Landings/CPUE) remain fairly stable.

Source of management advice: The state of exploitation was assessed for the period 1992–2006 by means of a VPA Separable, tuned with standardised CPUE from commercial fleet and abundance indices from MEDITS trawl survey. Analysis was carried out applying the Extended Survivor Analysis (XSA) method (Lowestoft suite; Darby and Flatman, 1994; Fisheries Library in R) over the period 1992–2006. In addition, a yield-per-recruit (Y/R) analysis (VIT program; Leonart and Salat, 1992) was applied on the mean pseudo-cohort 1992–2006 for the GFCM geographical sub-area Northern Spain (GSA-06). Both methods were performed from size composition of trawl catches (obtained from on board and on port monthly sampling) and official landings transforming length data to age data by slicing (L2AGE program).

Stock status: Overexploited. The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse.

Exploitation rate: High fishing mortality

Stock abundance: Low abundance

Comments by the WG: Total biomass of the stock has fluctuated around 800 t, in a similar way as SSB does around 500 t. The SSB-R relationship also shows a decreasing trend, with some stability around the R_{max} ($40 \cdot 10^9$ ind.) with recruitments showing a slight tendency to increase. Abundance indices show a slight recovery on 2006. Forecast at status quo shows no changes in SSB and yields, indicating a recruitment dependency. The resource was considered over exploited, with some indications of growth overexploitation, and with B and SSB below the mean values. By comparing to previous assessments, a new set of growth parameters has been used.

8. **SCSA Comments:** It is compulsory not to increase the fishing effort from the level reported in the assessment forms (8942 fishing days for a fleet of 130 vessels) being recommended a reduction of 10% to recover SSB of red shrimp (*Aristeus antennatus*) exploited by the Spanish trawl fishery (1996–2006) in GSA 06. Considering that a substantial part of the catches are immature individuals an improvement of the selectivity (use of 40mm square mesh) could be efficient.

- Document n° 3: Stock assessment of striped red mullet (*Mullus surmuletus*) off the GFCM-GSA 05 (Balearic Islands). A. Quetzglas, M. Valls, F. Ordines, B. Guijarro, E. Massuti and J. Moranta.

Description of fishery: Striped red mullet (*Mullus surmuletus*) is one of the most important target species in the trawl fishery developed by around 40 vessels of Mallorca (Balearic

Islands, GFCM-GSA05). A fraction of the small scale fleet (~100 boats) also directs to this species during the second semester of the year, using both trammel nets and gillnets. During the last decade, the annual landings of this species have oscillated between 73-117 and 17-29 tons in the trawl and small-scale fishery, respectively.

Source of management advice: The stock of *Mullus surmuletus* of the GFCM-GSA05 has been assessed using data from both the trawl and the small-scale fishery on a time series covering seven years (2000-2006). The assessment has been carried out applying tuned VPA (Extended Survivor Analysis, XSA) on the cohorts present during 2000-2006 and both VPA and Y/R analysis on a mean pseudo-cohort from that period. These approaches were performed using monthly size composition of catches, official landings and the biological parameters estimated within the framework of the Data Collection Programme (2003-2004). The VPA was tuned with CPUE from commercial trawl fleet (2000-2006) and bottom trawl surveys (2001–2006). The vector of natural mortality by age was calculated from Caddy's (1991) formula, using the PROBIOM Excel spreadsheet (Abella et al., 1997). The software used was the Lowestoft VPA program (Darby and Flatman, 1994) for the XSA and the VIT program (Leonart and Salat, 1992) for the VPA and Y/R analysis from a mean pseudo-cohort.

Stock status: Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;

Exploitation rate: Moderate fishing mortality

Stock abundance: Intermediate abundance

Comments from the WG: Current Y/R very close to the maximum and Bnow being 33.5% Bvirgin.

Management advice and recommendation: Not to increase the fishing effort especially for trawl. Trawl selectivity should be improved, in order to decrease catches of immature individuals. This will be achieved with the implementation of the 40 mm square mesh.

9. SCSA comments: the management advice and recommendations of the WG related to the striped red mullet (*Mullus surmuletus*) off the GSA 05 were endorsed by the Sub-Committee.

- Document n° 4: Actualisation de l'évaluation des stocks de rougets de roche (*Mullus surmuletus*) en Tunisie (GSA 12, 13, 14): mortalités et analyse de rendements par recrue. H. Gharbi, Sadok Ben Meriem and M. Cherif.

Abstract: Two independent stocks of red mullet in Tunisia were identified: one relative to the Northern and Eastern and the other to the Southern part. The two stocks were treated separately. The present study deals with demographic analysis of *Mullus surmuletus* in Tunisia by means of length composition of capture applied to the inshore trawl fishing from 2003 to 2005 the analysis of pseudo-cohort method is used and the results show that: The global fishing mortalities rate of the northern and eastern stocks were weak; while for the southern stocks, it is moderate. The exploitation's profile of north and east trawler and coastal fleet is orientated to mature fish; however, the southern trawlers catch essentially juveniles before reaching the optimal size exploitation. The increase of actual effort would lead to a long-term a positive effect in global yield for the northern and eastern stocks. As well, this increase of effort would have a negative effect on the spawning biomass. For the global stock the progressive decrease of actual fishing effort at 50 % would lead to on long term important amelioration in spawning biomass; while, a negative effect in landings. The northern and eastern stock of striped mullet are underexploited, while, the southern stocks are in optimum exploitation.

Stock status: The global fishing mortality rates of the northern and eastern stocks are low; while for the southern stocks, they are moderate. The exploitation's profile of north and east trawler and coastal fleet is orientated to mature fish; however, the southern trawlers catch mainly an important fraction of juveniles.

WG management advice and recommendation: Effort should not be increased.

10. SCSA comments: SCSA endorsed the WG management advice and recommendations on the striped red mullet (*Mullus surmuletus*) in GSAs 12, 13 and 14.

- Document n° 5: Stock assessment of hake (*Merluccius merluccius*) from the trawl fishery off the GFCM-GSA 05 (Balearic Islands). Guijarro, B., Ordines, F., Valls, M., Quetglas, A., Massutí, E. and Moranta, J.

Description of fishery: The information used for the assessment of the stock consisted in annual size composition of catches (estimated from monthly sampling), official landings and the biological parameters estimated from the Data Collection Programme (2003-2006). A tuned VPA, applying the Extended Survivor Analysis (XSA) method on the period 1980-2006 was carried considering the CPUE from commercial trawl fleet. The trawl fishery off Mallorca (Balearic Islands; GFCM-GSA05) is developed by around 40 vessels, which total annual landings are approximately 1400 tons. The European hake (*Merluccius merluccius*) is a target species for this fishery, mainly exploited on the deep shelf and upper slope, with annual landings oscillating between 50 and 190 tons during the last decades.

Source of management advice: The trawl fishery off Mallorca (Balearic Islands; GFCM-GSA05) is developed by around 40 vessels, which total annual landings are approximately 1400 tons. The European hake (*Merluccius merluccius*) is a target species for this fishery, mainly exploited on the deep shelf and upper slope, with annual landings oscillating between 50 and 190 tons during the last decades.

Exploitation rate: Moderate fishing mortality

Stock abundance: Intermediate abundance

Comments from the WG: None of the previous status agrees to the Y/R results, which indicated a slight growth overexploitation. Option O could be adequate ("The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion"), but not for the last sentence ("a higher risk of stock depletion/collapse"). Slight overexploitation, growth overexploitation.

Management advice and recommendation: To improve the trawl exploitation pattern and reduce the trawl effort (to use 40 mm square mesh size in the cod-end and a 20% reduction of time at sea. In the Balearic Islands, it has been assessed the change of current mesh type in the codend (40 mm diamond to 40 mm square mesh). For hake, it could produce an increase of length at first capture (from 11 to 15 cm, respectively), without a significant decrease in commercial yields.

WG advice for research: See general comment on biological parameters in section 7.

11. SCSA comments: SCSA endorsed the WG management advice and recommendations on hake (*Merluccius merluccius*) from the trawl fishery in GSA 05.

- Document n°6: Assessment of hake (*Merluccius merluccius*) in the GSA06 (Northern Spain). M. García-Rodríguez, J. L. Pérez-Gil, A. Esteban, E. Barcala and N. Carrasco.

Description of fishery: Hake (*Merluccius merluccius*) is one of the most important target species for the trawl fisheries developed by around 647 vessels along the GFCM

geographical sub-area Northern Spain (GSA-06). In last years, the annual landings of this species, which are mainly composed by juveniles living on the continental shelf, were situated around 3800 tons in the whole area.

Source of management advice: Hake (*Merluccius merluccius*) is one of the most important target species for the trawl fisheries developed by around 647 vessels along the GFCM geographical sub-area Northern Spain (GSA-06). In last years, the annual landings of this species, which are mainly composed by juveniles living on the continental shelf, were situated around 3800 tons in the whole area. The state of exploitation was assessed for the period 1992-2006 by means of a VPA Separable, tuned with standardised CPUE from commercial fleet and abundance indices from two trawl surveys. Analysis was carried out applying the Extended Survivor Analysis (XSA) method (Lowestoft suite; Darby and Flatman, 1994; Fisheries Library in R) over the period 1992-2006. In addition, a yield-per-recruit (Y/R) analysis (VIT program; Leonart and Salat, 1992) was applied on the mean pseudo-cohort 1992-2006 for the GFCM geographical sub-area Northern Spain (GSA-06). Both methods were performed from size composition of trawl catches (obtained from on board and on port monthly sampling) and official landings, transforming length data to age data by slicing (L2AGE program). Transition analysis was also made to simulate different management strategies for the improvement of the state of this resource. In this assessment, a new set of parameters (fast growth hypothesis) were considered and a natural mortality vector (PROBIOM, Caddy and Abella, 1999) was applied.

Stock status: Overexploited. The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse;

Exploitation rate: High fishing mortality

Stock abundance: Low abundance

Comments from the WG: The general results are similar to previous assessments. Exploitation is based mainly on classes 0 and 1, with immature fraction dominating the landings. On observe a decreasing trend, both in landings and yields along the studied period. On the contrary, Z shows an increasing trend, as well as F_{bar} , with this last decreasing from 2003 onwards. Current Y/R represents 83% of Y/Rmax, meanwhile B/R represents 30 % of the B/Rmax. Total biomass of the stock decreases slowly, being stabilised at around the 8 000 t. SSB-R relationships shows a decreasing trend. The Recruitments show a slight tendency to increase.

Management advice and recommendations: The WG recommended to:

- Reduce 20% effort of trawl;
- Improve fishing exploitation pattern using the 40 mm square mesh for bottom trawls;
- Not to increase the effort in the small-scale fishery.

12. **SCSA comments:** SCSA endorsed the WG management advice and recommendations on hake (*Merluccius merluccius*) in GSA 06.

- Document n° 7: Assessment of European hake with a variant of a non-equilibrium Biomass Dynamic Model using exclusively trawl surveys data (GSA 09 Northern Tyrrhenian). A. Abella.

Description of fishery: Not available

Source of management advice: In this study, a simple assessment approach based on a non-equilibrium surplus production model is applied for the European hake. Only fisheries independent data derived from trawl surveys performed in the frame of the MEDITS programme from 1994 and 2006 was utilised. The approach analyses time series of abundance index (kg/km²) and their correspondent total mortality rates Z in order to

estimate, through a dynamic fitting procedure, the parameters of a Schaefer's population growth model. It allows the definition of the levels of total mortality and fishing mortality rates that are likely to produce the Maximum Biological Production. The model does not assume equilibrium. Results are compared with those obtained through alternative approaches in the same area. Comparisons regard consistency in estimated parameters as well as in the assessments of the current status of exploitation of the species and expected evolution under different exploitation scenarios. Data of indexes of Biomass and demographic structure at sea derived from trawl surveys performed from 1994 to 2006 in the Southern Ligurian-Northern Tyrrhenian seas (project MEDITS) (Fig.1) were used for the fitting of a Schaefer non-equilibrium model.

Stock status: Results suggest a situation from fully exploited to overexploitation status. A light recovery has been observed in the last years following a modest reduction of the fleet and of the fishing pressure. The assessment refers just to an operational unit of the GSA 9, not to the entire area.

WG management advice recommendation: no management advice.

13. SCSA comments: SCSA endorsed the assessment of the European hake in GSA 09, with a variant of a non-equilibrium Biomass Dynamic Model using exclusively trawl surveys data.

- Document n° 8: A preliminary Stock Assessment of Monkfish (*Lophius budegassa* Spinola, 1807) from the trawl fishery off the geographical sub-area 06 (Eastern Spain, Santa Pola Port). E. Barcala, M.García, J. L. Perez-Gil, and N.Carrasco.

Description of fishery: The characteristic of the trawl fleet change depending on where they fish, being smaller those that fish close to the coast and on the continental platform, than those that fish in the continental slope. In spite of the fact that this specie is not a target one of this fleet and captures are scarce, it is very important because its economic impact. This species is captured by the trawl fleet segment that fish from the coast to the continental shelf edge. In the continental slope are hardly found.

Source of management advice: This work has been carried out a preliminary stock assessment of Monkfish from the trawl fishery on the Southwest of the Mediterranean Sea (GSA06, Santa Pola port). To accomplish this, the VIT program has been used (Leonart and Salat, 1992), and the LCA-VPA and Y/R analysis have been applied to a pseudocohort (2006).

Stock status: Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion.

Exploitation rate: Moderate fishing mortality.

Stock abundance: Uncertain / Not assessed.

Comments from the WG: The current F is between the F_{msy} and $F_{0.1}$. This is a preliminary assessment, so these results must be considered with caution, because the data comes from a year and one port, and the smaller individuals are underestimated. Sampling for young individuals should be increased.

Management advice and recommendations: No management advice.

14. SCSA comments: no specific comments regarding this preliminary stock Assessment of Monkfish (*Lophius budegassa*) from the trawl fishery in GSA 06

- Document n° 9: Stock assessment of *Dentex dentex* from Tunisian coasts (GSA 12, 13). Bachra Chemmam-Abdelkader, Soufia Ezzeddine & Mejdeddine Kraiem.

Abstract: This study consists of the stock assessment of the fish *Dentex dentex* exploited on the Tunisian coasts by artisanal gears especially, the trammel nets and long-lines. Two stocks are separately dealt according to two different regions: the Northern and the Eastern coasts. In total, 1538 individuals are sampled from January 2004 to December 2004, along the Tunisian coasts. The total length of the monthly sampled fish are ranged by size classes of one centimeter and the size structure is pondered to the respective monthly landings, then extrapolated to the yearly captures. The obtained data was accessible for cohort analysis according to Vit Program elaborated by Leonard & Salat (1997). Natural mortality index ($M=0.18$) was obtained from the mean value estimated by Pauly (1980) and Djabali & al. (1994). Chosen fishing effort values (F_t) were 1.3 and 1.2 respectively for the Northern and the Eastern regions. In the North, the yield by recruit values is below the optimal level; the stock seems to be under-exploited. In the aim to improve the exploitation, the actual effort by catch would be duplicated. Nevertheless, the exploitation profile in the eastern region is in optimal conditions. Consequently, the actual conditions of fishing should be maintained. However, *Dentex dentex* is considered as a target species and captured by selective long-lines, all tentative to increase the actual fishing effort would permit to improve in short term or in long term the captures along Northern and Eastern coasts.

Stock status: In the North (GSA 12), the yield by recruit value is below the optimal level; the stock seems to be under-exploited. The exploitation profile in the eastern region (GSA 13) is in optimal conditions.

WG advice for research: A more detailed description of the fishery should be provided to facilitate the management advice.

WG management advice and recommendations: As a precautionary measure is recommended not to increase the fishing effort in both areas.

15. SCSA comments: SCSA endorsed the WG management advice and recommendations on *Dentex dentex* from Tunisian coasts (GSA 12, 13).

- Document n° 10: Assessment of sole (*Solea solea*) from rapido trawl surveys in GSA 17 (Northern and Central Adriatic) (2005–2006; SoleMon project). G. Fabi, O. Giovanardi, F. Grati, I. Isajlovič, S. Raicevich, G. Scarcella, N. Vrgoč

Description of fishery: Besides to be included in the otter trawler multi-species catches, in the Adriatic Sea the sole represents the main target species of set nets (both gill nets and trammel nets) and rapido trawl (a sort of beam trawl having a mouth made of an iron frame provided with 3-5 skids and a toothed bar on its lower side). The fishing pressure applied by rapido trawlers and set netters on the Adriatic sole stock has increased in the last ten years in terms of either fishing effort (number of vessels, fishing time and engine power), efficiency of the gears and exploitation of new fishing grounds thanks to the use of advanced navigation equipment (e.g. GPS). This pressure, currently mainly due to the Italian fleets operating in the national and international waters, is likely to further increase in the next few years owing to fishery development in the emerging countries of the eastern Adriatic coast.

Source of management advice: Experimental catches from rapido trawl surveys in the area extending from Trieste to the Pomo Pit northern limit and from the Italian coast to the Croatian one, for a total trawlable surface of 44,880 km² (depth range 5 - 143 m); landing data from rapido trawlers (fish market auction documents; sampling of landings; biological sampling of landings), otter trawlers (fish market auction documents; sampling of landings; biological sampling of landings), and set netters sampling of landings; biological sampling of landings) along the Italian coast from Trieste to San Benedetto del Tronto; direct interviews at the landing sites to get information on the fishing grounds along the Italian coast from Trieste to San Benedetto del Tronto.

Stock status: Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;

Exploitation rate: Uncertain / Not assessed

Stock abundance: Intermediate abundance

Comments from the WG: Data from trawl surveys and commercial fishery evidenced that: a) catches strictly depend on the recruitment success; b) catches of rapido trawlers include a relevant portion of undersized specimens (TL < 20 cm) although they use a larger mesh size than the legal one; c) the recruitment strongly fluctuates; d) a general LPUE reduction was recorded in the last four years.

Management advice and recommendation:

- a) the adoption of management measures aimed to reduce the portion of undersized specimens in the rapido trawl catches would be recommended: reduction of the towing speed, temporal closure of the fishing inside the 6 nm offshore for at least one month (September) after the biological fishing stop for trawlers occurring in August;
- b) at a precautionary level an increase of fishing effort in respect to that reached in 2006 should be unwise.

WG advice for research:

- a) continuation of surveys and their extension to the overall Adriatic Sea (GSA 17 and GSA 18)
- b) scientific investigation on the possible use of technical devices to increase selectivity.
- c) future assessment to be carried out using also analytical methods with commercial data.

16. SCSA comments: The Sub-Committee underlined that other information exist to improve the analysis, anyhow at a precautionary level it is advisable not to increase the fishing effort in respect to that reached in 2006. However further research is needed on trawl "rapido net" operation and also its impact on the bottom communities.

- Document n° 11: Assessment of red coral (*Corallium rubrum*) in GSA 06 (Northern Spain). Rossi S., Gili J.-M.

Description of fishery: The Mediterranean red coral (*Corallium rubrum*, L. 1758; *Gorgonacea*, *Octocorallia*) is an octagonal that forms arborescent colonies situated in semidark rocky habitats along the Mediterranean coast. It is perhaps the precious coral par excellence, as its beautiful calcium carbonate skeleton has been used as jewellery, currency, and religious talismans as early as 30.000 years ago. Commercial fishing for red coral began in the 1500s-1600s in Catalonia, but was in the 1800s when the Kingdom of Naples (Italy) employed 1800 coral fishing boats manned by 17.000 sailors and red coral harvesting became a big industry. The fishermen lowered a wooden cross to the seafloor and began twisting the rope in order to rotate the cross on the bottom and entangle coral colonies in the nets attached to the cross. The widespread adoption of SCUBA after the second world war enabled professional coral divers to dive down to sometimes considerable depths (>100m), in order to find large valuable colonies hidden in caves and crevices. After a recent ban of dredging for red coral, SCUBA diving is the only form of coral fishing today. Museum specimens give us an impression of the maximum size of this species. SCUBA divers use a small pickaxe and a net to take whole colonies. Sometimes they broke the entire colony with the basal foot, but they try to leave this basal foot, because red coral has a strong capability to re-growth from the base. Once in the boat, red coral fisherman clean, dry and store the coral to sell it. In Catalonia there are now 12 licenses for interior waters red coral divers (waters within cape to cape). They can harvest s much as 400 kg per year and person. The number of divers per boat is 3 (there are 4 boats working). They can do the dive from May to October, from the rising to the sunset (one dive a day) and from

Monday to Friday. They have to have the professional diving licence, and the fisheries licence is renewed each year.

Source of management advice: The present study was carried out at the Spanish NW Mediterranean coast, the Costa Brava. The productivity and yield estimates focus on the Cap de Creus area since this is where the majority of red coral is harvested at the Costa Brava. The biometry of red coral between 15 and 60 m depth was studied by photographic sampling. Colonies were photographed at random within patches encountered. As the photo sampling is not a quantitative method and in order to obtain a maximum number of photographs from each patch, the photo sampling was not restricted to the survey area along the survey line. A 3.1 megapixel digital camera. For each photo a small ruler was placed for size reference next to the coral, in a way that it was oriented parallel to its axis. The photos were processed with Adobe Photoshop™ 5.5 software. In each photo the scale was calibrated using the ruler as a size reference, which allowed a precision of 1 mm. This way the basal diameter and height of coral colonies could be estimated in each photo.

Four different oceanographic cruises (from 2002 to 2006) have been made to estimate the same parameters in deep populations (below 60m depth). The tool used has been the Remotely Operated Vehicle with different approaches to the deep coralligenous and deep cold corals communities off Cap de Creus.

Stock status: Overexploited. The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse;

Exploitation rate: High fishing mortality

Stock abundance: Low abundance

WG management advice and recommendation:

- The number of licences in the Catalan Coast (12) for interior waters seems to be excessive; It can be recommend to short the number by a half to allow the red coral population recovery within the next 5-10 years.
- To do that, we propose a retirement of coral fishermen at 55 years, and do not substitute the old licences with new ones; mean age of red coral fishermen in Catalonia is now 50 years, so in 7 years the total number of licences can be cut. The 400 kg IQ per year and fisherman needs no change.
- The integration of interior and exterior waters (DARP and Spanish Fisheries Ministry) is essential for the proper management of the fisheries area.
- Currently there are five areas in which red coral extraction is banned in Catalonia: Farallons, Encalladora, Point Cap de Creus and Norfeu and Medes Islands. The overall Cap de Creus Natural Parc needs a 10 years period in which the red coral fisheries are banned for a proper recover.
- Together with the current harvesting legislation (>7mm basal diameter), the height (minimum 10 cm height from the basal foot), and the branching pattern (minimum tertiary branches) of the colonies has to be taken into account to guarantee population stability and recovery.
- The 15 June-31 August period has to be the moment for harvesting stop, because it is the reproductive period of red coral.

17. SCSA comments: the SCSA did not endorse the recommendations regarding age of retirement and the integration of interior and exterior waters, because they imply other advices than the scientific ones.

3.1.2 Assessment related documents.

18. The Sub-Committee also reviewed and endorsed the conclusions presented in 5 related assessment documents as follows :

- Document n° 12: Use of composite models for the assessment of European hake, Red mullet and Norway lobster stocks in the North-Western Mediterranean (GSAs 7, 8, 9, 10 and 11). A. Abella, V.Bartolino, J.Bertrand, A. Cau, F.Colloca, C.Follesa, A.Mannini, B.Reale, P.Rinelli, M.Sbrana , M.T.Spedicato , A.Voliani , R.Zupa .

19. SCSA comments: The use of composite models was qualified as interesting. No proposal of management advice has been done.

- Document n° 13: Study on the Stock of the Deep Water Pink Shrimp (*Parapenaeus longirostris* L., 1846) in the Marmara Sea GSA 28. M. Zengin, F. S. Karakulak, H. Polat, S. Kutlu.

20. SCSA comments: The SCSA welcomed this contribution and noted that relevant issues in the document could be the object of further analysis.

- Document n° 14: Geographic and temporal variations of Cephalopod Catches by selective and species-specific fishing gears in the Hellenic Seas (GSA 20, 22, 23). E. Lefkaditou.

21. SCSA comments: SCSA noted the need for further work in the assessment of this very important resource in Mediterranean fisheries.

- Document n° 15: Bottom Trawl Fish Composition of Çandarlı Bay, Eastern Aegean Sea (GSA 22). O. Özyaydin, S. Leblebici, A. Tokaç, R. Gurbet

22. SCSA comments: No comment was made by the Sub-Committee.

- Document n° 16: Experimental Studies on the Restocking of the Turbot *Psetta maxima* Populations in the Eastern Black Sea Coast (GSA 29). M Zengin, H. Polat, S. Kutlu, A. Gümüş.

23. SCSA comments: No comment was made by the Sub-Committee.

3.1.3 Performance of the joint assessments.

24. The SCSA acknowledged the exercises as been done during the joint assessment session of the working group on demersals and recommended for 2008, to have a joint assessment of hake, using both commercial catches and trawl survey data, as this is the most studied species in the Mediterranean.

3.1.4 General conclusions and scientific advice addressed by the WG.

25. The Sub-Committee took note of the following specific recommendations:

- Perform analysis of sensitivity in order to test differences in the assessment results due to the different biological parameters;
- Take into account, in future assessment, of new findings on growth parameters for hake, following tagging studies and otoliths new interpretation;
- Prepare a list of reference points and indicators for the next WG, in order to discuss those that are more suitable to be included in the assessment forms. The discussion could take

place using electronic communication in the intersession period. Mr Alvaro Abella will be in charge of this Task.

3.2. Conclusions and scientific advice addressed by the Working Group on Small Pelagics

26. Assessments for 14 stocks were presented for sardine and anchovy covering 7 GSAs (1, 6, 7, 16, 17, 18 and 22) and 4 shared stocks.

27. Two types of documents were presented: (i) assessment documents and (ii) assessment-related documents.

3.2.1. Pelagic assessment documents

28. The Sub-Committee reviewed and endorsed the conclusions and recommendations presented in 18 assessment documents as follows :

- Document n° 1: Anchovy, *Engraulis encrasicolus* stock assessment by acoustic methods in the GSA 01, Northern Alboran sea. Authors: A. Giráldez, M. Iglesias, J. Miquel, P. Torres D. Oñate, N. Díaz and A. Pérez

Description of fishery: The current fleet in GSA 01 the Northern Alborán Sea is composed by 135 units, characterised by small vessels. 24% of them are smaller than 12 m, 76% between 12 and 24 m and no one bigger than 24 m. The purse seine fleet has been continuously decreasing in the last two decades, from more than 230 vessels in 1980 to 135 in 2006. A strong reduction of larger vessels occurred from 1985 onwards, possibly linked to a decreasing in anchovy catches in Northern Morocco, where a part of that fleet fished under agreement between the countries. Nowadays, only a few vessels with a high GRT are working in GSA 06 and Gulf of Lions. Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Alboran GSA01, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus spp.*), mackerel (*Scomber spp.*), frigate mackerel (*Auxis rochei*), Atlantic saury (*Scomberesox saurus*) and gilt sardine (*Sardinella aurita*). Anchovy is the species with the highest economical value. The annual landings of anchovy for the last seventeen years ranged between 200 and 3000 tons. During the period from 1990-2006, the catches of anchovy stock in the Alborán Sea showed marked fluctuations. A successful recruitment, estimated by echo-acoustic tracking, was observed during 2001 in the Alborán Sea producing a strong increment of landings in 2002. Nevertheless, the catch dropped in 2003, continuing at low level to 2006. This decline is consistent with the echo-acoustic evaluation. Málaga Bay is the most important recruitment and fishery area. Only this area, which represents 85% of total landings, has been considered.

Source of management advice: Acoustic surveys, commercial landings and CPUEs.

Stock abundance: Low levels of biomass, recruitment and catch from 2003 to 2006

WG Management advice and recommendations: Do not increase the actual level of fishing effort even if next years could come an increase of stock abundance.

Advice for research: Monitoring of the stock should be continued. It is also recommended a complete sampling of ECOMED acoustic survey for the whole GSA01 area.

29. **SCSA comments:** The Sub-Committee highlighted the fact that an adjustment of minimum legal size (9cm) to first maturity size (11cm) should mainly result in an increase of the discards. Moreover, from a strictly technical point of view, it is known that a change in mesh size has no effect on the purse seine selectivity (see general comments). In the Alboran Sea the fleet operates

all the year but focuses on the recruitment period (late summer to autumn); so it may be advisable to shift the fishing season to protect the juveniles, or to implement closed seasons or areas.

- Document n° 2: Anchovy, *Engraulis encrasicolus* stock assessment by acoustic methods in the GSA 06, Northern Spain. Authors: A. Giráldez, M. Iglesias, J. Miquel, P. Torres D. Oñate, N. Díaz and A. Pérez

Description of fishery: The purse seine fleet operating in GSA 06 Northern Spain is composed by 139 units: 4% are smaller than 12 m in length, 90% between 12 and 24 m and 6% bigger than 24 m. The fleet continuously decreased in the last decade, from more than 222 vessels in 1995 to 139 in 2006. This stronger reduction (63%) is possibly related to a decreasing in anchovy catches. Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Alboran GSA01, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus spp.*), mackerel (*Scomber spp.*), frigate mackerel (*Auxis rochei*), Atlantic saury (*Scomberesox saurus*) and gilt sardine (*Sardinella aurita*). Anchovy is the species with the highest economical value. The annual landings of anchovy in the Northern Spain for the last seventeen years ranged between 3000 and 23000 tons. The minimum values were recorded during 2006. The studied area was divided in two regions, Tramontana Region (C. Creus - C. La Nao) and Levantine Region (C. La Nao-C. Palos), in order to use the historical series of acoustic evaluation data (ECOMED survey); which is recorded in the Tramontana Region since 1990. The time period in which the surveys were carried out corresponds to the recruitment season of the species (November – December). The acoustic assessment provides an estimation of the recruitment of the species. They are two recruitment areas: one located between Barcelona and the south of the Ebro River Delta (the most important) and other in Rosas Bay.

Tramontana region. The estimated total biomass for the whole area in 2006 (12000 tons) was twofold times high than 2005, but the half of 2001. There is not defined trend in calculated biomass since 1996. For this area, the survey's results suggest that the recruitment was very low from 1996 to 2000; the population appeared to recover in 2001 and 2003, decline for the two years and recovered in 2006. The distribution area for anchovy in 2006 year is reduced 27%. Most of resources are concentrated along Ebro River Delta where the distribution percentage of the species has increased from 2003 to 2006. This reduction in distribution areas of the species and the highest concentration in certain areas lead a stock contraction. This could raise the alarm but increasing vulnerability of the species, nevertheless the high recruitment could increase the distribution areas in years to come. The landings had an increase in 2002 (this rising is consistent with the echo-acoustic evaluation of recruitment in 2001), but there is a general negative trend from the beginning of the time series. Cpue in 2006 is the lowest of the historical series.

Levantine Region. The estimated biomass for 2006 was very low, the lowest of whole historical series and the landings showed the strongest negative trend for all the Mediterranean regions.

It is important to note that for the last five years there was a gradual increase in the estimated biomass of other small pelagic species (mainly the three species of horse mackerel and bogue and in 2006 the *Scomber scombrus*) which are either eggs and larvae predators anchovy or resources competitors. As regards 2005 and 2006, the biomass of sardine and anchovy represented 42% of the total estimated biomass, in contrast to 63% and 83% in 2004 and 2003, respectively.

Source of management advice: Acoustic surveys, commercial landings and CPUEs.

Stock abundance: Low levels of biomass. However 2006 estimation is twice that of 2005.

WG Management advice and recommendations:

- Do not to increase the current level of fishing effort, even if next years could come an increase of stock abundance.

- Maintain the current closed areas and seasons established for the small pelagic fisheries.
- Adjust minimum legal size (9cm) to first maturity size (11cm).

Advice for research: Monitoring of the stock should be continued.

30. SCSA comments: SCSA endorsed the WG management advices and recommendations. Furthermore, the geographical positions of the current closed areas and seasons were asked to be presented to the SCSA as soon as possible.

- Documents n° 3 & 5: Sardine, *Sardina pilchardus* stock assessment in the GSA 01 Northern Alboran sea . Bellido, J.M., Giráldez, A., Iglesias, M., Torres, P., Ceruso, C., Quintanilla, L., Alemany, F., Miquel, J., Díaz, N., Pérez, A.

Description of fishery: The current fleet in GSA 01 the Northern Alborán Sea is composed by 135 units, characterised by small vessels. 24% of them are smaller than 12 m, 76% between 12 and 24 m and no one bigger than 24 m. The purse seine fleet has been continuously decreasing in the last two decades, from more than 230 vessels in 1980 to 135 in 2006. A strong reduction of larger vessels occurred from 1985 onwards, possibly linked to a decreasing in anchovy catches in Northern Morocco, where a part of that fleet fished under agreement between the countries. Nowadays, only a few vessels with a high GRT are working in GSA 06 and Gulf of Lions.

Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Alboran GSA0, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus* spp.), mackerel (*Scomber* spp.), frigate mackerel (*Auxis rochei*), Atlantic saury (*Scomberesox saurus*) and gilt sardine (*Sardinella aurita*).

The annual landings of sardine (*Sardina pilchardus*) in the Northern Alborán Sea show a strong annual fluctuation for the last seventeen years ranged between 4,000 and 11,000 tons. Landings increase in 2006, risen up 10,000 t. This species is the most fished one in GSA 01, both for pelagic and demersal species. Although its economical value is lower than anchovy the high volume of catches makes it a valuable fishery.

Source of management advice: This assessment is based on both on VPA (XSA) methods and acoustic methods. Both XSA and acoustics methods have the same perception of the state of the stock.

Stock status: Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion

Exploitation rate: Moderate fishing mortality

Stock abundance: Intermediate abundance

Management advice and recommendations: This fishery is considered as fully exploited. By these results we consider fishing effort should not increase beyond the current levels. This should allow maintaining the current levels of fishing mortality.

Advice for research: This is the first application of VPA methods to this stock. No reference points can be suggested at this stage. Further years will come an extension of the assessment time series suitable to suggest Reference Points and Harvest Control Rules.

Monitoring of the stock should be continued. It is also recommended a complete sampling of ECOMED acoustic survey for the whole GSA01 area.

31. SCSA comments: SCSA endorsed the WG management advice and recommendations on sardine (*Sardina pilchardus*) stock assessment in the GSA 01.

- Documents n° 4 & 6: Sardine, *Sardina pilchardus* stock assessment in the GSA 06 northern Spain. Bellido, J.M., Giráldez, A., Iglesias, M., Torres, P., Ceruso, C., Quintanilla, L., Alemany, F., Miquel, J., Díaz, N., Pérez, A.

Description of fishery: The purse seine fleet operate in GSA 06 Northern Spain is composed by 139 units: 4% are smaller than 12 m in length, 90% between 12 and 24 m and 6% bigger than 24 m. The fleet continuously decreased in the last decade, from more than 222 vessels in 1995 to 139 in 2006. This stronger reduction (63%) onwards possibly linked to a decreasing in anchovy catches.

Sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Spain GSA06, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus spp.*), mackerel (*Scomber spp.*), frigate mackerel (*Auxis rochei*), Atlantic saury (*Scomberesox saurus*) and gilt sardine (*Sardinella aurita*).

The annual landings of sardine (*Sardina pilchardus*) in the Northern Spain for the last seventeen years ranged between 19000 and 53000 tons. This species is the most fished one in GSA 06, both for pelagic and demersal species. Although its economical value is lower than anchovy the high volumen of catches makes it a valuable fishery.

Source of management advice: This assessment is based on both on VPA (XSA) methods and acoustic methods. Both XSA and acoustics methods have the same perception of the state of the stock.

Stock status: Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion.

Exploitation rate: High fishing mortality.

Stock abundance: Intermediate abundance.

Management advice and recommendations: This fishery is considered as fully exploited. By these results we consider fishing effort should not increase beyond the current levels. This should allow maintaining the current levels of fishing mortality.

Advice for research: this is the first application of VPA methods to this stock. No reference points can be suggested at this point. Further research is aimed to produce Reference Points and Harvest Control Rules. Monitoring of the stock should be continued.

32. SCSA comments: SCSA endorsed the WG management advice and recommendations on sardine (*Sardina pilchardus*) stock assessment in GSA 06.

- Document n° 7: Assessment of anchovy, *Engraulis encrasicolus* in the gulf of Lions-GSA07. Authors: J-L. Bigot, B. Liorzou, D. Roos

Description of fishery: In the gulf of Lions, pelagic fisheries are targeted on sardine and anchovy. Fishing effort depends on market fluctuations. A mean of 50 trawler boats in the last years are targeting these pelagic species. There are also 12 purse seiners in the south of gulf of Lion that catch also these species. Some purse seine boats from Spain come in the area to fish mainly sardine.

Source of management advice: The stocks of the main species of small pelagics in the gulf of the Lion are evaluated annually. The objective is to provide some advices to administrations and the profession on the state of resources in view of a durable exploitation. The pelagic species studied are anchovy and sardine in priority but also mackerels, horse mackerels, sardinella and sprat when present. The different species don't have the same biology and behaviour (life span, reproduction period, habitat...). Also, the

catches data and specific fishing effort collected by producer organisations are not sufficiently precise to permit an indirect approach of the stock assessments.

The solution chosen in the gulf of Lions is to use direct assessment method of stocks by echo - integration while completing them with indicators of the fishing activity. At this end, PELMED surveys are performed at daytime in July. Transects are prospected, perpendicular to the coast at a speed of 8 knots, from 15-20m depth until the offshore break. Pelagic and bottom trawling operations are performed to identify species met along transects. Population structures are identified by size and age. The acoustic assessment results are completed by an analysis of catches and fishing effort to improve the fisheries diagnoses.

Stock abundance: Intermediate abundance

Additional comments: The global species biomass estimated during Pelmed surveys showed strong fluctuations according to years. In 2005, the level of accessible biomass of small pelagic fishes (all species) was around 472000 tons, highest level of 1993–2006 periods. Mainly, the presence of a rich inshore zone of small sardines and an offshore zone of anchovy and biggest sardines was observed. But for some years this spatial distribution did not occurs

After a downward trend from 2001 peak until 2005 (18000 MT), anchovy biomass increased again in 2006 to 26000 MT.

The size structure from landings of 2002-2004 shows a lack in big fish, but in 2005 there were no fish from age 1. In 2006, appear again some 1 years old fish.

Management advice and recommendations.: As the biomass estimate for 2006 increased and because production in the first 6 month of 2007 show an increase of catches, no management advice is given. However, as the level of biomass is not high, it is recommended to follow with a great attention the gradual changes in all indicators of Stock status.

Advice for research: As GSA07 is close to GSA06, common survey between Spain and France could be done with the aim of assessing anchovy spawning stock in June-July and recruitment in November-January in an area delimited by the south of Ebro and the Gulf of Lion.

In the same way and with the aim of assessing shared stocks, reinforce the cooperation between Spain and France to update biological data as well as catch and effort data for the boats of the two nations catching this species in the Gulf of Lion.

33. SCSA comments: SCSA endorsed the WG management advice and recommendations on anchovy (*Engraulis encrasicolu*) in GSA07.

- Document n° 08: Assessment of sardine, *Sardina pilchardus* in the Gulf of Lions - GSA07

Authors: J-L. Bigot, B. Liorzou, D. Roos

Description of fishery: In the gulf of Lion, pelagic fisheries are targeted on sardine and anchovy. Fishing effort depends on market fluctuations. A mean of 50 trawler boats in the last years are targeting these pelagic species. There is also 12 purse seiners in the south of gulf of Lion that catch also these species. Some purse seine boats from Spain come in the area to fish mainly sardine.

Source of management advice: the stocks of the main species of small pelagics in the gulf of the Lion are evaluated annually. The objective is to provide some advices to administrations and the profession on the state of resources in view of a durable exploitation. The pelagics species studied are anchovy and sardine in priority but also mackerels, horse mackerels, sardinella and sprat when present. The different species don't have the same biology and behaviour (life span, reproduction period, habitat,...). Also,

catches data and specific fishing effort collected by producer organisations are not sufficiently precise to permit an indirect approach of the stock assessments.

The solution chosen in the gulf of Lion is to use direct assessment method of stocks by echo - integration while completing them with indicators of the fishing activity. At this end, PELMED surveys are performed at daytime in July. Transects are prospected, perpendicular to the coast at a speed of 8 knots, from 15-20m depth until the offshore break. Pelagic and bottom trawling operations are performed to identify species met along transects. Population structures are identified by size and age. The acoustic assessment results are completed by an analysis of catches and fishing effort to improve the fisheries diagnoses.

Stock abundance: Intermediate abundance.

Additional comments: The global species biomass estimated during Pelmed surveys showed strong fluctuations according to years. In 2005, the level of accessible biomass of small pelagic fishes (all species) was around 472000 tons, highest level of 1993–2006 periods. Mainly, the presence of a rich inshore zone of small sardines and an offshore zone of anchovy and biggest sardines was observed. But for some years this spatial distribution did not occurs.

After an upward trend of sardine from 2003 to 2005, up to 231000 MT, sardine biomass return at a mean level in 2006 with 83000 MT.

Management advice and recommendations: Not to increase the fishing effort.

Advice for research: As **GSA07 is close to GSA06, common survey between Spain and France could be done with the aim of assessing sardine recruits in June-July and spawning stock in November-January in an area delimited by the south of Ebro and the Gulf of Lions.**

With the aim of assessing shared stocks, reinforce the cooperation between Spain and France to update biological data as well as catch and effort data for the boats of the two nations catching this species in the gulf of Lions.

34. SCSA comments: SCSA endorsed the WG management advice and recommendations on sardine (*Sardina pilchardus*) in GSA07.

- Document n° 9: Anchovy, *Engraulis encrasicolus* in the strait of Sicily- GSA16.

Authors: Patti B., Bonanno A., Basilone G., Mazzola S.

Description of fishery: In Sciacca port, the most important base port for the landings of small pelagic fish species along the southern Sicilian coast (GSA16), explaining for about 2/3 of total landings in GSA 16, two operational units are presently active, purse seiners (12-24 meters, 17 vessels) and pelagic pair trawlers (15 couples). An average anchovy landing over the last decade (1997-2006) was about 1,500 metric tons, with large interannual fluctuations. Anchovy biomass, estimated by acoustic methods, ranged from a minimum of 6,300 tons in 2006 to a maximum of 32,000 tons in 2005.

Source of management advice:

- Census data for catch and effort information (on deck interviews) in Sciacca port
- Biological samples for fish biology information
- Acoustic data for fish biomass evaluations

Exploitation rate: High fishing mortality.

Stock abundance: Low abundance.

Additional comments: biomass evaluations from eleven echo-surveys carried out from June 1998 to June 2006 in the Strait of Sicily show that anchovy population experienced

quite large inter-annual fluctuations, from a maximum of about 32,000 t in 2005 to a minimum of 6,300 t in 2006.

Taking into account that fishing effort was relatively stable in last decade, results would suggest the importance of environmental factors variability on yearly recruitment success.

Acoustic evaluations are largely consistent with landings (from purse seiners and midwater pair trawlers) recorded in Sciacca (the most important base port in the G.S.A. 16 for the small pelagic fish landings) during the year following the evaluation campaigns.

The recent "collapse" in anchovy (-80% from 2005 to 2006) biomass, combined to the quite high level of exploitation rates, also suggests questioning about the sustainability of current levels of fishing effort. In addition, possible negative effects on these populations resulting from pressure of other fishing gears on larval stages.

WG Management advice and recommendations.: Considering the alarming signal linked to the last year biomass estimate, combined to the quite high and increasing level in exploitation rate, fishing effort should not be increased. A warning on the fishing of larval stages (locally named *bianchetto*) is relevant for anchovy population if derogation of the fishing ban, normally operated in wintertime, would be postponed after the start of the spawning season, even though more data and investigation are needed in order to estimate the possible impact of this fishing activity on the exploited populations.

35. SCSA comments: SCSA endorsed the WG management advice and recommendations.

- Documents n° 10: Sardine, *Sardina pilchardus* in the strait of Sicily GSA 16.
Authors: Patti B., Bonanno A., Basilone G., Mazzola S.

Description of fishery: In Sciacca port, the most important base port for the landings of small pelagic fish species along the southern Sicilian coast (GSA16), explaining for about 2/3 of total landings in GSA 16, two operational units are presently active, purse seiners (12-24 meters, 17 vessels) and pelagic pair trawlers (15 couples). An average sardine landing over the last decade (1997-2006) was about 1,500 metric tons, with large interannual fluctuations. Sardine biomass, estimated by acoustic methods, ranged from a minimum of 6,000 tons in 2002 to a maximum of 39,000 tons in 2005.

Source of management advice:

- Census data for catch and effort information (on deck interviews) in Sciacca port;
- Biological samples for fish biology information;
- Acoustic data for fish biomass evaluations

Exploitation rate: Moderate fishing mortality.

Stock abundance: Low abundance.

Additional comments from the WG: Biomass evaluations from eleven echo-surveys carried out from June 1998 to June 2006 in the Strait of Sicily show that sardine population experienced quite large inter-annual fluctuations, from about 39,000 t in 2005 to 6,000 t in 2002.

Taking into account that fishing effort was relatively stable in last decade, results would suggest the importance of environmental factors variability on yearly recruitment success.

Acoustic evaluations are largely consistent with landings (from purse seiners and midwater pair trawlers) recorded in Sciacca (the most important base port in the G.S.A. 16 for the small pelagic fish landings) during the year following the evaluation campaigns.

The recent "collapse" in sardine (-74% from 2005 to 2006) biomass, combined to the quite high level of exploitation rate, also suggests questioning about the sustainability of current levels of fishing effort. In addition, possible negative effects on these populations resulting from pressure of other fishing gears on larval stages.

Management advice and recommendations: Considering the alarming signal linked to the last year biomass estimate, combined to the quite high level in exploitation rate, fishing effort should not be increased. A warning on the fishing of larval stages (locally named *bianchetto*) is relevant, taking into account that in the past years derogation of the fishing ban was normally operated in wintertime during the sardine spawning season, even though more data and investigation are needed in order to estimate the possible impact of this fishing activity on the exploited populations.

36. SCSA comments: SCSA endorsed the WG management advice and recommendations related to sardine (*Sardina pilchardus*) in the strait of Sicily GSA16.

- Document n° 11 & 13: Anchovy, *Engraulis encrasicolus* in the Adriatic - GSA17.

Authors: A. Santojanni, N. Cingolani, E. Arneri, A. Belardinelli, S. Colella, F. Donato, G. Giannetti, I. Leonori, A. De Felice, G. Sinovcic, B. Marceta

Description of fishery: Anchovy (*Engraulis encrasicolus*, L.), together with sardine, is one of the most important commercial species of the Adriatic Sea. The stock of anchovy living in the northern and central Adriatic Sea (GFCM GSA 17) is shared between Italy, Slovenia and Croatia. The Adriatic small pelagic fleet is targeting both anchovy and sardine. The Italian fleet is composed of about 120 (60 pairs) pelagic trawlers (*volante*) mainly operating from Trieste to Ancona (average GT 72, average engine power 223 kW) and about 46 *lampara* vessels (purse seiners with light), operating in the Gulf of Trieste (25 small *lampara*, average GT 9, average engine power 110 kW) and in the Central Adriatic (21 big *lampara*, average GT 97, average engine power 390 kW). The Slovenian fleet is composed of 1 pelagic trawlers and 5 purse seiners, no updated data are available on Croatian fleet.

Source of management advice: The present assessment of this stock has been carried out by means of Virtual Population Analysis (VPA). Catch and fishing effort data were collected for the period 1975-2006 along with biological data. Length frequency and age-length data were combined to obtain annual catch-at-age series from 1975 onwards, which represented the basic input of VPA.

Stock abundance: Moderately exploited. Stock biomass of anchovy dropped at very low level in 1987. After this collapse, recovery took place, but a fluctuation also occurred in the last ten years. In the most recent years, the values of the exploitation rate $F/(F+M)$ are lower than 0.4 which is a precautionary reference point. The mean ratio of the last three years between catch and estimated biomass is 0.25.

Management advice and recommendations: Due to strong changes over time commonly observed in small pelagic abundance, which are quite fast for the Adriatic anchovy, it is recommended not to increase the fishing effort.

Advice for research: The research programme supported by FAO-ADRIAMED, entitled "Data Collection and Biological Sampling System on Small Pelagics in the Adriatic Sea (AdriaMed-SP)" (ended in 2003) improved the VPA stock assessment of anchovy in northern and central Adriatic (GFCM Management Unit 17), through the adoption of a common protocol among Adriatic countries for data collection and data processing. It is crucial further improvement of scientific collaboration of Adriatic countries.

37. SCSA comments: SCSA endorsed the WG management advice and recommendations on anchovy (*Engraulis encrasicolus*) in the Adriatic GSA17.

- Documents n° 12 & 13: Sardine, *Sardina pilchardus* in the Adriatic - GSA17.

Authors: A. Santojanni, N. Cingolani, E. Arneri, A. Belardinelli, S. Colella, F. Donato, G. Giannetti, I. Leonori, A. De Felice, G. Sinovcic, B. Marceta

Description of fishery: Sardine (*Sardina pilchardus*, Walb.), together with anchovy, is one of the most important commercial species of the Adriatic Sea. The stock of sardine living in the northern and central Adriatic Sea (GFCM GSA 17) is shared between Italy, Slovenia and Croatia. The Adriatic small pelagic fleet is targeting both sardine and anchovy. The Italian fleet is composed of about 120 (60 pairs) pelagic trawlers (*volante*) mainly operating from Trieste to Ancona (average GT 72, average engine power 223 kW) and about 46 *lampara* vessels (purse seiners with light), operating in the Gulf of Trieste (25 small *lampara*, average GT 9, average engine power 110 kW) and in the Central Adriatic (21 big *lampara*, average GT 97, average engine power 390 kW). The Slovenian fleet is composed of 1 pelagic trawlers and 5 purse seiners, no updated data are available on Croatian fleet.

Source of management advice: The present assessment of this stock has been carried out by means of Virtual Population Analysis (VPA). Catch and fishing effort data were collected for the period 1975-2006 along with biological data.

Stock status: Fully exploited. Decline of stock biomass is observed after the peak in the first half of 1980s and lowest values of this series correspond to recent years. Moreover, just in the most recent years, the values of the exploitation rate $F/(F+M)$ are higher than 0.4, while in 2006 the exploitation rate is 0.38, lower than the limit of 0.4 (precautionary reference point). The mean ratio of the last three years between catch and estimated biomass is 0.23.

Management advice and recommendations: Due to strong changes over time commonly observed in small pelagic abundance, and the relatively low level of the estimated sardine biomass, it is recommended not to increase the fishing effort.

Advice for research: The research programme supported by FAO-ADRIAMED, entitled "Data Collection and Biological Sampling System on Small Pelagics in the Adriatic Sea (AdriaMed-SP)" (ended in 2003) improved VPA stock assessment of sardine in northern and central Adriatic (GFCM Management Unit 17), through the adoption of a common protocol among Adriatic countries for data collection and data processing. It is crucial further improvement of scientific collaboration of Adriatic countries.

38. **SCSA comments:** SCSA endorsed the WG management advice and recommendations on sardine (*Sardina pilchardus*) in the Adriatic GSA17.

- Document n° 14: Anchovy, *Engraulis encrasicolus* in the Southern Adriatic - GSA18.

Authors: Leonori I., De Felice A.

Description of fishery: Not available

Source of management advice: The annual echosurvey was performed in the summer season 2006 covering the western part of GSA 18. Pelagic biomass estimates, as a whole and per anchovies and sardines, were analyzed. Also in this area there was an increase in biomass in the last year. Trends of the western GSA 18 (from Vieste to Brindisi, historical surveys since 1987) show an abundance level similar to that of the years 1997-2002 for total pelagic biomass after the fall of the years 2003-05; this result is mainly due to the anchovy stock that has come back to the abundance level of 5-10 years ago.

Biomass in tons: Year 2006 (Area $3501 \text{ nm}^2 = 12008 \text{ km}^2$). Anchovy biomass = 189332 tons.

Stock abundance: Intermediate level

Comments: The results of the studies of small pelagic populations derived from the historical surveys in the western Adriatic Sea show that these populations are affected by large variability in time and space. This variability is mostly due to environmental factors and this is why an effort is currently in progress to find possible relations between abundance estimates and oceanographic parameters. Even if anchovy (both in Northern and Southern Adriatic) and sprat stock (in Northern Adriatic) showed good levels of abundance in 2006 survey they have just recovered from a previous worse condition; moreover sardine stock still shows a low level of abundance that is going on with continuity since 1998.

Management advice and recommendations: It is reasonable not to increase the actual level of fishing effort on small pelagic fish.

Advice for research: Fishery data should be collected

39. SCSA comments: SCSA endorsed the WG management advice and recommendations related to anchovy (*Engraulis encrasicolus*) in GSA18.

- Documents n° 12: Sardine, *Sardina pilchardus* in the Western Adriatic GSA18.

Authors: Leonori I., De Felice A.

Description of fishery: Not available.

Source of management advice: The annual echosurvey was performed in the summer season 2006 covering the western part of GSA 18. Pelagic biomass estimates, as a whole and per anchovies and sardines, were analyzed. Also in this area there was an increase in biomass in the last year. Trends of the western GSA 18 (from Vieste to Brindisi, historical surveys since 1987) show an abundance level similar to that of the years 1997-2002 for total pelagic biomass after the fall of the years 2003-05; this result is mainly due to the anchovy stock that has come back to the abundance level of 5-10 years ago.

Biomass in tons: Year 2006 (Area 3501 nm² = 12008 km²). Sardine biomass = 36867 tons.

Stock abundance: Low level

Comments from the WG: The results of the studies of small pelagic populations derived from the historical surveys in the western Adriatic Sea show that these populations are affected by large variability in time and space. This variability is mostly due to environmental factors and this is why an effort is currently in progress to find possible relations between abundance estimates and oceanographic parameters. Even if anchovy (both in Northern and Southern Adriatic) and sprat stock (in Northern Adriatic) showed good levels of abundance in 2006 survey they have just recovered from a previous worse condition; moreover sardine stock still shows a low level of abundance that is going on with continuity since 1998.

Management advice and recommendations: It is reasonable not to increase the actual level of fishing effort on small pelagic fish.

Advice for research: fishery data should be collected.

40. SCSA comments: SCSA endorsed the WG management advice and recommendations on sardine (*Sardina pilchardus*) in GSA18.

- Documents n° 15, 16 & 18: Anchovy, *Engraulis encrasicolus* in the Aegean sea - GSA22. Authors: Giannoulaki M., Somarakis S., Machias A., Kallianiotis A., Tserpes G., Petrakis G., Papaconstantinou C.

Description of fishery: In Greek Seas anchovy is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics

in percentages less than 5% of their total catch. The main fishing ground for anchovy is northern Aegean Sea, an area where anchovy reported landings have showed an increasing trend since 2000, comprising 22311 tons in 2006. Regarding the regulations enforced they concern a closed period from the mid December till the end of February and technical measures such as minimum distance from shore, gear and mesh size, engine, GRT, etc which are not fully observed. There is also a minimum landing size at 9 cm which is not fully observed.

Source of management advice: Three methods of stock assessment have been applied. Specifically, acoustic surveys as well as the Daily Egg Production Method (DEPM) have been applied in order to estimate the Total Biomass and the spawning stock biomass (SSB) of the stock respectively, in Northern Aegean Sea since 2003. Furthermore, Integrated Catch at Age (ICA) analysis for stock assessment was applied. This method uses separable virtual population analysis (VPA) with weighted tuning indices. The application of ICA was based on commercial catch data (2000-2006) and as tuning indices were used the biomass estimates from acoustic surveys and the Daily Egg Production Method (DEPM) estimates over the period 2003-2006.

Anchovy data were comprised of annual anchovy landings, annual anchovy catch at age data (2000-2006), mean weights at age, maturity at age and the results of acoustic and DEPM surveys. Natural mortality was set constant for all ages and years at value of 1.2 like the one used in the Atlantic anchovy stock. Reference age for the fishery was age group 2. The age groups 0, 4 and 5 were underweighted in the analysis. Catchability for the DEPM index is assumed as absolute indicator of Biomass, linear catchability relationship assumed for the acoustic surveys.

It should be noted that this is a first run of ICA, no sensitivity analysis was applied, therefore results are considered preliminary and no suggestions on reference points could be made.

Stock status: fully exploited.

Stock abundance: intermediate.

Exploitation rate: high fishing mortality.

Comments from the WG: Stock assessment analysis results showed a decreasing trend in the Total anchovy Biomass (as estimated by acoustics) and in the SSB (as estimated by DEPM), up to 2005. However an increase in both Total biomass and SSB, indicating signs of stock recovery was observed in 2006. Specifically, both Total Biomass in 2006 (TB=62,685 t) and Spawning Stock Biomass in 2006 (SSB=42,700 t) show a slight recovery of the stock from the lowest observed SSB (SSB=20,533 t in 2005), although both TB and SSB are still at a rather low level.

An increasing trend in anchovy reported landings (22311 t in 2006) has been observed mainly concerning age groups 1 and 2 since 2003. The major component of the anchovy stock was the 1-year-old anchovy and 2-year-old anchovy (i.e. the recruitment to the fishery). An increasing trend in the number of recruits of age 0 was observed with a sharp increase (3645 millions individuals) in 2006. The unweighted mean fishing mortality rate (F_{mean}) over the age class range 1-3 were obtained varying from 0.33 to 1.33. Furthermore, the estimated exploitation rate was above the empirical level for stock decline ($E > 0.4$, Patterson 1992) for small pelagic in 2000, 2003, 2004, 2005. However, both the exploitation rate and the SSB estimates showed a recovery of the stock in 2006. Anchovy stock was generally characterized by intermediate abundances and high fishing mortalities.

These assessment suggestions should be taken as preliminary and cautionary, as this is the first run of the ICA assessment for this area and it is based on a short time series of data. No reference points can be suggested at this point. Further years will come a Time series extension suitable to suggest relevant Reference Points for this fishery.

Based on assessment results this fishery is considered as fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion. However this has to be confirmed in following years, as this assessment should be considered still as preliminary and the anchovy stock should be monitored in a regular basis with direct assessment surveys.

WG Management advice and recommendations: Fishing effort should not increase beyond the current levels. This should allow maintaining the current levels of fishing mortality.

Furthermore, and for precautionary reasons, a shift of the closed period (present: mid December to end of February) towards the recruitment period of anchovy (e.g., October to December) / or the recruitment period of sardine (e.g., February to April) could be suggested that would allow the fishery to recover and more individuals of anchovy and sardine to enter the fishery at an older age.

Advice for research: Further work is required to improve the assessment model and in order to allow suggestion of reference points.

41. SCSA comments: SCSA endorsed the WG management advice and recommendations. Furthermore, since no data on stock depletion are given, but only high fishing mortality it recommends for precautionary reasons a shift of the closed period (present: mid December to end of February) towards the recruitment period of anchovy (e.g., October to December) / or the recruitment period of sardine (e.g., February to April) to allow more individuals of anchovy and sardine to enter the fishery at an older age.

- Documents n° 17 & 18: Sardine, *Sardina pilchardus* in the Aegean sea - GSA22.
Authors: Machias A., Giannoulaki M., Somarakis S., Schismenou E., Tsagarakis K., Siapatis A., Stamataki C., Vassilopoulou V., Kalianiotis A. Papaconstantinou C.

Description of fishery: In Greek Seas sardine is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics in percentages less than 5% of their total catch. The main fishing ground for sardine is northern Aegean Sea, an area where sardine reported landings have showed an decreasing trend since 2000, comprising 12784 tons in 2006. Regarding the regulations enforced they concern a closed period from the mid December till the end of February and technical measures such as minimum distance from shore, gear and mesh size, engine, GRT, etc which are not fully observed. There is also a minimum landing size at 9 cm which is not fully observed.

Source of management advice: A direct stock assessment method based on acoustic estimation of sardine Total Biomass has been applied in Northern Aegean Sea in June 2003, 2004, 2005 and 2006. Trawl samples have been collected during the survey in order to obtain biological samples for length frequency distribution estimates and otoliths were removed for age readings.

Stock abundance: intermediate.

Comments from the WG: Stock assessment analysis results showed that Total stock biomass remained at the approximately the same level till 2005, increasing in 2006 at 42856 t. The lowest observed Total Biomass was in 2004 (13842 t). The major component of the sardine stock was the 1-year-old anchovy and 2-year-old individuals (i.e., the recruitment to the fishery).

Management advice and recommendations: For precautionary reasons and because practically sardine consists with anchovy one fishery, we consider that fishing effort should not increase beyond the current levels.

Furthermore, and for precautionary reasons, a shift of the closed period (present: mid December to end of February) towards the post recruitment period of anchovy (e.g. October to December) / or the post recruitment period of sardine (e.g. February to April) could be suggested that would allow the fishery to recover and more individuals of anchovy and sardine to enter the fishery at an older age.

Advice for research: Sardine should be monitored in a regular basis with direct assessment surveys. Furthermore, since no data on stock depletion are given, but only high fishing mortality it recommends for precautionary reasons a shift of the closed period (present: mid December to end of February) towards the recruitment period of anchovy (e.g., October to December) / or the recruitment period of sardine (e.g., February to April) to allow more individuals of anchovy and sardine to enter the fishery at an older age.

Further work is required for this purpose and in order to apply Integrated Catch at Age (ICA) analysis, a method that uses separable virtual population analysis (VPA) with weighted tuning indices, the results of acoustic surveys.

42. SCSA comments: SCSA endorsed the WG management advice and recommendations on sardine (*Sardina pilchardus*) in GSA22 .

3.2.2. Other document

43. During the sub-committee meeting was presented a document on the evaluation of the small pelagics stocks in the Mediterranean Moroccan waters by acoustic method which was not presented to the working group on small pelagic “Evaluation acoustique du stock des petits pélagiques de la Méditerranée marocaine” (by Omar KADA & Mansour SERGHINI). There is no management recommendation in this document, however the sub-Committee took note of the situation of the small pelagics in Morocco.

3.3. SCSA general comments and conclusions on demersal and small pelagic topics

44. The Sub-Committee made the following general conclusions on demersal and small pelagics:

- The SCSA expressed the need for a joint work to process the data coming from the numerous trawl surveys realized in several countries;
- The participation and the contribution of scientists from the Eastern part of Mediterranean were welcomed;
- The assessments should be presented using the new updated assessment forms which include information on the units of fishing effort exerted by fleet segment and OUs. These forms include information on the data, the methods used, the results, the diagnosis and the management advice;
- Data required notably for the joint stock assessment session to be held during the working groups meetings should be available at least one month in advance;
- Acoustic surveys should be completed by catch at age data collection in order to improve the assessments;
- As a change in mesh size has no effect on the purse seine selectivity, so a better selection could be obtained by other means such as specific windows close to the float-line for example (still experimental), or sorting on the deck, like Portuguese fleet is doing;
- The scientific community was invited to explore further the possibilities to produce assessments and relevant advices on the stocks;
- It was recommended to crosscheck the analyses done by different methods because their conclusions can be very different;

- GFCM was invited to closely follow the progress of the project of the new European project “SARDONE” aimed to improve assessment and management of small pelagic species in the Mediterranean Sea;
- It was suggested the convenience to organize a joint assessment session during the WG on small pelagics to be held in 2008. This practical session will last at least three days;
- According to the decision taken by GFCM at its 30th session (Istanbul, 24–27 January 2006)¹, it was suggested that the TECHNOMED network become a permanent Working Group of SAC, with the following objectives:
 - Assist SAC in its recommendations on fisheries management dealing with fishing technology aspects;
 - Favour the cooperation between Mediterranean scientists involved in fishing technology studies;
 - Assure a permanent watch on fishing technology issues in Mediterranean Sea.

This network will work by exchange of field experiences and information by the way of a standing email forum and will be in charge of the meeting organization on a fishing technology issue at the request of the SAC of GFCM. Its reports and different works will be published on the GFCM website.

4. REVIEW AND DISCUSSION OF TRANSVERSAL ISSUES

4.1. Preliminary review by the Sub-Committee.

45. The Sub-Committee reviewed the outcome of the transversal meetings held during the 2007 intersession as follows:

- Transversal Workshop on Methodology to Analyse Disaggregated Fishery Data (Sète, France, 12 – 16 March 2007)

- This Workshop was the first one in the GFCM based on actual work with computers. It was recognized as very useful and recommended to be used in more workshops in the future;
- Several data bases exist in the Mediterranean although not present in the Workshop;
- The contribution of specialists like economists is essential for the future of this activity
- The preparation of a document of methodological guidelines to work with disaggregated data (recommendations on the future harmonization of the databases)
- A publication was proposed within the GFCM Studies and Reviews series on the guidelines to analyze disaggregated data.

46. The SCSA endorsed the following conclusions and recommendations of the workshop:

- It was noted that this is the first workshop carried out in the GFCM based on actual work with computers, rather than on symposium-type presentations. It was considered that this mode was very useful and is recommended to be used in more workshops in the future;
- It was noted that several databases known to exist in the Mediterranean were not present in the workshop;

¹ Paragraph 50 of the report of the 30th session: “promoting the establishment of a network of Mediterranean technologists, including from industry and collecting information and establishing a databank on gear selectivity....”

- Although two economists were present in the workshop, it was considered that the contribution of more of such specialists, as well as experts on databases, is necessary for the future of this activity;
- The follow-up of this workshop consists in the preparation of a document of methodological guidelines to work with disaggregated data. The preparation of the contents and organization of the work (to be done by email) will be dealt by the GFCM Secretariat. The guidelines will also contain recommendations about the future harmonization of the databases;
- It was suggested to propose a publication within the GFCM Studies and Reviews series on the guidelines to analyse disaggregated data. This document would have the following chapters: the present report, the guidelines to be developed further and a set of papers presenting several case studies.

- Transversal Workshop on gear Selectivity (Barcelona, Spain, 2-4 April 2007)

a. The WS confirmed the necessity to standardize the terminology of Mediterranean fishing gears: glossary and catalogue are needed.

b. It is considered that selectivity studies require a multi-disciplinary approach, integrating technologists, biologists and economists.

c. It is necessary to develop a protocol for the standardization of selectivity studies, taking into account the ATSELMED-1 meeting and the conclusions from the present WS, including technological, biological, ecosystem and economic aspects. The participation of fishing industry (especially fishing gear manufacturers) is also recommended.

d. It is also needed to monitor the implementation of 40 mm square mesh cod-end, taking into account technological, biological, ecosystem and socio-economic aspects.

e. In addition to the monitoring of implementation of 40 mm square mesh cod-end, the WS suggests to perform research on:

- effect on discards.
- survival of escapees (estimation of unaccounted mortality).
- effect of the type of netting material and mounting.
- analysis of economic effects.
- further analyze and compare the effects on the ecosystem.

f. The WS pointed out that the knowledge of survivability in the Mediterranean should be strongly improved, and stressed the need to establish an appropriated methodology to address this issue.

g. The WS considered that the implementation of 40 mm square mesh cod-end is going to have generally positive effects for the majority of the studied species. From a biological point of view, the WS stressed that the 40 mm square mesh cod-end should be implemented as soon as possible.

h. The WS stated that implementation of 40 mm square mesh is considered not sufficient to recover highly exploited species and ecosystem. Additional measures will also be required.

i. The available information on the effect of application of 40 mm square mesh cod-end does not cover the whole Mediterranean. The WS encouraged the development of selectivity studies in more GFCM GSAs.

47. SCSA comments: To undertake selectivity studies it is not necessary to have a multidisciplinary team, anyhow it is clear that also other studies on socio-economic and environment impact should be in parallel undertaken to provide GFCM all the elements for a sound management decision.

- Transversal Workshop on Ecosystem Approach to Fisheries (EAF) (Tunis, Tunisia, 22-23 May 2007)

- Conclusions:

- The workshop noted that there are still challenges in terms of sharing a common understanding of the principles and the actual application of the ecosystem approach. In particular, it was noted that there is a prevailing perception that application of the EAF is primarily a scientific concern, while the meeting stressed the importance of commitment at political, administrative and sector level. Furthermore, the importance of adopting participatory mechanisms at all steps in the application of EAF was stressed, as a precondition for its success.
- The meeting noted that the case studies presented were good examples of the changes that are taking place, sometimes implicitly, in a direction that is fully consistent with the ecosystem approach. These case studies provide useful background information for planning under an Ecosystem Approach framework and were therefore found to be very useful in this context. However, it was noted that they could not be considered as examples of application of EAF.
- The workshop underlined the need for training initiatives that could lead to both sensitize and familiarize stakeholders, at all levels (fishermen, managers, scientists, decision makers, NGOs, etc), in concepts, principles and implementation of EAF.
- The framework for application of the ecosystem approach by WWF (called EBM) appears to be very similar in terms of basic principles and implementation to the one adopted by FAO (FAO, 2003).
- The workshop recognized the importance of the regional database for Mediterranean cartilaginous fishes as a useful tool for decision makers.
- The meeting agreed that the framework provided by the FAO guidelines for the Ecosystem Approach to Fisheries should be a basic reference for guiding implementation. It was noted that the use of this framework entails consideration of ecological/biological, socio-economic and governance issues and the adoption of participatory processes.

- Recommendations.

- Undertake feasibility studies for the application of the EAF, as outlined in the FAO guidelines, in selected case studies. The process could include the following steps:
 - Identification of countries/areas to be the object of the case study. The volunteering countries could be selected to test the feasibility of implementing EAF, including the process of developing a management plan within an EAF framework for a given fishery (potential candidate countries were suggested during the workshop, e.g. Morocco, Tunisia, and Malta).
 - Ways should be identified as to ensure that neighboring countries will be able to benefit from the experience and training opportunities that will be associated with the case study.
 - Identify ways of how support can be provided by FAO/GFCM and other organizations in the implementation of the case studies.
- Collaborate with RAC/SPA in the creation of a regional database for Mediterranean cartilaginous fishes. Analyze the possibilities of MEDLEM and SIRENO databases to be the reference.
- Reinforce cooperation with relevant partners (e.g. UNEP, ACCOBAMS, WWF, IUCN, PELAGOS etc.) in various aspects related to the implementation of EAF.

48. The SCSA comments: The Sub-Committee endorsed the conclusions and recommendations of the workshop on EAF.

- Transversal Workshop on Marine Protected Areas (MPAs) (Tunis, Tunisia, 24-25 May 2007)

- Conclusions:

- The meeting noted the heterogeneity of the current terminology, the redundancy of the information and the need for a common understanding of the role of MPAs and a standardized terminology.
- The meeting recognized a weak representativity of the Mediterranean habitats in MPAs. Corrected area
- The workshop underlined the lack of up to date information concerning both MPA management and the effectiveness of the implementation of the management plans for already functioning MPAs.
- The workshop underlined the need to have clear objectives when proposing an MPA and to define appropriate links between protection measures and MPA objectives.
- The meeting noted that no clear definition of ‘deep sea’ was available in the context of this workshop.
- The workshop pointed out that MPAs alone are not sufficient to protect certain species, in particular dusky grouper (*Epinephelus marginatus*), and that additional measures are required at a regional level.
- The size and connectivity of MPAs have been recognized as key issues regarding fishery sustainability. MPA size depends on the mobility of the target species, and protection of 20% of fishing grounds has been considered a sound reference point to have a real effect on the stocks.

- Recommendations to SCME

- Use the IUCN definition of MPAs, as a reference, taking into consideration recent updates and follow the definitions given by FAO MPA Workshop (Rome, 12-14 June, 2006) as a reference to elaborate GFCM criteria to establish fisheries MPAs.
- In the selection of sites to be declared as MPAs, to consider the RAC/SPA habitat reference list and amend it to make it more relevant to fisheries.
- Adopt the standard form proposed by WWF and IUCN as reviewed in the present workshop (Appendix C) to submit new MPA proposals to SCME.
- Propose the creation of a common data base on MPAs using standard terminology.
- Further refine the concept of MPA representativity and analyze the representativeness of the current MPA network regarding the habitats involved.
- Elaborate a definition of ‘deep sea’ in the GFCM context.

49. SCSA comments: comments related to some transversal issues are presented in point 4.2 of this report.

- Transversal Workshop on the compilation of GFCM Task 1 Data (Casablanca, Morocco, 19–22 June 2007)

- Conclusions of the WS to the SCSA:

- Re-address the definition of target assemblages, especially the distinction between inshore and offshore inside the demersal species group. If the distinction is supposed to be between continental shelf and continental slope assemblages, then change the wording accordingly.
- Review the list and definitions of parameters in Task 1;

- Implementation of Resolution GFCM 31/2007/1 (Task 1): The GFCM Task 1 electronic tool has been found to be very useful in compiling multidisciplinary data, identifying Operational Units and describing the operations of the fleet in accordance with Task 1 Resolution GFCM 31/2007/1. It is therefore recommended to proceed with the development of the tool whilst continuing to work and test the revised version (according to the outcomes of this workshop) at national.

50. The SCSA endorsed the above recommendations drawn up by the workshop, in connection with the way forward in implementing GFCM Task 1 and data submissions according to GFCM/31/2007/1.

51. The Sub-Committee, based on the recommendations addressed by the Workshop to SCSA and also aiming the way forward in implementing GFCM Task 1, it further recommends:

- The replacement of the terms on Task 1 tool “inshore, off shore” by the “continental shelf, continental slope” respectively.
- The last sheet of the assessment forms as titled “SCSA reporting” could be used as the Task 1.5 contributions to the Task 1 tool.

52. During the meeting, a document on selectivity issues ("Alternative Codend Designs to reduce discards in mixed fish/crustacean fishery in the Aegean Sea" by Adnan TOKAÇ Hüseyin ÖZBİLGİN and Hakan KAYKAÇ) was presented :

Abstract: There is a high discarding in the Aegean Sea because of a multitude of species and size classes present on the fishing grounds and poor selectivity of traditional trawls. To reduce the fish and crustacean juvenile bycatch in the Aegean Sea demersal fisheries, selectivity experiments with alternative codend designs were carried out in Aegean Sea , at depths ranging from 250-420 m. Commercial trawler "Niyazi Reis" was chartered for a fifteen-days sea trial between 5 and 27 August 2004. Selectivity of commercially used 300 meshes around the circumference codend, relatively narrow codend with 200 meshes around the circumference and a square mesh top panel (SMTPC) codend were investigated as a part of an EU funded project (NECESSITY). A total of 32 valid hauls were carried out by using three different codends. Numbers of the hauls were 12 for commercial, 13 for narrow, and 7 for SMTPC (Figure 3a). All the tows were carried out during daylight. Towing duration varied between 130 and 430 minutes Towing speed changed between 2.1 and 2.2 knots. Covered codend method was used to collect the selectivity data (Wileman et al., 1996). Selectivity and discard data were collected for seven species. These were Norway lobster (*Nephrops norvegicus*), rose shrimp (*Parapeneus longirostris*), hake (*Merluccius merluccius*), blue whiting (*Micromesistius poutossou*), greater forkbeard (*Phycis blennoides*), blackbelly rosefish (*Helicolenus dactylopterus dactylopterus*) and fourspotted megrim (*Lepidorhombus boscii*). Results can be summarised as the presently used commercial codend is rather unselective. Modifications of narrow or square mesh panel codends in general improve the selectivity. However, even these modifications when using the same mesh size and material (40 mm PE) of netting are not sufficient enough to provide satisfactory selection.

4.2. Review and discussion by the Sub-Committees transversal session

53. Disaggregated data (presented by C. Karlou-Riga, Coordinator of SCSA): The group noted the different issues regarding the use of the fishing day as a measure of effort. It was suggested the participation of the SCESS in the preparation of the guidelines recommended by the Workshop.

54. Selectivity (Presented by J. Sacchi, responsible of the ATSELMED group): The transversal group noted the complexity of the selectivity issues. Selectivity is not only matter of cod-end mesh-size, but of many other factors related to the whole gear and its operation. In this context, it

is usefulness to perform in some areas experiments that have already been performed in other places. It was also noted that GFCM has already adopted the Resolution GFCM/31/2007/3 regarding the implementation of the 40 mm square mesh for the cod-end.

5. CONCLUSION OF THE WORKSHOP ON TRAWL SURVEY BASED MONITORING FISHERY SYSTEM IN THE MEDITERRANEAN.

55. The Workshop on Trawl Survey Based Monitoring Fishery System in the Mediterranean was held in Rome, Italy, from 26 to 28 March 2007. Three sessions were organized on:

- The status of knowledge on trawl survey undertaken in the GFCM Area
- The methodologies for trawl survey data used to assess fishery resources and the ecosystem, including the use of the biological and ecological indicators
- The application test for surplus production models

56. The conclusions of the Workshop, listed below, were reviewed by the Sub-Committee:

- The high attendance (76 participants) to the first GFCM workshop on trawl surveys reflected the interest of the scientific community to this topic;
- The existence of several survey data series in the Mediterranean was noted. Among them MEDITS is the most extended, including 10 countries. However AdriaMed, Grund or other surveys at local level should be also emphasized;
- The Workshop on Trawl Survey Based Monitoring System recognized the existence of many though different protocol trawl surveys operating in the area of Mediterranean. Besides the use of trawl surveys data to biological indicators and demographic population structure, various approaches were presented for the use of trawl surveys data in estimating the state of stocks, mainly by the application of surplus production models. The need for a common protocol for all member countries to follow was stressed, while the determination of certain approaches for stock assessment applied first locally then globally was considered a major Task. Thus, the following recommendations were proposed:

→ Establishment of a permanent working group, under the GCFM/SAC umbrella, with the general objective to promote the use of the surveys data for stock assessment and management purposes² including for EAF needs. In particular this group shall:

- Identify the data requirements from the surveys at sea, examine any data deficiencies, look for research needs and finally search for appropriate ways in addressing them.
- Set a common framework for the harmonization of protocols and approaches, planning and quality control of demersal and pelagic surveys in the Mediterranean. The new GFCM protocol regarding trawl survey in particular should take into consideration the MEDITS experience.
- Facilitate data and information exchange.
- Perform analyses and interpretation of the data obtained from surveys at regional and GSA level, in connection with the Sub-Committee for Stock Assessment (SCSA)

57. SCSA comments: The use of surveys data to perform stock assessment and to provide management advice, including EAF perspective, is an important step that needs to be further

² Parag. 74 of the ninth session of SAC report

promoted and supported in the SAC so that efforts and investments in undertaking the surveys at sea (trawl surveys, echo surveys, eggs-larvae) are reconciled with their ultimate goal to provide assessments on the status of stocks.

58. With a view of promoting common understanding and protocols on the methods to be used, and taking stocks of all meetings convened on this matter, including the workshop on trawl surveys, urgent actions must be launched so that the Permanent Working Group on Methodologies could harmonize early in 2008 the basic methods, protocols, data format and software to be used to undertake joint assessments with direct methods. However, the already existing protocols downloadable from the GFCM website can be used as reference.

59. Therefore it was recommended to organize a meeting of the Permanent Working Group on Methodologies to address the above issue back to back with the next MEDITS meeting which also will take place early in 2008.

60. If some stock assessments are realized during these sessions the analysis, conclusions and recommendations should be presented to the GFCM WG on demersals or at least to the Sub-Committee on Stock Assessment.

61. In Parallel, actions shall be launched within the WG-Demersal to undertake stock assessments in all GSAs where data from trawl survey have been regularly collected.

62. Data requirements and data format for some method have been already discussed in the framework of the WG-demersal and in the transversal workshop on trawl surveys and it is now important to start selecting the appropriate methods to evaluate the status of the stocks and provide management advice. This exercise may helps in examining any data deficiencies, look for research needs and search for appropriate ways in addressing them.

63. Within the framework of the permanent working group on methodology it is also important to address the harmonization of protocols, approaches, planning and quality control to execute demersal and pelagic surveys in the Mediterranean. It would be advisable that the GFCM protocol regarding the carrying out of trawl survey take into consideration in particular the MEDITS experience.

64. Facilitate data and information exchange taking into account the GFCM recommendation 2006/7 on confidentiality of data.

65. Dedicate some meetings of the working groups on demersals and small pelagic of the SCSA to perform analyses and interpretation of the data obtained from surveys at regional level.

6. FOLLOW-UP OF SAC RECOMMENDATIONS ON STOCK ASSESSMENT METHODOLOGIES

6.1. Standardization of the different approaches for echo-surveys in the Mediterranean

- **Work on the standardization of echo-surveys protocols in the Adriamed and MedSudMed Project**

In the Adriatic Sea, an inter-ship calibration between the R/V Dallaporta of the ISMAR-CNR of Ancona, Italy and the R/V Bios of the IOF in Split, Croatia was performed in 2005 in GSA 17 and had positive outcome regarding the comparability of the acoustic data collected by the two vessels. Following the Adriamed WG on small pelagic fish in 2006, the "Coordinated team on echo-survey" was created and was requested to carry out an on-the-job exercise to compare, step-by-set, the methodologies used from collection of raw data to

final biomass estimates. The meeting was informed on the progress of the work achieved by the coordinated team on echo-survey.

The MedSudMed Project organized two working groups with the scientists of the Project area (GSA 12, 13, 14, 15, 16 and 21) in 2004 and 2005 to standardize the protocol for data collection and for data processing. Since 2005, annual surveys carried out by the different participating institutes are based on the agreed protocol; however, discussions are on-going at regional level, in particular to agree on the format of the final outputs produced by the data processing. The meeting was informed that GSAs 12, 13, 14, 15 and 16 are currently covered by annual echo-surveys and that a Libyan acoustic program is being implemented in GSA 21.

66. The activities of the Projects on this issue were acknowledged by the Sub-Committee.

• **EU Mediterranean Coordinated Survey on Small Pelagics “MEDIAS”**

In the last Mediterranean Regional Coordination Meeting (RCM-MED) of the EU Data Collection Regulation (DCR) it was discussed the need of a coordinated survey on small pelagics in the Mediterranean under the EU-DCR.

In the Mediterranean 5 direct surveys on small pelagic fish are regularly held at least during the last decade : Iberian coast (IEO):ECOMED, Gulf of Lions (IFREMER): PELMED, Adriatic Sea (ISMAR), Sicilian channel & Malta (IAMC) : ANCHOVY, Aegean Sea (HCMR): ANCHOVY. These surveys mainly target on anchovy and sardine and cover the major stocks of these species in the Mediterranean European Union waters. The 3 surveys (French, Spanish and Greek) are included in the extended program of the DCR while the 2 Italian surveys are funded by other programs.

These surveys cover a long time data series: Adriatic from 1976, Gulf of Lions from 1995, Iberian coast from 1993, Aegean from 1995 and Sicily from 1998.

DEPM has been applied occasionally (Gulf of Lions, Catalan Sea, Sicilian Channel) with the exception of Aegean Sea, where DEPM is applied all years on a regular basis. Results and data for the two target species (anchovy and sardine) from all these surveys are being presented on a regular basis in the GFCM working group for the small pelagics, providing stock assessment results through the stock assessment forms of GFCM.

Anchovy and sardine contribute 30% to 40% (up to 200.00 mt) of the Mediterranean European Union landings and 33% to 51% of the total Mediterranean landings. Small pelagic, anchovy and sardine are key-stone species in the marine ecosystems because of their contribution to total landings and because they are the link between lower and higher trophic level in a marine ecosystem.

A small pelagic survey provides essential information for the implementation of an ecosystem approach to fishery management. According to 12-16/2 Brussels recommendation, these 5 Mediterranean pelagic surveys should be merged and combined in 1 EU international Mediterranean survey. A common protocol should be adopted for all surveys which should be Coordinated and for this purpose a scientific steering group is required.

In the last RCM for Mediterranean, it was decided that a coordinated acoustic survey on small pelagic for all EU countries should be proposed in the liaison meeting of DCR. According to the RCM, this acoustic survey should be included in the minimum program of the Data Collection Regulation. A common protocol for the acoustic surveys should be adopted by a steering committee.

It was stressed the necessity of organizing a Workshop at the beginning of 2008 was agreed, for the final establishment of the MEDIAS. A Steering Committee was proposed and the RCM Med approved it. The proposed Steering Committee is composed by one participant

of each of the five ongoing pelagic surveys to be merged: Magdalena Iglesias (IEO), Bernard Liorzou (IFREMER), Angelo Bonanno (IAMC – CNR), Iole Leonori (ISMAR – CNR) and Athanassios Machias (HCMR).

67. SCSA was acknowledged for the above activity. GFCM/SAC was invited to collaborate with this project. The facilitator of the SAC small pelagic Working Group was invited to be member of the Steering Committee.

6.2. Criteria for ensuring/improving the validation of growth parameters used in stock assessments

68. The SCSA coordinator presented some tables showing the wide range of growth parameters used in the assessments up to now.

69. The SCSA took note of a working document on the main sources of errors in growth estimation which was presented. Given the usual high negative correlation between L_{inf} and k it was recommended to take the couple of values with higher L_{inf} to minimize the problems of sensitivity in the VPA's.

7. NEW AVAILABLE INFORMATION ON MAPPING THE DISTRIBUTION OF JUVENILES.

70. In this context, a presentation on “Mapping of eggs and larvae distribution of *Engraulis encrasicolus* and *Sardinella aurita* in the MedSudMed project area (Authors: A. Bananno and all) was made to the Sub-Committee meeting.

Abstract: Oceanographic surveys were carried out in Maltese waters (GSA 15), South Sicily (GSA 16) and the western continental margin of the Libyan coast (GSA 21) on board the CNR research vessel *Urania* in summer 2006; GSA 15 and GSA 21 were covered in the framework of the FAO MedSudMed Project. The main aim of the surveys was to locate areas of major concentration of *Engraulis encrasicolus* (anchovy) and *Sardinella aurita* (round sardine) eggs and larvae and possibly relate them to oceanographic patterns to understand transport and retention processes in the Project area. Ichthyoplankton samples were collected using a Bongo 40 and eggs and larvae were counted in laboratory. Environmental data were collected with a CTD probe Seabird 9/11 plus. A total number of 1954 larvae were identified (38 species, 46 genera, 37 families, 10 orders) in the western part of GSA 21 while 1763 larvae were collected in the GSAs 15 and 16. In the Italian and Maltese part of the study area, the sites of concentration are coherent with those found in the previous years, thus providing additional elements to confirm the hypothesis that were drawn on the transport and concentration of eggs and larvae in relation with the Atlantic Ionian Stream. In GSA 21, it was the first time mapping of spawning grounds and larvae distribution of anchovy and round sardinella were carried out. The first results show that the distribution patterns of anchovy eggs and larvae are strongly influenced by oceanographic factors. Salinity and temperature fields seem to be the main factors influencing the distribution of the sardinella larvae.

71. SCSA took note of the new information given.

8. PRIORITY SPECIES AND SHARED STOCKS LISTS INCLUDING THE IDENTIFICATION OF CRITERIA TO UPDATE

72. Some working documents on the concept and definition of the “priority species” for the fishery assessment and management purposes in the GFCM area coming from the AdriaMed sub regional project were presented to SCSA. The report of the SCSA/SCSI/SCSS Transversal

workshop on methodology to analyse disaggregated fishery data and FAO presented lists of species sorted on different criteria mainly catches, prices and revenues for different zones of the Mediterranean.

73. The SCSA noted that priority species are very important for the main mission of the GFCM “to promote the development, conservation and management of living marine resources and to formulate and recommend conservation measures”. Thus, the three issues development, conservation and management should be taken into account when considering the list of the priority species.

74. It put emphasis of the need of clarification on the concept is a key research question of the GFCM, as it was reported in the Report of the ninth session of the SAC (Rome, 2006). And this issue was recommended in the SAC Preliminary Workplan for 2007: “Priority species and shared stock lists: - identify criteria to update the SAC priority species and shared stocks lists, for all GSAs, including for the Black Sea”. At the moment no definition of priority species is included in the SAC – Glossary of terms

75. Other working documents showed sorting based on different criteria such as catches, prices and revenues for different zones of the Mediterranean.

76. There was no conclusion regarding the criteria for updating the shared stocks list. This issue is still pending.

77. Regarding the priority species list, SCSA recommended the production of a list of species sorted by the above 3 mentioned criteria (catches, prices and revenues), by country and GSA and send it to the coordinator of the SCSA as soon as possible.

9. IMPROVEMENT AND UPDATE OF THE SAC GLOSSARY

78. A working document was presented by FAO and GFCM Secretariat regarding some terms being used in GFCM with different, or not well defined, meanings. The expressions considered were: Inshore, Offshore, Artisanal, Industrial, Small-scale and Deep-sea. However no conclusions were reached regarding these terms, except of the inshore-offshore (see point 4.1). Given that the glossary has not been updated since 2003, it is necessary to address this issue mainly on some conflicting words.

79. The GFCM secretariat was invited to take in charge the updating of the glossary.

10. SCSA WORKPLAN FOR 2008

80. The Sub-Committee recommended the following activities for 2008.

- Meeting of the Working Group on Demersal, including joint stock assessment session, Izmir, Turkey, second half of September 2008;
- Meeting of the Working Group on small pelagic, including joint stock assessment session, Izmir, Turkey, second half of September, 2008;
- Training courses on methodologies for stock assessment: - tuning VPA and production models (including composite models), in collaboration with CIHEAM, date to be defined.
- 2nd meeting of the permanent WG on methodology to address the basic methods and protocols to be used to undertake joint assessments with direct methods (back to back with MEDITS meeting), date and venue to be defined;
- Tenth session of SCSA, Antalya, Turkey, date to be defined
- Other activities: The preparation of methodological guidelines to work with disaggregated data. The preparation of the contents and organization of the work (to be done by email) will be dealt by the GFCM Secretariat. The guidelines will also contain recommendations about the future harmonization of the databases.

11. FUNCTIONING OF THE SCSA REGARDING THE SCIENTIFIC ACTIVITIES, IN CONNECTION WITH ITS WORKING GROUPS AND WITH THE TRANSVERSAL ACTIVITIES

81. It was suggested that the annual meeting of the working group on demersals should be held every year in the same period, preferably between the end of September and the beginning of October, in order to allow participation of scientists involved in surveys at sea and to facilitate the planning of annual research activities.

82. The duration of each Working Group meeting should be 5 days (including the practical session). The dates and venues for the WG should be independent and not in parallel. A period of at least one week has to separate the working groups from the Sub-Committee session.

12. NOMINATION OF SCSA COORDINATOR AND ENDORSEMENT OF THE DESIGNATION OF WORKING GROUP FACILITATORS

83. The Sub-Committee congratulated Ms Constantina Karlou Riga for the quality of the work which has been done during the last 3 years. Ms Constantina Karlou Riga (Greece) was re-elected as SCSA coordinator for the next 2 years term.

84. The SCSA also endorsed the nomination of facilitators:

- Mr Enrico Arneri (Italy): Working group on demersals
- Mr Stylianos Somarakis (Greece) for the working group on small pelagics.

13. DATE AND VENUE OF THE NEXT MEETING

85. The Sub Committee took note of the invitation of Turkey to host the next session of SCSA in Antalya (Turkey). The date of this meeting will be defined by SAC.

86. The SCSA took also note of the invitation of Turkey to host the next Working Groups meetings in Izmir (Turkey).

14. ADOPTION OF THE REPORT

87. The SCSA report was adopted on 20 September 2007.

Appendix A**Agenda**

- 1. Opening and arrangements for the meeting**
- 2. Adoption of the agenda**
- 3. Review of the scientific management advices**
 - 3.1. Conclusions and scientific advice addressed by the Working Group on Demersals
 - 3.2. Conclusions and scientific advice addressed by the Working Group on Small Pelagics
- 4. Review and discussion of transversal issues**
 - 4.1. Preliminary review by the Sub-Committee
 - 4.2. Review and discussion by the sub-Committees transversal session
- 5. Conclusion of the Workshop on Trawl Survey Based Monitoring Fishery System in the Mediterranean**
- 6. Follow-up of SAC recommendations on stock assessment methodologies**
 - 6.1. Standardization of the different approaches for echo-surveys in the Mediterranean
 - 6.2. Criteria for ensuring/improving the validation of growth parameters used in stock assessments
- 7. New available information on mapping the distribution of juveniles**
- 8. Priority species and shared stocks lists including the identification of criteria to update**
- 9. Improvement and update of the SAC glossary**
- 10. General conclusions and scientific advice**
- 11. 2008 SCSA workplan**
 - 11.1. Training courses on methodologies for stock assessment
 - 11.2. other activities (to be defined by the SC)
- 12. Functioning of the SCSA regarding the scientific activities, in connection with its Working Groups and with the transversal activities.**
- 13. Any other matters**
- 14. Nomination of SCSA Coordinator and endorsement of the designation of Working Group facilitators**
- 15. Date and venue of the next meeting**
- 16. Adoption of the report**

Annex 1**CONTENT OF THE SUB-COMMITTEES
TRANSVERSAL SESSION
(Agenda item 4.2)**

Chairperson : Nicos Hadjistephanou

- 1) **Methodology to Analyse Disaggregated Fishery Data (By Constantina K.R)**
Rapporteur : Henry Farrugio
 - Conclusions of the Workshop on disaggregated Fishery Data (France, 12-16 March 2007)
 - Elaboration of guidelines on the use of disaggregated data to identify fisheries parameters (OU, fishing effort...)
- 2) **Selectivity in the Mediterranean trawl fisheries (by Sacchi).**
Rapporteur : Henry Farrugio
 - Conclusions of the Workshop on selectivity in the Mediterranean trawl fisheries (Spain, 2-4 April 2007)
 - Presentation of the document on reference technics on impact of certain fishing gears on the environment
 - Works on improving gear selectivity, with special attention to trawls
- 3) **Ecosystem Approach to Fisheries (by M.N Bradai).**
Rapporteur : Bradai/chedly
 - Conclusions of the Workshop on EAF (Tunisia, 22-23 May 2007)
 - Common framework for the implementation of EAF in the Mediterranean, according to the FAO guidelines, including feasibility studies in selected GFCM GSAs.
- 4) **Marine Protected Areas (MPAs) (by C. Rais).**
Rapporteur : Bradai/Chedly
 - Conclusions of the Workshop on MPAs (Tunisia, 24-25 May 2007)
 -
 - Presentation of the inventory/synthesis of published studies on fisheries and biodiversity of the Mediterranean deep sea.
 - Proposition of new fisheries restricted areas
- 5) **The compilation of GFCM Task 1 data (by M. Camilleri).**
Rapporteur : Levrentis
 - Conclusions of the Workshop on the compilation of GFCM Task 1 (Morocco, 19-22 June 2007)
- 6) **Information on GEF project (By J. Lleonart)**

Appendix B

List of Participants

Jorge BARO
 Instituto Español de Oceanografía
 Puerto Pesquero s/n.
 29640-Fuengirola (Málaga) - SPAIN
 Tel.: 0034 952 47 69 55
 Fax: 0034 952 46 38 08
 E-mail: jorgebaro@ma.ieo.es

Franco BIAGI
 EUROPEAN COMMISSION
 Directorate General for Fisheries and
 Maritime Affairs
 Rue Joseph II, 79
 BELGIUM
 Tel.: 0032.2.2994104
 Fax: 0032.2.2957862 or 2994802
 E-mail: Franco.Biagi@ec.europa.eu

K. Can BIZSEL
 University of Dokuz Eylul
 Haydar Aliyev Bulvarı No:32
 35340 İnciralti, İzmir - Turkey
 Tel: +90 (232) 278 65 25
 Fax: +90 (232) 278 50 82
 E-mail: can.bizsel@deu.gov.tr

Najib EL OUAMARI
 Centre Régional de l'Institut National de
 Recherche Halieutique à Nador
 BP 493, Bd Zerktoni Nador - Maroc
 Tel.: +212 36 331251
 Fax: +212 36 603828
 E-mail: n.elouamari@inrhnador.gov.ma

Gianna FABI (Ms)
 CNR - ISMAR
 L.go Fiera della Pesca, 2
 Ancona - Italy
 Tel.: +39 071 2078825
 Fax: +39 071 55313
 E-mail: g.fabi@ismar.cnr.it

Henri FARRUGIO
 IFREMER
 BP 171 Avenue Jean Monnet
 34203-SETE cedex - FRANCE
 Tel.: + 33 (0)4 99 57 32 00
 Fax: + 33 (0)4 99 57 32 95
 E-mail: henri.farrugio@ifremer.fr

Otello GIOVANARDI
 ICRAM-Chioggia
 Loc. Brondolo, 30015 CHIOGGIA
 Venice, Italy
 Tel.: +39(0)41-5543933
 Fax: +39(0)41-5547897
 E-mail: otgiovan@tin.it

Fabio GRATI
 CNR - ISMAR
 L.go Fiera della Pesca, 2
 Ancona - Italy
 Tel.: +39 071 2078848
 Fax: +39 071 55313
 E-mail: f.grati@ismar.cnr.it

Othman JARBOUI
 Institut National des Sciences et Technologies
 de la Mer
 Laboratoire des Ressources Marines Vivantes
 BP 1035, 3018 Sfax, Tunisie
 Tel.: 00 216 74 497117.
 Fax: 00 216 74 497989.
 E-mail: Othman.jarbouï@instm.rnrt.tn

Aleksandar JOKSIMOVIĆ
 Institute of Marine Biology
 Dobrota bb, PO Box 69
 85330 Kotor - Montenegro
 Tel.: +382 67 507 926
 Fax: +382 82 334 570
 E-mail: acojo@cg.ac.yu

Omar KADA
 Centre Régional de l'Institut National de
 Recherche Halieutique à Nador
 BP 493, Bd Zerktoni Nador Maroc
 Tel.: +212 36 331251
 Fax: +212 36 603828
 E-mail: omarkada@hotmail.com

Athanassios MACHIAS
 Hellenic Center for Marine Research
 Institute of Marine Biological Resources
 Ext American Base, Gournes,
 PO BOX 2214, GR71003, Heraklion
 Greece
 Tel.: +30 2810 337832
 E-mail: amachias@her.hcmr.gr

Enrico ARNERI
CNR – Istituto di Scienze Marine (ISMAR)
Largo Fiera della Pesca 1
60125 Ancona - Italy
Tel.: +39 2078849
Fax: +39 55313
E-mail: e.arneri@ismar.cnr.it

Corrado PICCINETTI
Chairperson of SAC
Laboratorio di Biologia Marina Pesca
Viale Adriatico 1/N
61032 Fano
Tel.: +39 0721 802689
Fax: +39 0721 801654
E-mail: cpiccinetti@mobilia.it;
corrado.piccinetti@unibo.it

Salem W. SGOZI
Marine Biology Research Center
Tripoli
Libya
Tel.: +218 213 690001
Fax: +218 213 690002
E-mail : Salem_Zgozi@yahoo.com

Aljaz JENIC
Fisheries Research Institute of Slovenia
Zupanciceva, 9
1000 Ljubjana
Slovenia
E-mail : aljaz.jenic@zzrs.SI

Mark DIMECH
Malta Centre for Fisheries Sciences
Fort San Lucian
Marsaxlokk
Malta
Tel.: +356 22293302
Fax:
E-mail: mark.dimech@gov.mt

Nicola UNGARO
Regional Agency for the Environmental
Protection (Arda Puglia)
Corso Trieste, 27
70126 Bari - Italy
Tel.: +39 080 5460208
Fax: +39 080 5460200
E-mail: N.UNGARO@ARPA.IT

Jacques SACCHI
IFREMER
BP 171 Avenue Jean Monnet
34203-SETE cedex - FRANCE
Tel.: + 33 (0)4 99 57 32 00
Fax: + 33 (0)4 99 57 32 95
E-mail: jacques.sacchi@ifremer.fr

Giuseppe SCARCELLA
CNR - ISMAR
L.go Fiera della Pesca, 2
Ancona - Italy
Tel.: +39 071 2078848
Fax: +39 071 55313
E-mail: g.scarcella@ismar.cnr.it

Stylios SOMARAKIS
University of Crete, Department of Biology
Vassilika Vouton, PO Box 2208,
71409 Heraklion, Crete - Greece
Tel.: +30 2810 394065
E-mail: somarak@biology.uoc.gr

Adnan TOKAÇ
Ege University Fisheries Faculty
35100 Bornova, Izmir - Turkey
Tel.: +90 232 3884000 extn: 1307
Fax: +90 232 3747450
E-mail: adnan.tokac@ege.edu.tr

GFCM Secretariat

Alain BONZON
GFCM Executive Secretary
International Institutions and Liaison Service
Fisheries and Aquaculture Economics and
Policy Division
Tel.: +39 06 57056441
Fax: +39 06 57056500
E-mail: alain.bonzon@fao.org

Abdellah SROUR
GFCM Deputy Executive Secretary
International Institutions and Liaison Service
Fisheries and Aquaculture Economics and
Policy Division
Tel.: +39 06 57055730
Fax: +39 06 57056500
E-mail: abdellah.srou@fao.org

Matthew CAMILLERI
GFCM Bio-Statistician
International Institutions and Liaison Service
Fisheries and Aquaculture Economics and
Policy Division
Tel.: +39 06 57056435
Fax: +39 06 57056500
E-mail: matthew.camilleri@fao.org

FAO
Viale delle Terme di Caracalla
00153 Rome

Jordi LLEONART
Senior Fishery Resources Officer
Fisheries Management and Conservation Service
Fisheries and Aquaculture Management Division
Tel: +39 06 57056354
Fax: +39 06 57053020
E-mail: jordi.lleonart@fao.org

Tarub BAHRI (Ms)
FAO MedSudMed
Fisheries Management and Conservation Service
Fisheries and Aquaculture Management Division
Tel.: +39 06 57053885
Fax: +39 06 57053020
E-mail : tarub.bahri@fao.org

Appendix C

Stocks assessed in 2007

(source: report of the Working Group on Demersal Species, Athens 10-12 September 2007)

	GSA																									
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
<i>Parapenaeus longirostris</i>						1																			1	
<i>Aristeus antennatus</i>						1																				1
<i>Mullus surmuletus</i>					1							1	1	1												4
<i>Merluccius merluccius</i>					1	1			1																	3
<i>Dentex dentex</i>											1	1														2
<i>Lophius budegassa</i>						1																				1
<i>Solea solea</i>																		1								1
<i>Corallium rubrum</i>						1																				1
																										0
Total per GSA	0	0	0	0	2	5	0	0	1	0	1	2	1	1	0	0	1	0	0	0	0	0	0	0	0	13

Assessments	
Total	13
GSA's	8
Species	8
Shared stocks	1