

October 2008



**GENERAL FISHERIES COMMISSION
FOR THE MEDITERRANEAN**

**COMMISSION GÉNÉRALE DES
PÊCHES POUR LA MÉDITERRANÉE**



GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

SCIENTIFIC ADVISORY COMMITTEE

Eleventh Session

Marrakech, Morocco, 1-5 December 2008

**REPORT OF THE NINTH SESSION OF THE SUB-COMMITTEE ON
MARINE ENVIRONMENT AND ECOSYSTEMS (SCMEE)*
Antalya, Turkey, 13–16 October 2008**

*Available in English only

I. OPENING, ARRANGEMENT OF THE MEETING AND ADOPTION OF THE AGENDA

1. The Ninth meeting of the Sub-Committee on Marine Environment and Ecosystems (SCMEE) of the Scientific Advisory Committee (SAC) was held in Antalya, Turkey, from 13 to 16 October 2008. It was attended by 25 experts from seven GFCM members namely EC, France, Libya, Malta, Spain, Tunisia and Turkey as well as by GFCM partners (ACCOBAMS, UNEP-MAP-RAC/SPA, WWF and Greenpeace). The list of participants is provided in Appendix 2.

2. During the opening session of the four Sub-Committees, Mr Vahdettin KURUM, head of the Fisheries Department, Turkey, welcomed the participants and thanked them for attending this meeting. Mr Srour, Deputy Executive Secretary of the GFCM, also welcomed the participants and thanked the Turkish Authorities for their kindness in hosting and arranging the meetings of the Sub-committees. He also expressed the appreciation of GFCM for the valuable support of Turkey to the SAC activities.

3. Mr A.Srour informed that the Coordinator of the Sub-Committee, Mr Bradai was not able to attend this session of SCMEE. Mr Jacques Sacchi acted as Chair and Mr Chedly Raïs as rapporteur for the session.

4. The representative from Greenpeace made a statement in which she stressed the commitment of her Organization in campaigning for the establishment of a network of marine reserves in the Mediterranean Sea which is intrinsic to the application of the ecosystem approach. Greenpeace therefore welcomed the recommendations put forward through the SCMEE, including those calling for Fisheries Restricting Areas. It is looking forward to working constructively with the GFCM to push for long term protection and conservation of the Mediterranean valuable marine resources. Greenpeace also urged all Mediterranean and Black Sea countries to come together under GFCM, the regional fisheries body assigned the important task of conserving and managing the marine resources in the region.

5. The draft agenda was adopted without changes. It appears as Appendix 1 to this report.

II. PROMOTE THE IMPLEMENTATION OF THE ECOSYSTEM APPROACH TO FISHERIES (EAF)

- Review and consolidate information and classification of bottom habitats

6. The Meeting noticed that no additional information was presented to SCMEE on the bottom habitats. It suggested therefore that the classification of habitats presented by RAC/SPA be used as working reference to identify habitats of importance to fishery management in the Mediterranean.

- Improve knowledge on characterization of essential fish habitats:

7. Considering that the mandate of the SCMEE on this issue, as defined by the 32nd session of GFCM, was to "select criteria for the identification of sensitive habitats of relevance for the management of priority species by GSA", the Sub-Committee agreed to prepare a draft set of criteria with the view of submitting them to the next SAC Meeting (Marrakech, December 2008). To this end, a draft document will be prepared by Chedly RAIS and circulated by Email before 10 November 2008 for comments and inputs, before 15 November. Based on the received comments and inputs, a final version of the document will then be finalized and submitted to SAC.

8. The SCMEE agreed that the criteria be elaborated taking into account (i) the relevant work done in the context of the EU Technical and Economic Committee for Fisheries (STECF) about the sensitive and essential fish habitats in the Mediterranean sea and (ii) the results of the MedSudMed Project concerning the spawning and nursery areas for hake and red mullet. The Sub-Committee also agreed to cross information on this issue with the Sub-committee on stock assessment (SCSA).

- Review of the pilot study performed in the field of the implementation of EAF

9. The meeting was informed on the progress made so far in the development by INSTM (Tunisia) of the pilot study for the implementation of the EAF in GSA 12. It was emphasised that INSTM is collaborating with IFREMER (France) to develop a project aimed at promoting the implementation of the EAF, notably by integrating several available data (biological parameters, environmental aspect, socio-economic indicators and exploitation patterns) on the ecosystems in GSA12 (North of Tunisia), GSA14 (Gulf of Gabès) and GSA7 (Gulf of Lions) to give advice for managing resources and protecting marines habitats in these areas. The Project could be extended to other GSAs and any interested Institution of the Mediterranean is invited to join the initiative. The Project document is expected to be ready by the end of this year. It will be then submitted for fund raising.

10. The Sub-Committee commended the efforts being made to develop the pilot study and stressed the importance of launching other similar initiatives aimed at further developing the concept and methodologies for implementing EAF.

11. In this context, Mr Srour informed the Meeting that the GFCM Secretariat is envisaging to launch some experiences on EAF, on the basis of the decision taken by GFCM at its last Session (Rome, February 2008) and with the support of the regional projects. Ms Tarub Bahri (MedSudMed) informed the meeting that the Project might provide technical support for the participating countries upon request.

12. A substantive debate took place under this item about the methodology for applying the EAF. The meeting stressed the importance of involving the stakeholders from the beginning of the EAF process. The EAF is of relevance for all the SAC's Sub-committees and it should be addressed as a transversal issue. The SCMEE should focus on marine ecosystem aspects of EAF.

III. DEEP SEA, SENSITIVE HABITAT AND MARINE PROTECTED AREAS (MPAS)

13. A new proposal for establishing, within the framework of GFCM, a Fishery Restricted Area (FRA) encompassing marine canyons in the continental slope of the Eastern Gulf of Lions (CoSEGoL) was presented and discussed by SCMEE. The proposal was made by the French and Spanish scientific institutions and the WWF Mediterranean Programme and was submitted according to the Format adopted by GFCM.

14. The area of this new FRA is located on the continental slope of the Eastern Gulf of Lions in international waters; recent studies shown that it constitute a refuge for large spawners of several commercial species. The proposal is aimed to protect this area from any kind of demersal fishing. It is expected that the protection of the spawners that support demersal fishery of the Gulf of Lions and Spanish coasts will help maintain the status quo of the stocks.

15. The delimitation of the area is based on recent studies carried out in the field that evidenced high abundance of commercial species and greater individual size respect to other zones of the Gulf of Lions. Results were not published in peer-reviewed journals but a copy of the report of a pilot study carried out in the area was made available during the meeting for consultation. Other technical evidence was provided by publications and general knowledge of the area.

16. Because of its geographical location far from the coast and due to regulations currently applied on time at sea by Spain and France, the area is presently only slightly exploited.

17. After analysis of the information presented in the proposal, the Sub-Committee validated the proposal and agreed to submit it for consideration by the forthcoming Session of SAC. The full document of the proposed FRA is given as Appendix 3 to this report.

18. The results of the study "Differences in demersal community structure and biomass size spectra within and outside the Maltese Fishery Management Zone (FMZ)" were presented and discussed by the Sub-Committee. The study proved the effectiveness of protection of the Maltese FRA for the continental shelf and size spectra have been demonstrated to be a good indicator to evaluate the effectiveness of a FRA. The study had many management implications, it can particularly assist in:

- Determining geographical or spatial boundaries of fish and other demersal assemblages, especially in relation to depth zonation;
- Subdividing the fishery into components affected by different conditions, e.g. different intensities of fishing pressure, and to differences in environmental conditions; and
- Designing management actions which could be applicable to different components of the fishery or to different areas based on the spatial distribution patterns of the assemblages.

19. The RAC/SPA representative presented the main results of a recent study carried out on fishery reserves. The study was carried out through the circulation of a questionnaire whose objectives was (i) identification of existing fishery reserves and collection of information about their legal status, objectives, activities and procedures and (ii) evaluation of the effectiveness of Fishery Reserves. Information from 9 Mediterranean countries was received covering 61 fishery reserves (17654 Km²). The study shown that the main measures taken within the fishery reserves were:

- Management measures of fishing effort
- Restrictions regarding fishing gear
- Restrictions regarding minimum sizes for capture of marine organisms
- Restrictions regarding minimum mesh sizes
- Restrictions regarding minimum hook size
- Restrictions regarding attachments to and rigging of trawl nets
- Restrictions regarding Minimum distances and depths for the use of fishing gears
-

20. The meeting was informed that, as next step of the study, RAC/SPA will collect information from other Mediterranean countries and will work on the evaluation of the effectiveness of fishery reserves. A programme of work on MPAs was also presented, which will be carried out by RAC/SPA in collaboration with ACCOBAMS, WWF and IUCN. It will assist the Mediterranean countries to build an ecological and representative network of adequately managed MPAs.

21. In the following debate, the participants stressed the importance of devising a clear definition of the MPA that gives a common understanding of the concept. They also stressed the need of involving the relevant stakeholders and in particular fishermen in the establishment and the management of fishery reserves.

IV. REVIEW AND DISCUSSION OF OUTCOMES IN THE TRANSVERSAL MEETINGS

22. Under this agenda item, the meeting reviewed the conclusions of the meetings held during the 2008 intersession as follows:

- Transversal Working Group on Selectivity (Sète, France, 2-4 July 2008):

23. The outcome of the workshop was presented recalling that its objectives were (i) to make a review of selectivity studies on static gears and (ii) to examine the progress on the gradual implementation of 40 mm square mesh cod-end to the Mediterranean bottom trawling fleet. The main recommendations were discussed and endorsed by the Sub-Committee as follows:

- The Working Group pointed out the importance of selectivity studies on longline, traps, trammels and gillnets for the Mediterranean fisheries and stressed the need for further research on these issues. It was recommended considering results from outside the region to be used in the fisheries management;
- The Working Group stressed the importance to finalize the common framework for selectivity studies to support the implementation of the selectivity measures. Once this framework is finalized and adopted by SAC, the scientists of member countries will be encouraged to test it for future studies on selectivity;
- It was recommended to urgently implement and enforce the use of a square mesh of at least 40mm in the bottom trawl codend in accordance with GFCM regulation. The Working Group considered that measures based only on size selectivity are not enough and recommended that additional measures (closed seasons-areas) be also implemented ;
- The Working Group acknowledged the importance of the preliminary elements of the case study presented by the Moroccan participants. It was recommended that a project document be elaborated and submitted for consideration at next meeting, including all relevant phases covering project formulation, gear survey, trial protocol, indicative budget as well as technical support needs for different phases of the project ;
- The Working Group encouraged the members of the TechnoMed network to continue the effort on their different tasks, notably the development of a GFCM database on gear selectivity and gear characteristics. In this context, the completion of the new FAO manual on fishing gear classification will be useful, as each single technical term plays a crucial role in fishery regulations. It was also recommended to test the TechnoMed web page (foreseen to be hosted in GFCM website) with the aim to improve its use as a tool of communication and exchange between the network and other scientists. The meeting recommended to the members of the network to develop a permanent “watch” on the fishing technical evolution of the fisheries in their countries;
- The GFCM TechnoMed network was invited to coordinate and contribute to identify the list of main terms and concepts which needs to be defined and included in the updated GFCM glossary.

- Transversal Workshop on Bycatch/Incidental Catches (Rome, Italy, 15-16 September 2008)

24. The conclusions of this workshop were presented. The main recommendations of the Working Group as endorsed by the SCME are summarised as follows:

- To collaborate and promote, together with other relevant IGOs/NGOs, coordinated studies on population dynamics of protected species of conservation concern, such as marine turtles, mammals, birds;
- To launch pilot projects on by-catch in specific métiers, taking into account not only technological measures for mitigation, but also the social aspects connected with that métier (especially in artisanal fisheries);
- To implement more testing studies on promising technical and operational changes in fishing practices (e.g. circle hooks, TEDs, deep setting, etc.)

25. In terms of future SCMEE work plan, the Workshop recommended to follow-up on these activities by:

- Drafting a protocol for data collection on by-catch of species of conservation concern, merging the draft protocols prepared for ACCOBAMS and MEDLEM;
- Evaluating the existing data on by-catch, and identifying critical areas that could be object of local fishery management measures.

26. The participants recommended extending the work done on the by-catch of endangered species to include discards and also the impacts of fishing gears on habitats. The need to regulate trawling activities in areas with depths of less than 50 m was stressed considering their related significant impacts on Posidonia meadows. RAC/SPA will carry out a survey to compile information on existing national fishing regulations regarding protection of Posidonia. The related results will be presented to the SCMEE when completed.

27. Several participants raised the urgent issue of 'ghost fishing' where abandoned fishing gear continues to catch substantial numbers of species. The increase in the amount of abandoned fishing gear in the Mediterranean can result in adverse impacts to all fisheries and is a fully preventable economic loss to the fisheries. In addition, the abandoned fishing gear poses a dangerous threat to protected species that can be inadvertently tangled. The participants recommended that GFCM undertake an assessment of the extent of abandoned fishing gear present in active fishing grounds. The meeting suggested that the SCSA envisage the possibility to undertake assessments of by-catch of cartilaginous species stocks.

- International Workshop on Cetacean Bycatch within the ACCOBAMS Area (Rome, Italy, 17-18 September 2008).

28. The main conclusions of the workshop were presented. The Terms of Reference of the workshop were as follows:

- Gathering national overviews on the current status of by-catch and critical review of historical data in all ACCOBAMS Countries;
- The adoption by the ACCOBAMS scientific community of standard protocol on data collection and its submission to representatives of the ACCOBAMS Parties;
- The discussion on the implementation of the ByCBAMS framework within the ACCOBAMS area.

29. The workshop was organised within the framework of the BYCBAMS Project for the Assessment and mitigation of the adverse impacts of interactions between cetaceans and fishing activities in the

ACCOBAMS area with support from GFCM Secretariat. The project was presented, recalling its main objectives:

- To collect historical data about cetacean by-catch in the project area;
- To provide assistance to national authorities at their request to enable independent observers to sample fishing vessels;
- To collect data about current cetacean by-catch in the project area;
- To test the most appropriate mitigation measures;
- To help Countries undertaking information campaigns directed at fishermen with a special focus on the handling procedures in case of incidental catch of cetaceans.

V. CONTRIBUTION TO IMPROVING AND UPDATING THE GFCM GLOSSARY

30. The Sub-committee debated about terms and definitions to revise and add to the GFCM Glossary. Chair recalled that this exercise is on the agenda of the other SAC's sub-Committees. Many participants stressed the need of elaborating common agreed definitions for the environmental terminology used in fisheries sciences (eg: MPA, deep sea, etc.). They expressed their willingness to contribute to the exercise, provided that clear procedure for providing inputs and for their compilation is decided by SAC.

VI. CONCLUSIONS AND RECOMMENDATIONS

31. The Sub-Committee made the following main conclusions and recommendations.

- Conclusions:

- EAF is of relevance for all the four Sub-committees of SAC and it should be addressed as a transversal issue, although the SCMEF should lead/coordinate the works of the subcommittees on the subject.
- As the fisheries in the Mediterranean are multi-species in nature, attention must be paid to the potential consequences of the removal of only certain species from the ecosystems by means of selective fishing gears and practices.
- The Sub-Committee recognised that there is a clear improvement in selectivity for most species in the new 40 mm square mesh trawl codend compared to diamond mesh codends of same or smaller mesh sizes. Nevertheless, the Sub-committee considered that measures based only on size selectivity are not enough and recommended that complementary management measures (closed seasons, areas, etc.) be also implemented.
- To have a better knowledge of fishing mortality, it is necessary to consider the mortality rate after escapement.
- The SCMEF acknowledged the importance of Mediterranean selectivity results on longline; traps, trammels and gillnets for the Mediterranean fisheries and stressed the need for further research on these issues. In addition to the existing Mediterranean data, the meeting also invited to consider results from outside the region.

- Recommendations

- **to SCMEF**

- To use the classification of benthic habitats, as presented by RAC/SPA, as a reference to identify habitats of importance to fishery management.
- To prepare a draft set of criteria to identify essential habitats priority species, organised by GSA. Submit the draft for discussion and consideration to the next SCMEE Meeting;
- To pursue promoting the implementation of EAF through the development of pilot studies and encourage the involvement of stakeholders from the beginning of the process of implementing the ecosystem approach to fisheries.
- To develop a standard protocol for collection of data on by-catch of species of conservation concern in Mediterranean fisheries that takes into account the relevant protocols elaborated by other organisations and, possibly harmonised with the objectives of GFCM Task 1;
- To encourage the TECHNOMED network to pursue the effort, especially on the development of a GFCM database on gear selectivity and gear characteristics;
- To assess the lost fishing gear problem, particularly in sensitive habitat, and to evaluate the cost effectiveness of retrieval programmes and potential mitigating measures;
- To implement and promote coordinated studies on population dynamics of cartilaginous species in parallel to mitigation measure in those cases where protected species are involved and to collaborate and promote, together with other relevant IGOs/NGOs, coordinated studies on population dynamics of protected species of conservation concern, such as marine turtles, mammals, birds;
- To launch pilot projects on by-catch in specific métiers, taking into account not only technological measures for mitigation, but also the social aspects connected with that métier (especially in artisanal fisheries);
- To implement more testing studies on promising technical and operational changes in fishing practices (e.g. circle hooks, TEDs, deep setting, etc.)

- to SAC

- To formally consider the proposal of establishing a new FRA for the Continental slope of the Eastern Gulf of Lions (CoSEGoL) FRA, as validated by the Sub-Committee and to envisage its submission for adoption by the Commission at its 33rd Session.
- To invite GFCM to identify the best way to ensure effective implementation and monitoring of approved FRA.
- To urgently implement and enforce the use of a square mesh of at least 40mm in the bottom trawl codend in accordance with GFCM regulation. and to implement additional measures (FRA, closed seasons-areas, etc.);

VII. 2009 PRELIMINARY SCMEE WORKPLAN

32. The SCMEE would :

- Produce a list of essential/sensitive habitats;
- Continue to collect information on biological and ecological physical parameters and fishing activities on Deep sea and with a particular attention around seamount and canyons and on the implementation of the 1000 m measure, prohibiting the use of trawl net and dredge (action being addressed to the focal points of each countries).
- Pursue promoting the implementation of EAF by contributing to case studies (eg. Tunisian – French project on Gulf de Gabes).

- Contribute to updating the glossary for environmental and fishing technology inputs in cooperation with the other sub-committees; (action would be done by a consultant or group of experts).
- Analyse through the available literature on the different impact of fishing gears on the environment and the potential mitigating solutions, (action would be done by TECHNOMED).
- Experiment through case studies the most relevant solutions for reducing catch of juveniles and by-catch.
- Develop selectivity studies on static gear with a particular attention to pelagic longline.
- Finalize the common framework for selectivity studies to support the implementation of the selectivity measures, (action being done by TECHNOMED) and test this framework on square mesh codend selectivity studies (eg. Moroccan project on trawl selectivity in Alboran Sea). These studies should be carried out within the framework of the FAO regional projects.
- Pursuit the development of a GFCM database on gear selectivity and gear characteristics (action would be done by TECHNOMED).
- Elaborate a standard protocol for collection of data on by-catch of species of conservation concern in Mediterranean fisheries that takes into account the relevant protocols elaborated by other organisations and is possibly harmonised with the objectives and tools of GFCM Task 1.
- Drafting a protocol for data collection on by-catch of species of conservation concern, merging the draft protocols prepared for ACCOBAMS and MEDLEM;
- Evaluating the existing data on by-catch, and identifying critical areas that could be object of local fishery management measures.

33. The Sub-committee agreed to organize for 2010, 2 transversal workshops, the first one on selectivity improvement and by-catch reduction and the second one on EAF based on the results of the forthcoming case studies.

VIII. ANY OTHER MATTERS

34. The Sub-committee suggested to consider the issue of artificial reefs (action be done by TECHNOMED).

35. The participants expressed the importance to address the issue of measurements of fishing power and effort with aim to facilitate their monitoring and their control (eg. bollard pull, depth and soak time sensors, etc.) (Action to be done by TECHNOMED).

IX. DATE AND VENUE OF THE NEXT MEETING

36. The SCMEF suggested holding its next meeting in Rome during October 2009.

X. ADOPTION OF THE REPORT

37. The report was adopted by the Meeting on Thursday 16, October 2008.

Agenda

1. Opening, arrangement of the meeting and adoption of the agenda
2. Promote the implementation of the Ecosystem Approach to Fisheries (EAF)
3. Deep Sea, sensitive habitat and Marine protected Areas (MPAs)
4. Review and discussion of outcomes in the transversal meetings
5. Contribution to improving and updating the GFCM glossary
6. Conclusions and recommendations
7. Preliminary 2009 SCMEE workplan
8. Any other matters
9. Date and venue of the next meeting
10. Adoption of the report and closure

Appendix 2

List of participants

Name	Title	Country	Address	Phone Fax number	E-mail
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**New Proposal of FRA the Continental slope
of the Eastern Gulf of Lions (CoSEGoL)**

Date of endorsement by the SCMEE

16 October 2008

**STANDARD FORMAT FOR THE SUBMISSION OF PROPOSALS FOR GFCM
FISHERIES RESTRICTED AREAS (FRA) IN THE MEDITERRANEAN**

Name of the FRA:

Continental slope of the Eastern Gulf of Lions (CoSEGoF)

Submitted by (Institution, Scientists, GFCM Members...):

ICM/CSIC Barcelona:	Lleonart, Salat, Olivar, Puig
IEO, Balears:	Moranta
IFREMER, Sète:	Le Corre, Sacchi
Fac. Economia, UB	Franquesa
WWF	Tudela

Date of submission:

23 September, 2008

1 EXECUTIVE SUMMARY (maximum 500 words)

Supply a summary of the information contained in sections 2 to 8, including the expected results.

Part of the fishing fleets of northern Catalonia (Spain, NW Mediterranean) and Sète (France) exploit the fishing resources of the Gulf of Lions. This is a relatively well known fishery, with its main target species being hake (*Merluccius merluccius*), which is exploited using trawlnets (both countries), longlines (Spain) and gillnets (France). Assessments of this species are regularly presented to SCSA and point to heavy growth overexploitation and likely recruitment overexploitation. The remaining spawning fraction of the hake stock appears to be limited to the most inaccessible areas on the continental slope of the Gulf of Lions, where it is only lightly exploited. Its preservation from full commercial exploitation is considered vital for avoiding the intensification of recruitment overexploitation and the associated collapse of the fishery.

The current proposal reveals key findings of a study carried out in the Gulf of Lions, in which results indicate that the continental slope of the Eastern Gulf of Lions acts as a refuge for large spawners of several commercially important species, including hake. Based on this finding, and with fishing activities expected to shift to areas further out on the continental shelf in future years due to the dismal state of stocks closer the shore, the current proposal suggests that a fisheries restricted area be established on the continental slope of the Eastern Gulf of Lions in order to protect one of the last refuges for large spawning adults of hake and other important fish species. The suggested management measure would be to prohibit any kind of demersal fishing, towed or not, including trawl gears, bottom and midwater longlines, bottom nets (gillnets, trammelnets) and traps in the proposed zone. This measure is expected to result in major socio-economic benefits, since preserving the area would preserve the source of recruits supporting the current demersal fishery in the Gulf of Lions and even further south, in Northern Catalonia.

2 AREA IDENTIFICATION

2.1 GFCM GEOGRAPHICAL SUBAREA

<http://www.gfcm.org/gfcm/topic/16162>

GSA7

2.2 NAME OF THE FRA

Continental slope of the Eastern Gulf of Lions
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2.3 GEOGRAPHIC LOCATION

2.3.1 General location

North Western Mediterranean, on the eastern part of the continental slope of the Gulf of Lions, in international waters.
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2.3.2. Precise location of the proposed core area: provide geographical coordinates
(latitude and longitude in degrees, minutes and seconds) for the vertex of a polygonal area.

(42°40'N, 4°20'E), (42°40'N, 5°00'E), (43°00'N, 4°20'E), (43°00'N, 5°00'E)
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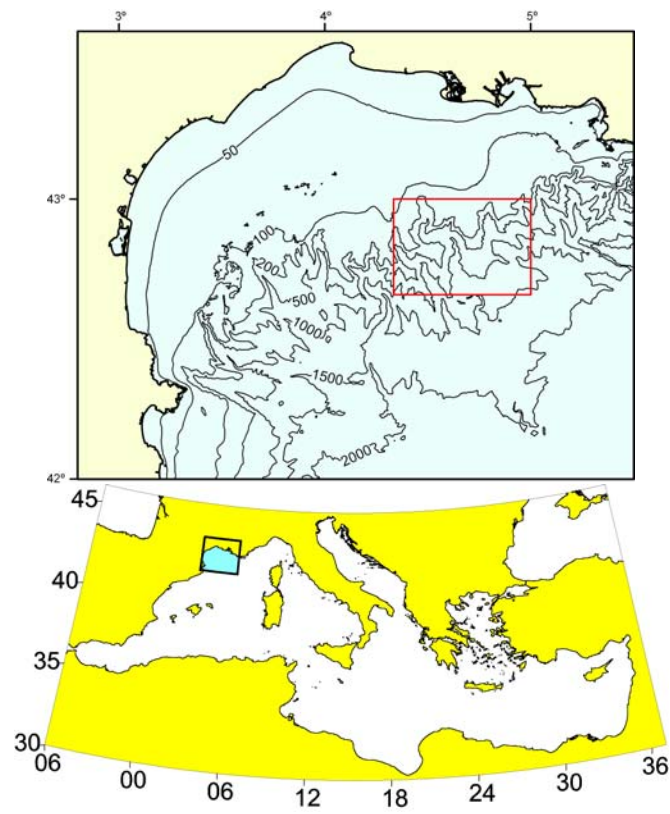
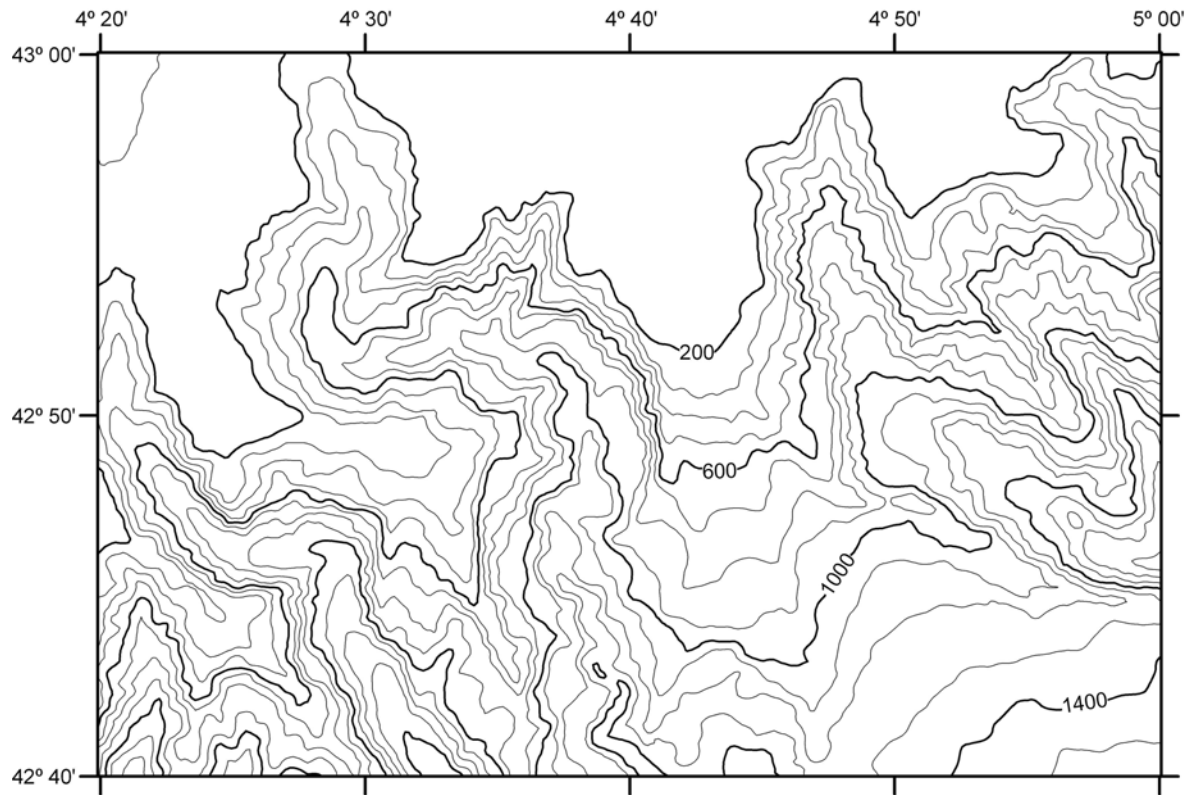
The area proposed matches exactly the study area described and characterized in the work by Massuti <i>et al.</i> (2008).

2.3.3. Buffer area (if applicable), provide geographical coordinates

(latitude and longitude in degrees, minutes and seconds) for the vertex of a polygonal area.

No buffer area is proposed

2.3.4. Location Map: include geographical coordinates of the core and buffer areas, bathymetry, and the boundary of international waters. Add a global reference map of the Mediterranean with the location of the site.



2.3.5. Depth range (in m; specify core and buffer area, if applicable)

100 m to 1500 m

2.4 SURFACE AREA (in ha and km²; specify core and buffer area, if applicable)

205100 ha, 2051 km² 598 sq miles

3 SITE DESCRIPTION

3.1 MAIN PHYSICAL FEATURES

3.1.1. Geology/Geomorphology

Give a brief description of the geological aspects; processes of sedimentation and erosion observable in the area and other geomorphologic features or geological risks. Indicate bibliographical sources.

The proposed zone is located in the Gulf of Lions, a tectonically-passive margin extending from the Pyrenean mountains of northern Spain to the Alps of eastern France. It was formed by Oligocene-Aquitainian rifting followed by the opening of a micro-ocean separating the Corsica-Sardinia block from the southern French margin (Le Pichon et al., 1971; Séranne et al., 1995). Because of the young age of this passive margin, its subsidence rate and the associated accommodation space for sediments are significant. As a result, a thick (up to 2 km at the shelf edge and 10 km in the deep basin) pile of sediment accumulated during the Neogene (Berne and Gorini, 2005).

The main source of sediment to the modern Gulf of Lions is the Rhone River, which provides $2.2\text{--}5 \times 10^6$ tons of sediment annually (Zuo et al., 1991; Courp and Monaco, 1990). This is approximately equivalent to 80% of the total sediment input to the Gulf. Six smaller, western rivers (Hérault, Orb, Aude, Agly, Tech, Têt) supply most of the remainder of the Holocene sediment.

The Gulf of Lions' continental shelf is crescent-shaped and has a maximum width about 70 km, with the shelf-break found at approximately 120 m depth. Modern sands extend from the shoreline to ~30 m water depth, the mid-shelf is characterized by a mud deposit and reworked Pleistocene sands are exposed on the outer shelf deeper than 90 m (Courp and Monaco, 1990; Certain et al., 2005). The continental slope is characterized by an intricate network of submarine canyons that coalesce into two primary channels on the deep slope. These canyons formed progressively since the Middle-Late Pliocene, probably in relation with increasing sea-level changes and sediment supply (Lofi, 2002).

The proposed zone comprises three of these submarine canyons named (from East to West) Estaque, Grand-Rhône et Petit-Rhône and a small part of Marti Canyon (Fig. 2). Such canyons often exhibit very important slopes, attaining in some cases more than 20°, and local areas around the canyon heads with cliffs. The zones inter-canyons are less rough with slopes of 2°-3° between 180 and 2000 m. The sediment of the slope is mainly muddy.

Numerous studies have shown that, at present, sediment is actively escaping the Gulf of Lions' shelf via submarine canyons, with very important consequences for the biological populations inhabiting these slope environments (Company et al., 2008).

3.1.2. Other interesting physical or chemical features: Such as hydrodynamics, frontal areas, upwelling, etc than support the proposal.

On spawning of *M. merluccius* and marine circulation

Ichthyoplankton surveys and adult gonadal analysis carried out off the Catalan coast allow to determine the close association between spawning grounds of *Merluccius merluccius* and the shelf-break (Olivar *et al.*, 2003; Recasens *et al.*, 2008), spawning being concentrated at the 100-200 m isobaths. Adult distribution in the Gulf of Lions suggested that in peak spawning periods the adults, especially females, move towards the edge of the shelf (Recasens *et al.*, 1998). Mature female Mediterranean hake are present all the year round, but the peak of reproductive activity is concentrated from August to December in the Catalan Sea.

Surveys of the vertical distribution of *Merluccius merluccius* eggs and larvae evidenced that although they may appear along the upper 200 m of the water column, they are mainly located below the thermocline, from 50 to 100 m of the water column (Sabatés, 2004; Olivar *et al.*, 2008). This vertical pattern is consistent with those found for species in Atlantic waters (Coombs and Michell, 1982; Motos *et al.*, 2000) and also to other hake species around the world: *M. productus* (Kendall and Naplin, 1981), *M. capensis* (Olivar *et al.*, 1988).

The general circulation of the NW Mediterranean is dominated by a current along the continental slope (Allain, 1960; Millot, 1990). This current is produced by a geostrophic adjustment of a shelf-slope front separating less dense shelf waters from those in open sea, and its influence reaches down to 300-400 m (Millot, 1987; Font *et al.*, 1988). The total transport associated with this current is variable, from 0.8 to 1.2 Sv (Albérola *et al.*, 1995; Castellón *et al.*, 1990). Typical surface velocities at the jet are around 30 cm/s, but occasionally can reach more than 50 cm/s. Current speed decreases with depth but is still greater than 5 cm/s at 300 m and around 10-15 cm/s between 100 and 200 m (Albérola *et al.*, 1995; Salat, 1995).

While the current path is centered along the shelf break (Salat, 1996), it presents some oscillations (Sabatés *et al.*, 2001; Flexas *et al.*, 2002), eddies (Rubio *et al.*, 2005) and other mesoscale instabilities (Wang *et al.*, 1988; Petrenko, 2003).

Based on the above mentioned information, it can be assumed that an important part of the larvae that originated from a spawning activity within the FRA will be transported towards the Catalan shelf and upper slope, like it has been shown for other species in the region (Sabatés *et al.*, 2001). Therefore, according to the current speeds, the journey from the FRA to the Catalan shelf for larvae originated from a spawning activity at depths between 100 and 200 m would take not more than 15-20 days, actually 18.6 days, assuming a current speed of 10 cm/s at the referred depths and a total path of 160 km. The straight distance from the centre of the proposed FRA to Cap Creus is 60 NM (~110 km).

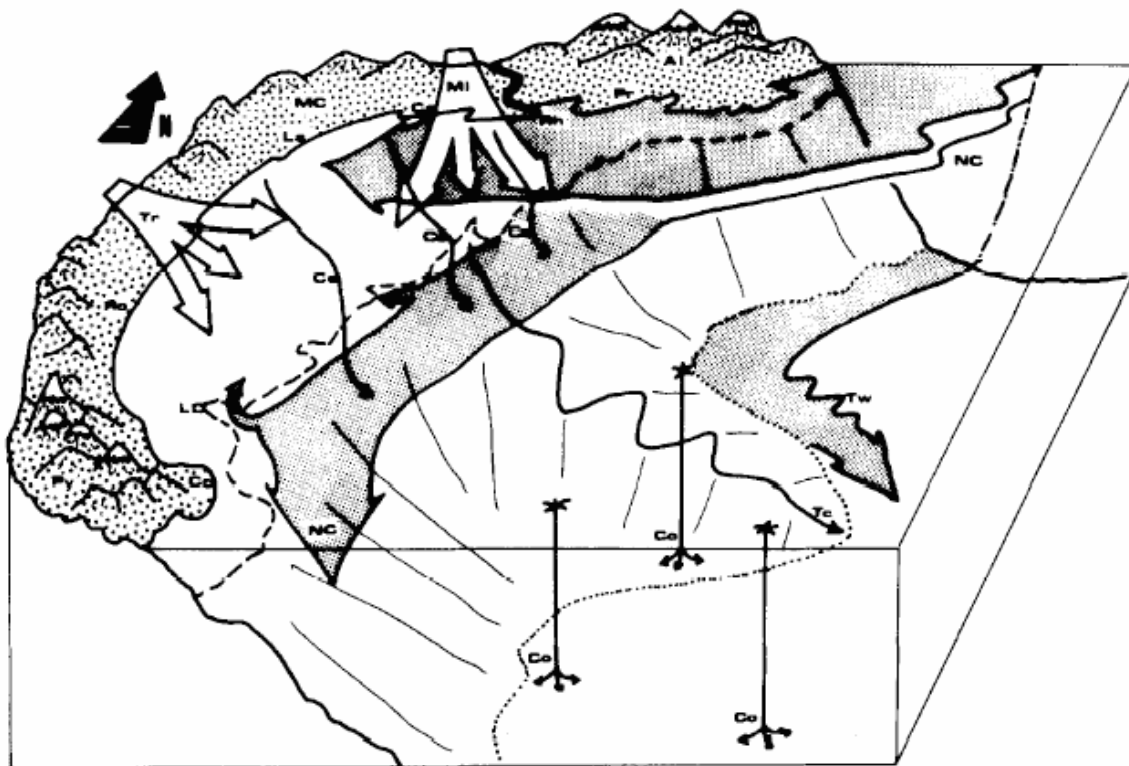


Fig. 1. Schematic view of the Gulf of Lions representing mountains (Py, Pyrenees; MC, Massif Central; Al, Alps), winds (Mi, Mistral; Tr, Tramontane), regions (Ro, Roussillon; La, Languedoc; Ca, Camargue; Pr, Provence), rivers (Rh, Rhône), canyons (LD, Lacaze-Duthiers), capes (CC, Cap de Creux), and phenomena such as: the general circulation (NC, Northern Current); Tc, turbidity currents; Tw, topographic waves; and dense water formation [through chimneys offshore (Co) and cascading on the shelf (Cs)].

3.2 BIOLOGICAL FEATURES

3.2.1. Habitats: A brief description of the dominant marine habitats including pelagic ones if applicable

See 3.1.1. and 3.1.2

3.2.2. List of regionally important species

List here those marine species protected by international agreements (specify the agreement) and/or included in the GFCM priority list. If applicable, give the IUCN category. Any other species may be listed if it is clearly considered of regional importance given its high representation in the area. For each species state:

a) its relative abundance as Common (C), Uncommon (U) or Occasional (O), b) Its regional status as rare (r), endemic (e) and/or threatened (t), and

c) its status as an important resident population (R), or important for its breeding (B), feeding (F), wintering (W) or migratory passage (M)

Accurate data on fish assemblages in the area was obtained during scientific cruises performed by Massuti *et al.* (2008). A total of 88 fish species were recorded, of which 12 are priority species for GFCM. Up to 17 species account for 90% of the biomass caught. 12 species are of commercial importance and 6 of high economic importance: *Lophius piscatorius*, *Nephrops norvegicus*, *Aristeus antennatus*, *Merluccius merluccius*, *Trigla lyra* and *Lepidorhombus boscii*.

I. SPECIES	Rel. Abundance (C) (U) (O) In biomass	Rel. Abundance % In biomass	Regional STATUS (r) (e) (t)	Local STATUS (R) (B) (F) (W) (M)	GFCM priority species
<i>Galeus melastomus</i>	C	16.42%			
<i>Micromesistius poutassou</i>	C	12.92%			+
<i>Lophius piscatorius</i>	C	11.88%		B	+
<i>Nephrops norvegicus</i>	C	7.56%		B	+
<i>Lepidopus caudatus</i>	C	5.16%		B	
<i>Trachurus trachurus</i>	C	5.06%			+
<i>Aristeus antennatus</i>	C	5.03%		B	+
<i>Merluccius merluccius</i>	C	4.44%		B	+
<i>Helicolenus dactylopterus</i>	C	3.98%			
<i>Chimaera monstrosa</i>	C	3.07%			
<i>Trigla lyra</i>	C	2.70%			
<i>Phycis blennoides</i>	C	2.39%			
<i>Trachyrincus scabrus</i>	C	2.23%			
<i>Capros aper</i>	C	2.19%			
<i>Conger conger</i>	C	1.86%			
<i>Caelorinchus caelorhincus</i>	C	1.74%			
<i>Lepidorhombus boscii</i>	C	1.58%			
<i>Centrophorus granulosus</i>	C	1.56%			
<i>Trachurus picturatus</i>	C	1.01%			
<i>Lophius budegassa</i>	U	0.55%			+
<i>Pagellus bogaraveo</i>	U	0.16%			+
<i>Palinurus mauritanicus</i>	O	0.06%			+
<i>Mullus surmuletus</i>	O	0.01%			+
<i>Parapenaeus longirostris</i>	O	0.01%			+
<i>Eledone cirrhosa</i>	O	0.01%			+

3.2.3. Occurrence of biological and ecological processes relevant to fish resources (essential fish habitats)

The lower shelf and slope of the Gulf of Lions is a spawning zone for many fish species. The data from Massuti *et al.* (2008) shows that individuals from species particularly relevant to fisheries like hake, monkfish and Norway lobster occurring in the area are large adult specimens. The importance of the areas as a refuge for spawners and even megaspawners is reinforced by the fact it is still relatively untouched by commercial fleets.

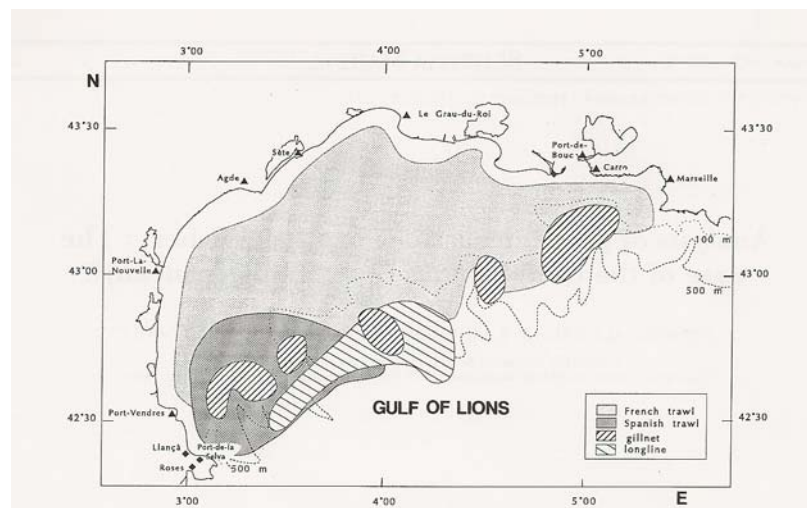
3.3 USE OF NATURAL RESOURCES

3.3.1. Current human use and development of fisheries

a) Briefly describe the current use of the area by artisanal, industrial and recreational fishing.

The zone proposed for protection has been occasionally exploited by French and Spanish fleets, such as trawlers of both countries and also French gillnet vessels and Spanish longliners.

In a paper by Aldebert *et al.* (1993) a chart on activity zones of the four fleets was presented. Since the allowed time at sea has not significantly changed since this publication, it may be assumed that the chart still represents the current fishing situation. It is important to note, however, that this map doesn't inform on the intensity of fishing activity. It only focuses on the geographical range covered by the different gears, even if fishing is infrequent, as is the case in the proposed area.



Even if the fishing pressure in the proposed area is currently still very low, there is an expected increase in interest from fleets operating in the neighbouring ports to expand their range of activity to include this region, due to the rarefaction of fish resources in the traditional fishing grounds in the area. The area proposed is thought to act as a refuge for spawners (which would supply the fishery in the traditional areas with recruits) and its protection would be a precautionary measure to avoid the collapse of the associated groundfish fisheries.

b) Enter how many of the users depend on these resources, seasonality, and assessment of the social and economic importance of their use and of the perceived impact on the conservation of the area, in a score of 0-1-2-3 (meaning null, low, medium, high).

ACTIVITY AND CATEGORY	ASSESS IMPORTANCE OF		ESTIMATED No. of USERS	SEASONALITY
	SOCIO-ECONOMIC	CONSERV. IMPACT		
FISHING				
Artisanal		0 1 2 3		
Industrial	0 1 2 3	0 1 2 3		
Other:	0 1 2 3			
- Acuiculture				

3.3.2. Current human use and development (except for fisheries)

a) Briefly describe the current use of the area for other economic sectors.

No use other than fisheries mentioned in 3.3.1

b) Enter how many of the users depend on these resources, seasonality, and assessment of the social and economic importance of their use and of the perceived impact on the conservation of the area, in a score of 0-1-2-3 (meaning null, low, medium, high).

ACTIVITY AND CATEGORY	ASSESS IMPORTANCE OF		ESTIMATED No. of USERS	SEASONALITY
	SOCIO-ECONOMIC	CONSERV. IMPACT		
OTHER ACTIVITIES				
Tourism		0 1 2 3		
Transport	0 1 2 3	0 1 2 3		
Mining	0 1 2 3			
-				

4 REGIONAL IMPORTANCE OF THE SITE

This Section aims at stressing the importance of the site for conservation at the regional scale.

4.1 PRESENCE OF ECOSYSTEMS/HABITATS OF PARTICULAR IMPORTANCE IN THE MEDITERRANEAN

No studies are available on deep-sea ecosystems in the area. However, the existence of rare deep-water corals such as *Lophelia pertusa* and *Madrepora oculata* is possible, given its recorded presence in similar areas in the western part of the Gulf of Lions.

4.2 PRESENCE OF HABITATS THAT ARE CRITICAL TO ENDANGERED, THREATENED OR ENDEMIC SPECIES

Name the habitat types and the species linked to it. Give information about its status (IUCN classification, etc.).

Not relevant

4.3 OTHER RELEVANT FEATURES

4.3.1. Educational Interest

E.g. particular values for activities of environmental education or awareness

Not applicable

4.3.2. Scientific Interest

Explain if the site represents a particular value for research.

It constitutes a relatively pristine bottom ecosystem and can provide clues to know and understand the functioning of the ecosystems of the Mediterranean slopes.

5 IMPACTS AND ACTIVITIES AFFECTING THE AREA

5.1 IMPACTS AND ACTIVITIES WITHIN THE SITE

5.1.1. Exploitation of natural resources

Assess if the current rates of exploitation of natural resources within the area (e.g. fishing, sand and mineral exploitation) are deemed unsustainable in quality or quantity, and try to quantify these threats, e.g. the percentage of the area under threat, or any known increase in extraction rates.

Only the exploitation levels of hake have been regularly assessed and the results presented to the GFCM corresponding bodies (SCSA). Hake is the most important species and target for most of the fishing operations in the Gulf of Lions lower shelf.

Since the first Franco-Spanish joint assessment of hake (Aldebert *et al.*, 1993), several assessments with longer data series and more sophisticated procedures (i.e. from LCA at the beginning to XSA the last assessment) have been carried out. In the SCSA sessions up to 4 (2001, 2003, 2005, 2006) joint Franco-Spanish (considering the mentioned 4 gears) Gulf of Lions hake assessments were submitted.

In all cases hake populations in the Gulf of Lions appeared to be heavily growth overexploited with serious indications of recruitment overfishing.

5.1.2. Threats to habitats and species

Mention any serious threats to the habitat (e.g. modification, disturbance, pollution) or to species (e.g. disturbance, poaching, introduced alien species...) within the area.

Fishing constitutes a very real threat to the proposed area since fishers are asking for being allowed to be more time at sea in order to reach this zone. If this were allowed, soon the continental slope that is the object of this document would be transformed into an overexploited zone, similar to the slope closer to harbors.

5.2 IMPACTS AND ACTIVITIES AROUND THE SITE

5.2.1. Pollution

Name and describe sources of pollution.

Not applicable

5.2.2. Other external threats, natural and/or anthropogenic

Briefly describe any other external threat to the ecological, biological, aesthetic or cultural values of the area (such as unregulated exploitation of natural resources, serious threats on habitats or species, pollution problems) likely to influence the area in question.

Not applicable

5.2.3. Sustainable development measures

Comment whether the area is covered by a management plan, or bordering upon a zone under such a plan.

Current measurements limit the time at sea in such a way that vessels cannot reach the FRA.

6 EXPECTED DEVELOPMENT AND TRENDS¹

This is not always easy to assess and thus, it is not obligatory to fill in this Section.

6.1 EXPECTED DEVELOPMENT AND TRENDS OF THREATS TO AND PRESSURES UPON THE AREA

Deal briefly with the development of economic activities within the area

An exacerbation of fishing pressure is expected in the area, particularly by larger fishing vessels from ports from the Gulf of Lions, in quest of higher fishing yields in the most inaccessible areas of the Gulf of Lions' slope. This would lead to a destruction of the last relevant spawning aggregations of hake, Norway lobster and other important fish species in the Gulf of Lions.

¹ By expected development and trends are meant the development, which is thought most likely to occur in the absence of any deliberate intervention to protect and manage the site.

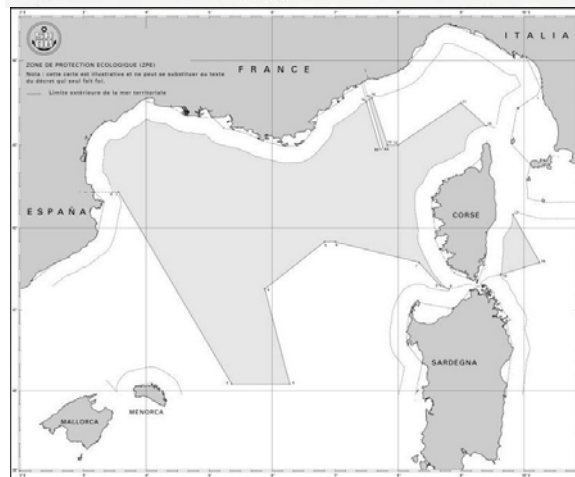
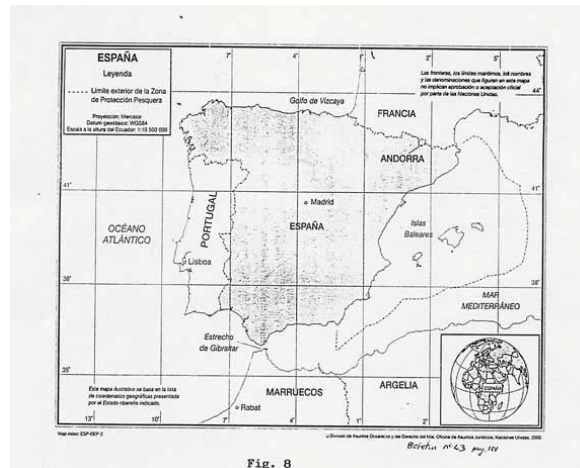
7 MANAGEMENT AND PROTECTION REGIME

7.1 LEGAL STATUS (if applicable)

7.1.1. Historical background of the management related to the area

This area is in international waters, outside of the Spanish Fishing Protected Area.

This area is inside the French “zone de protection écologique”



A part of the proposed FRA corresponds to a depth beyond 1000 m, recommendation GFCM/2005/1, however this recommendation prohibit the use of towed dredges and trawling, not longlining, gillnetting or any other system able to catch fish spawners.

7.1.2. Regulatory measures currently ruling the management on the site

Mention if the area, or part of it, has been designated and on what date, with an international conservation category.

In the chapter on legislation (item 9, later in this document) there is a list of laws affecting the area, regarding, the Spanish fishing protected zone and time at sea. Lacleta Muñoz (2004) deals with legal aspects.

7.1.3. Objectives

Name in order of importance the objectives of the area as stated in its legal declaration.

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7.2 LEGAL BACKGROUND

Briefly mention if the area or part of it is subject to any legal claim, or to any file open in that connection within the framework of an international body.

The so-called Fisheries Protection Zone established by Spain in 1998 encompasses the westernmost part of the Gulf of Lions and lies completely <u>outside</u> the area proposed here for protection as FRA. Additionally, France has never accepted the limit of this Spanish FPZ within the Gulf of Lions.

7.3 LEGAL PROVISIONS FOR MANAGEMENT

7.3.1. Zoning regulating the area

Briefly state if the legal text protecting the area provides for different zones to allocate different management objectives of the area (e.g. core and scientific zones, fishing zones, etc) and in this case the surface area of these zones. Include a map as an annex.

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7.3.3. Legal competencies

Legal competence and responsibility with regard to administration and implementation measures

The GFCM has full mandate to manage fisheries in the area proposed as FRA: international waters of the Gulf of Lions, NW Mediterranean. Fleets occasionally operating in the area or in neighboring areas are based in French and Spanish ports. Both fleets are subject to the rules of the EC Common Fisheries Policy, concretely to the management framework established by Council Regulation (EC) No 1967/2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea.
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7.3.4. Other legal provisions

Describe any other relevant legal provisions, such as those requiring a management plan or any other significant measures concerning the protection and management of the area.

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8.1 OBJECTIVES OF THE FRA

State the reasons that justify the designation of the FRA

The objective of proposing this FRA is to protect very important spawning stocks of several species of fishes of paramount importance in the North Western Mediterranean fisheries, affecting mainly France and Spain.

Justification

The presence of reserves of spawners is of paramount importance to guarantee the sustainability of fisheries, and the exploitation of such reserves would impact very negatively on the whole fishery. An example of what can result from the exploitation of spawners is demonstrated by the hake fishery of the Cap Breton canyon, where overfishing collapsed the stock, obliging the launch of an emergency plan in 2001 and a recovery plan in 2004.

Caddy (1990) noted that some of the most important Mediterranean fisheries are based (as opposed to the Atlantic Ocean) on the spawners refugia paradigm, meaning the existence of untouched of spawners that provide good recruitments to the fisheries of juveniles.

Froese (2004) presented the “three simple indicators” as the right way to manage fisheries: (i) Let them spawn, (ii) Let them grow and (iii) Let the mega-spawners live. The third one is important because of the quantity and quality of spawning produced by the old spawners (the so-called FOF, fat, old females) and this is what the present proposal is based on.

The cruises realized by Spain in the proposed zone (Massutí *et al.*, 2008) have demonstrated the presence of a Caddy’s refugium, affecting very important commercial species.

The scientists working on the North Western Mediterranean Fisheries know that a relatively untouched spawning stock must exist somewhere, otherwise they cannot explain the situation of “sustainable overfishing” on juveniles, because the recruitment sustaining that fishery appears to be more or less constant. The bottom characteristics and the hydrographic conditions of the zone proposed for FRA strongly suggest that this area is one of such refugia supplying recruits to the nearby fishery.

There are some precedents of the use of protected areas to address the management of hake. Argentina established a closed area (among other measures) in 1997 in order to recover the Argentinean hake (*Merluccius hubbsi*). However, as in the case of Cape Breton, the Argentinean hake fishery is based on old individuals (the Caddy’s “minimum size limit” paradigm). Mesh size is thus larger than 100 mm, and the closed area was established for protecting juveniles rather than spawners.

8.2 PROPOSED PROTECTION MANAGEMENT MEASURES FOR THE FRA

8.2.1. Management measures

Suggest management measures to be implemented in the FRA

Prohibit any kind of demersal fishing, towed or not, including trawl gears, bottom and midwater longlines, bottom nets (gillnets, trammelnets), traps, etc.

8.2.2. Monitoring, Control and Surveillance measures

Suggest measures to effectively enforce the FRA

- 1.- Limit (keep) the time at sea in such a way that vessels have no time to reach the zone and fish. Actually it is enough to maintain the current time at sea, avoiding expanding it.
- 2.- Provide the vessels able to reach the FRA with VMS in order to control their geographical position.

8.2.3 Socioeconomic impact(s) of the FRA

Prevision of the socioeconomic impact(s) of the proposed measures

Since the exploitation of the proposed FRA is currently very low, no major negative socioeconomic impact is expected. A major benefit is expected since preserving the area would preserve the source of recruits supporting the current demersal fishery in the Gulf of Lions and even further south, in Northern Catalonia.

8.2.3.1. Economic evaluation of the ecosystems services (not only marketable)

Economic value of the goods and services that the ecosystems support

It may be assumed that a significant fraction of the market value of demersal fish landings obtained in the traditional fishing grounds in the Gulf of Lions are directly resulting from the preservation of the spawning populations in the area proposed as FRA.

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