



EU FP7 Project CREAM

***Coordinating research in support to application of EAF
(Ecosystem Approach to Fisheries) and management
advice in the Mediterranean and Black Seas***

Deliverable 3.2

***Overview of data available in support of an EAF in the
Mediterranean and Black sea, and evaluation of their
quality***

Start date of project: 01/05/2011 Duration: 36 months

Due date of deliverable: 30/04/2013

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1. Background and objectives

In 2012 a data mining exercise was carried out by all CREAM partners and the result can be found in deliverable 3.1. This report will make an overview of data available in support of an EAF in the Mediterranean and Black sea and assess the quality of these data.

The scope of data needed for EAF is extremely large. In their guidelines for responsible fisheries, FAO (FAO, 2003) defined the EAF as striving to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.

FAO (2003) also expressed that because EAF is a broadening of current fisheries management practices, the data and information needs will by necessity be broader. However, it is important to stress that immediate action should be based, as much as possible, on data and information that already exist. In some countries, much of the information will already be available in reports and statistics from various research institutes, agencies and ministries. In others, EAF will have to be based on comparatively fewer data. However, in these cases there is often extensive traditional knowledge about the ecosystem and the fishery, which can be extremely useful if collected and validated from interviews with local fishermen and other stakeholders. In all cases, information about the local situation should be complemented by information from ecologically similar situations elsewhere.

Ideally, the information should consider the following, but if this is not possible, at least a comment about the following should be included:

- the critical habitats that may be affected and the potential direct and indirect impacts of the fishery on these habitats;
- the species composition of both the retained and non-retained by-catch and the potential effects of additional fisheries-generated mortality on affected populations;
- the likely amounts of discards produced by the fishery and the importance of these discards for potential scavengers;
- the potential amounts of litter produced by the fishery and the possible effects of lost or abandoned gear on fish and other biota;
- the ecosystem within which the fishery takes place including the impact of other anthropogenic activities such as releases of nutrients and contaminants;
- the major biological interactions in which the harvested species participate and the potential effects of fisheries on these interactions. Particular efforts should be made to identify possible interactions with critical species, with forage species important for transfer of energy in the food chain, and with habitat structuring species such as coral;
- the impact of fishing on life history traits, such as age and size of first maturity and possible effects of the fishery on the genetic diversity of affected populations;
- the legal framework and extent to which the effects generated by the fishery would comply with national regulations and with international law and agreements related to nature conservation with consideration for endangered species; and
- the possible management measures to reduce adverse environmental impact



This deliverable will precisely describe the data as reported available through a questionnaire sent to all CREAM partners in 2012, enriched by knowledge of data available from international organisations or networks. The quality of the data as described by the CREAM partners will be evaluated.

2. Recall of the data mining exercise

The reception of 114 files of information from the questionnaire sent in 2012, proved that all CREAM partners were committed to extract the information demanded from their archives and routine monitoring programmes.

The spatial gaps identified are from countries non part of the consortium like Lybia and Algeria, or region (Sardinia, East of Italy) not covered by CREAM partners.

In terms of temporal information, only the last 20 years can be used, and apart some exceptions it will be impossible to create indicators prior to the 90's.

There are some gaps also in the most recent years, in particular linked to the stoppage by Greece of the data collection from 2008 onward.

In general all data available are in Excel files, which could lead to inconsistencies in references used when compiled at a supra-national level. In the Western Mediterranean, major part of the data is stored in structured database which is usually synonymous of better quality. Lots of information was based on reports and outcomes of research projects and even a book. This kind of information is much more difficult to process.

There was an extensive amount of information provided by seaDataNet to the project for the abiotic component. This information collected by buoys or other data collection electronic devices should find a usage when implementing EAF, in particular in the elaboration of abiotic indicators.

The anthropogenic activities (other than fishing) are an essential part of the understanding of the trends and status of ecosystems. These activities are amongst others aquaculture, pollution, construction, modification of habitats, etc... Several partners listed some of these activities, but it was agreed among the group that without guidance on what information is important, we should not seek for this kind of data. This may be the object of further discussion since Garcia et al. (2003) expressed that a complete inventory of competitive uses of the fishery resources and environment, including sources of land-based pollution and degradation, need to be developed.

The gaps identified by RAC-SPA (2010) are often confirmed. For example, it is confirmed that the national inventories of marine and coastal species and habitats are not homogeneous. For most countries they are incomplete; but when RAC-SPA says that the effort made is more focused on the north-western Mediterranean, this current data mining suggests that it is more in the eastern Mediterranean and the Black Sea. It is not surprising knowing the specificities of the region with countries' economies ranging from low-income food-deficit to highly developed; their coastlines from deserted to heavily urbanised; and their fisheries from unindustrialized and labour intensive to modern and capital intensive. Although often overlooked in the statistics, these fisheries play important livelihood, food security, cultural, and recreational roles (Cochrane and de Young, 2008).

3. Data overview

The questionnaire sent to all CREAM partners in 2012 as detailed in the deliverable D3.1, served as the basis to describe precisely the information available in the Mediterranean and Black Sea to support EAF. The information contained in the questionnaire may be considered as partial since the multitude of parameters to report was huge and it was difficult for each of the CREAM partners to cover all the range of available parameters. Nevertheless, this overview will provide a good starting point for stakeholders in their reflections towards an EAF in the Mediterranean and Black Sea.

3.1. Abiotic parameters

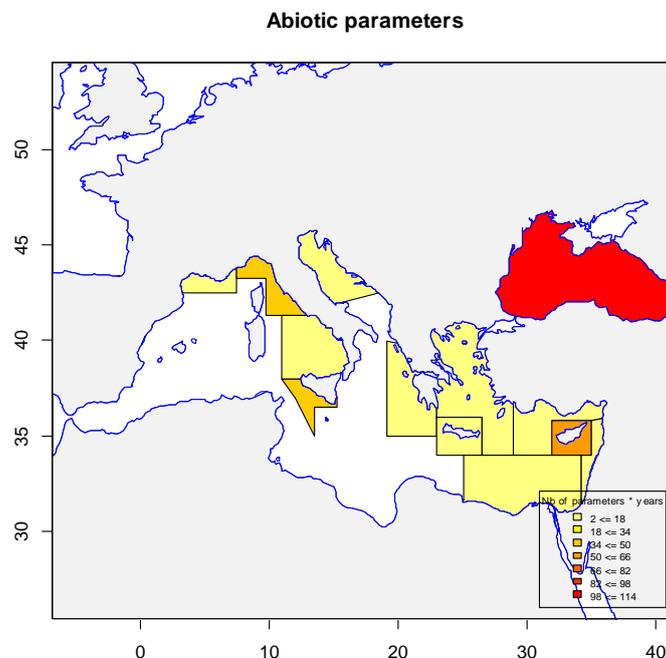


Figure 1 : View of the information received for the abiotic compartment.

Annual and monthly North Atlantic Oscillation (**NAO**) can be provided for all Mediterranean GSAs (EVOMED project). The oldest date in archive is given to be 1864 and continuous time series, which is the longest series of parameters given within the questionnaire.

Parameters such as **surface and bottom temperature, salinity, turbidity, Ph and depth** are available from different sources all over the Mediterranean and Black Sea. The time series may be discontinued at some locations and the format range from paper sheet to structured databases.

Nutrients and **chlorophyll-a** are also available in some locations for the most recent years. It is noticeable that a wide range of abiotic information is available from the project SeaDataNet, which makes use of buoys and other electronic devices to gather the information. The issue is about the format which is difficult to compile, and would deserve a specific work on the use of such

information in view of implementing an EAF in the Mediterranean and Black Sea.

3.2. Fleet and fisheries statistics

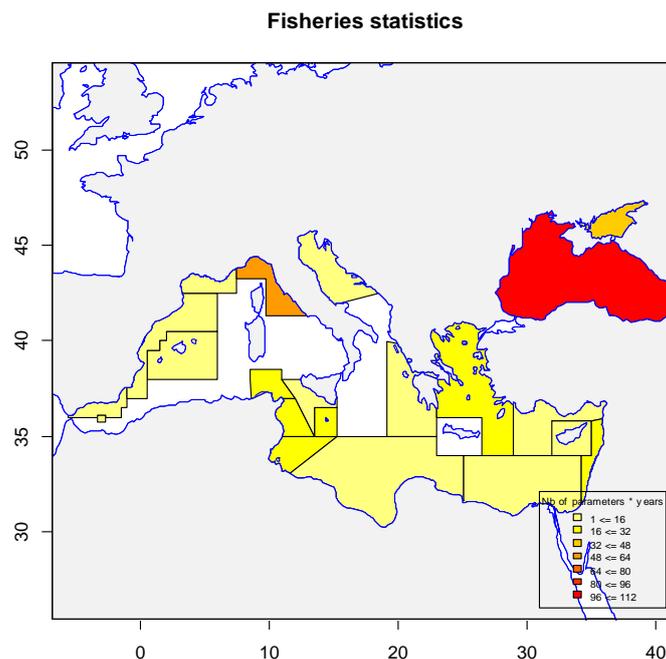
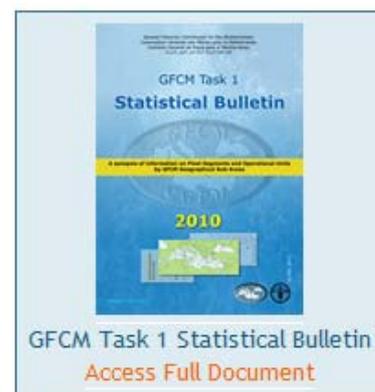


Figure 4 : View of the information received for fisheries statistics.

Doing single species management right, i.e., keeping fishing mortality at or below FMSY, and keeping **fleet capacity** in line with the potential of the resources, is one of the core aspects of EBFM (Hillborn, 2011). Fleet capacity data collection is part of the requirements for all GFCM member countries (Rec. GFCM/33/2009/5 on the establishment of the GFCM Regional Fleet Register (RFR) and Rec. GFCM/33/2009/6 concerning the establishment of a GFCM record of vessels over 15 metres authorized to operate in the GFCM area amending the recommendation GFCM/29/2005/2). A comprehensive overview of fishing capacity and **fishing activities** at the operational unit level (metier * fleet segment) per GSA is available online on the GFCM





website for the whole Mediterranean and Black sea. In their latest release¹. Part of the GFCM Task 1 is also to collect catch statistics and effort and this information is beginning to flow also into the GFCM databases. For the reported year 2010, 21 GSA out of 31 are covered, which is a continuous improvement from the first release, and with the new GFCM Framework Programme, it is likely that improvement will continue in the coming years.

Most of the CREAM partners declared having access to **catch statistics** in a continuous time series, either in Excel format or in databases, but some countries report having only reporting documents. The beginning of the time series is very heterogeneous ranging from early 70's to the late 2000. Most partners are also referring to catches of all commercial species, whereas some are referring only to a restricted list of species. The situation is almost similar for **fishing effort** with the additional difficulty of the variable used (fishing days, days at sea, Kw*days, ...) which would need to be harmonised for a regional use.

By-catches of endangered species is to be monitored under several GFCM recommendations² and for most species, part of the Task 1 feature. Vulnerable species such as sea turtles must be released unharmed to the sea and be the object of a reporting to the GFCM. For birds, any event of incidental taking and release shall be recorded by the vessel owner/master in the logbook (or any equivalent document as developed by a Contracting Party to this specific end) and reported to national authorities for notification to GFCM Secretariat, the first time being no later than June 2013. Given the very recent status of these recommendations, no evaluation can be made on the amount of information which will be gathered, but fishermen awareness of these recommendations should be undertaken in every GFCM member countries. From the questionnaire, some partners declare having records of **by-catch and strandings of cetaceans**, and it seems particularly the case in the eastern Mediterranean (GSA22, GSA24, GSA27) and in the Black Sea (GSA29). Besides, a comprehensive list of areas of special importance for cetaceans is available on the ACCOBAMS website³.

Evaluation of **discards** is available in several GSA with continuous series starting recently (2003, 2005 or 2009) and mainly in the trawling fisheries. When referring to discards estimates, all contributors expressed that all commercial species were monitored.

¹ http://www.faosipam.org/Task1_Bulletin_2013_GSAs/

² The latest GFCM recommendations on mitigation of by-catch of vulnerable species:

Rec. GFCM/35/2011/3 on reducing incidental by-catch of seabirds in fisheries in the GFCM Competence Area

Rec. GFCM/35/2011/4 on the incidental by-catch of sea turtles in fisheries in the GFCM Competence Area

Rec. GFCM/36/2012/2 on mitigation of incidental catches of cetaceans in the GFCM area

Rec. GFCM/36/2012/3 on fisheries management measures for conservation of sharks and rays in the GFCM area

³ http://www.accobams.org/index.php?option=com_content&view=article&id=1094&Itemid=147

3.3. Abundance and biomass indices

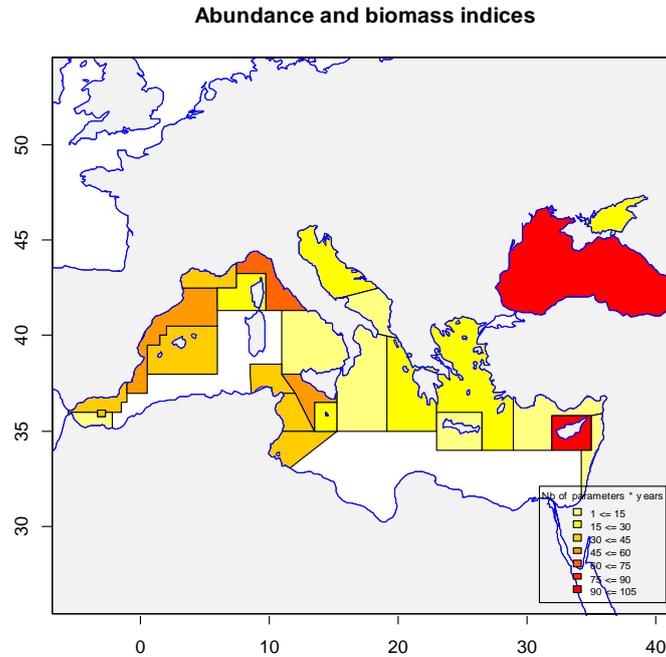


Figure 2 : View of the information received for abundance and biomass indices.

Abundance and biomass indices of **commercial species** are derived either from surveys at sea, MEDITS and GRUNDS for the demersal species, MEDIAS for the pelagic species or from outputs of assessments carried out within international scientific organisations (GFCM, STECF) or within a research project. MEDITS developed a website where abundance and biomass indices may be extracted for almost all species fished⁴. It should be added that FAO sub-regional projects such as COPEMED (I & II), MEDSUDMED, ADRIAMED and EASTMED all are producing estimates of abundance and biomass indices in their framework. From surveys all commercial species are considered, whereas from outputs of assessments only a restricted list of species are evaluated. The most often listed species are hake (*Merluccius merluccius*), red mullet (*Mullus barbatus*), sardine (*Sardina pilchardus*), anchovy (*Engraulis encrasicolus*) in the Mediterranean, and sprat (*Sprattus sprattus*) and turbot (*Psetta maxima*) in the Black and Azov Seas.

Biomass and abundance indices from **epifauna** and **macrobenthos** are also available from research project such as RESPONSE and Gökova Integrated Coastal & Marine Management Planning or within data collection programmes (Water Framework Directive). Benthic invertebrates, posidonia (*Posidonia oceanica*) and macroalgae have been monitored during the most recent years.

⁴ http://www.ifremer.fr/Medits_indices/

3.4. Fishing mortalities and exploitation rates

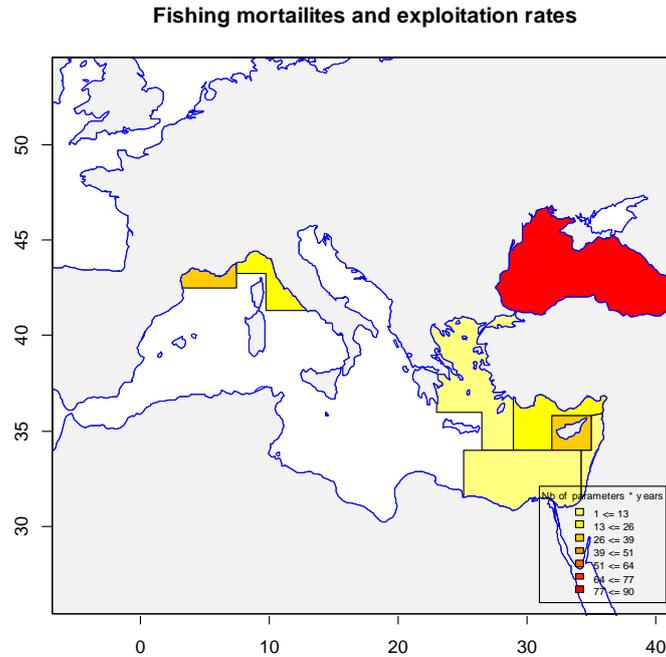


Figure 3 : View of the information received for fishing mortalities and exploitation rates.

As for abundance biomass indices (section 3.3), **fishing mortalities and exploitation rates** may be derived from surveys (MEDITS, GRUNDS, MEDIAS) or from assessment outputs. Figure 3 is misleading for displaying the areas where this information exists.

Outcomes of stock assessments and stock status are available in the yearly GFCM/SAC reports with more details in the sub-committee on stock assessment (SCSA) reports⁵. In 2013, the GFCM/SAC noted that for demersal species, 22 stocks out of the 29 assessed were in overfishing status, one was uncertain and the rest preliminary. As for small pelagics, the WG assessed 12 stocks, 5 assessments being considered as preliminary, the rest being either classified as sustainable or fully exploited (5), in overfishing (1) or collapsed (1) (GFCM, 2013). A resource inventory is also available in the worldwide FAO project FIRMS⁶ and its marine resource fact sheets.

⁵ <http://www.gfcm.org/gfcm/topic/16092/en>

⁶ <http://firms.fao.org/firms/resource/10533/en>

3.5. Biological parameters

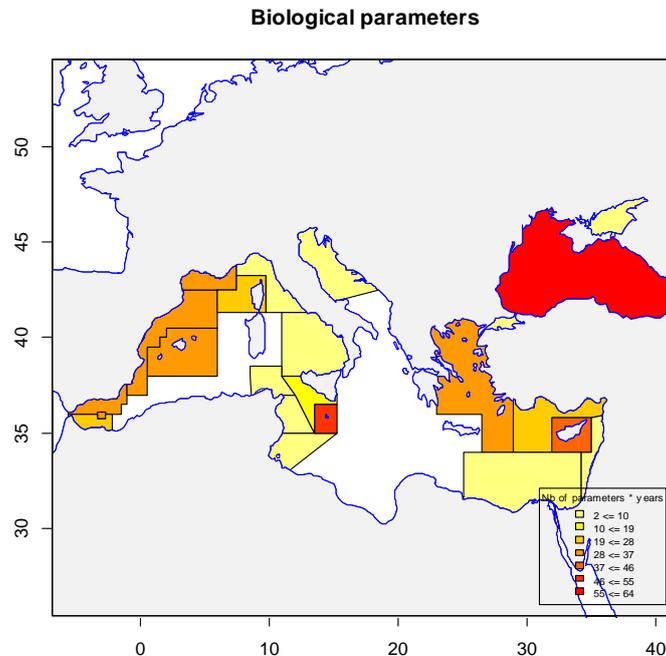


Figure 3 : View of the information received for biological parameters.

Research surveys, monitoring programmes and research projects all contribute to the collection of biological parameters of some species in some years and some area. Composing historical time series is the rule but the starting year of the time series is often recent (from 2000 onward). **Length structure of the population** is the most cited estimate, available for all commercial species when collected onboard a research vessel, and for a restricted list of species otherwise.

Besides the length structure, **individual weight, sex-ratio, maturity and age** are cited. It must be noticed that these parameters are mandatory within the EU Data Collection Framework (DCF) and are also collected within other national monitoring programmes. **Growth** is also often cited as data available, and must be the output of individual length, weight and age parameters. Whether the original samples are available for computing or not will have to be investigated if this information is required. Cited more seldomly are

- **fat content** collected in GSA24 within a research project investigating the small pelagic stocks of the Northeastern Mediterranean from 2009 to 2011;
- **stomach content** for anchovy within PELMON project in GSA17 from 2003 to 2007, for *Lagocephalus sceleratus* within a research project in GSA25 in 2009 and 2010 and for some species in GSA22 in 2006,
- **Gonado-Somatic Index (GSI)** within acoustic surveys of small pelagic stocks at the

Moroccan Mediterranean (GSA03) from 2003 to 2011, from research project for selected species in GSA24 from 2009 to 2011, and in GSA22 in 2006.

- **Condition indices** within monitoring activity of purse seine landings off the Lebanese coast (GSA27) in 2003.

Temporal occurrence, abundance and spatial distribution of **non-indigenous or exotic species** were not cited in the answers given by CREAM partners within the questionnaire. This important issue for the Mediterranean and Black Sea must be part of the indicators for an EAF, knowing that an important peer-reviewed literature does exist and an overview was made in 2011 by RAC/SPA (2011).

3.6. Habitat description

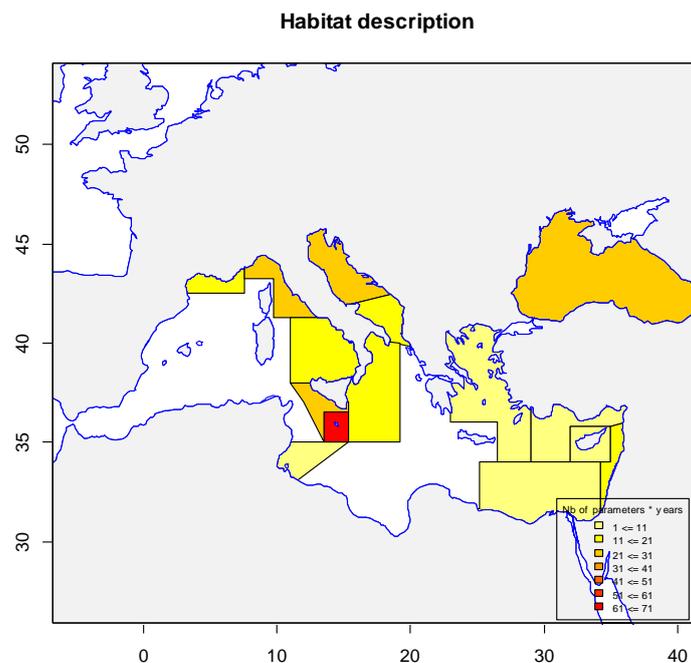


Figure 5 : View of the information received for habitat description.

Not much information was given on habitat description, which does not mean that this information does not exist elsewhere, as it is often studied within research projects. Key words cited for habitat description are linked to

- the **stock boundaries, spawning and nursery areas** of a particular species (*Lagocephalus sceleratus*, *Aristeomorpha foliacea*, *Mullus Barbatius*, *Merluccius merluccius*, *Parapenaeus longirostris*), or nursery areas for a group of species;
- **Areas of wintering, spawning and fattening** of adults, juveniles and larvae and total

distribution of 15 species;

- Location of important **bird areas**;
- Location and classification of habitats according to RAC/SPA, EUNIS;
- Location of **vermetid reefs, coralligenous bottoms, seagrass meadows**;

3.7. Economics

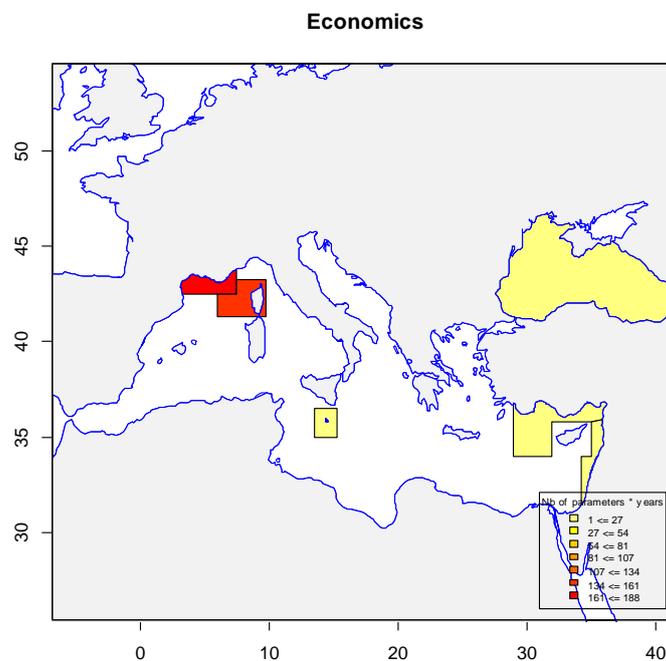


Figure 7 : View of the information received for economics.

Economic parameters listed are **employment rates (Full time equivalent), gross value of landings, price of fish per species, wages and salaries of crew, imputed value of unpaid labour, energy consumption and cost, variable and non-variable costs, annual depreciation of the vessel and gears, value of physical capital, qualification of the crew**. As shown figure 7, very few partners reported economic data, stating that these data were available only on an aggregated form. The time series is short, the longest starting in 2001.

It is reminded that, part of GFCM Task 1 (Task 1.5) must be reported employment, salary share, landing value, vessel value for the whole fleet, cost of fishing/day per vessel and yearly fixed costs per vessel (Res. GFCM/31/2007/1 on the implementation of the GFCM Task 1 statistical matrix).

3.8. Pollution and contaminant

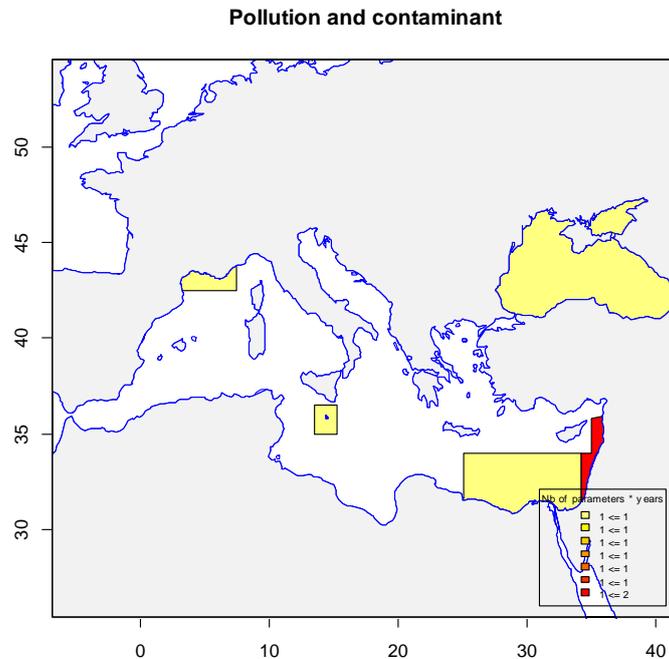


Figure 6 : View of the information received for pollution and contaminant.

Very little information is given for pollution monitoring. Are cited **land based pollution** in GSA26 from a research project, **bunkering areas, sewage outlets and location of point/source of pollution** in GSA15 and data on distribution of **various pollutants and contamination** in GSA29 and GSA30 in 2010. Only one partner cites the **follow-up of marine litter** in the Mersin Bay (GSA24) although it is an important aspect to follow-up in an EAS. No mention of monitoring or retrieval programme on lost or abandoned gears, but relevant information on these topics are provided by ACCOBAMS⁷. Some EU projects involving Mediterranean and Black Sea partners just started on addressing the litter issue (CLEANSEA, MARLISCO) and some others are under evaluation.

As concerns **contaminant**, the MERLUMED project has studied their **bioaccumulation in the hake trophic web**. Like the abiotic parameters, SeaDataNet may be a large source of information for contaminants follow-up like concentration of polychlorobiphenyls (**PCBs**) and polycyclic aromatic hydrocarbons (**PAHs**) in sediment samples and in the water column, and concentration of **carbohydrates, phenols, alkanols** (alcohols), **aldehydes and ketones** in water bodies. What is the spatial and temporal distribution of this information remains to be seen.

⁷ http://www.accobams.org/index.php?option=com_content&view=article&id=1157&Itemid=170

3.9. Management

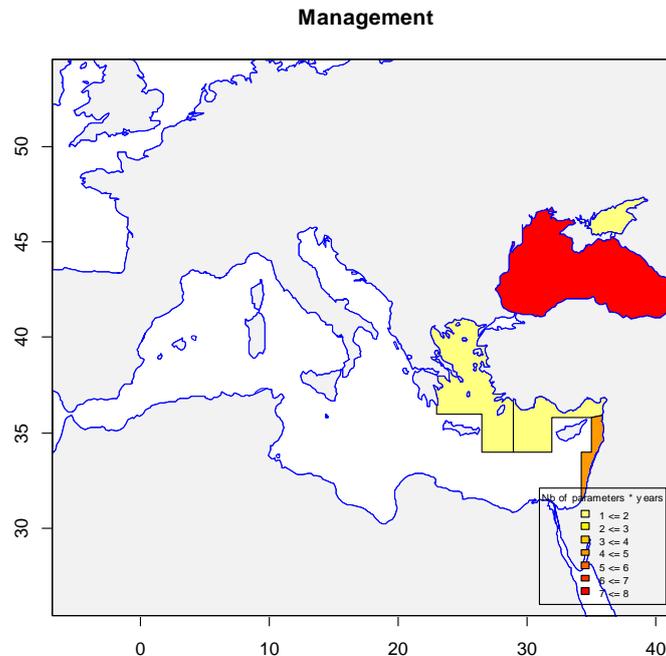


Figure 8 : View of the information received for management.

The legal framework and extent to which the effects generated by the fishery would comply with national regulations and with international law and agreements related to nature conservation with consideration for endangered species is an important part of EBFM (FAO, 2003). Figure 8 provides the map of the information received from the questionnaire, and must not be seen as the only information available in the Mediterranean and Black sea. Part of the CREAM project, the deliverable 2.3 proposes a comparative analysis of the management systems adopted in different countries/GSAs of Mediterranean and Black Seas.

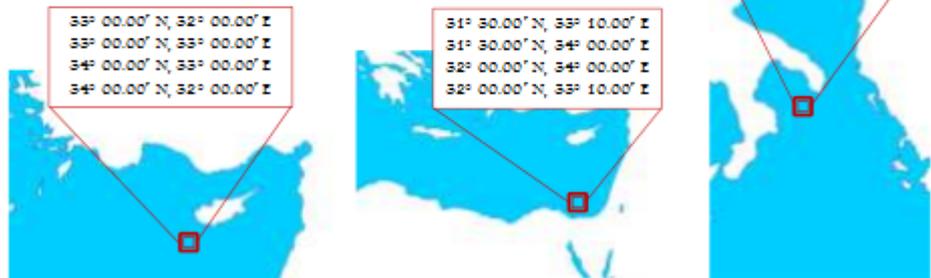
Within its competence area, GFCM provides a number of recommendations and resolutions aiming at managing the fisheries and protecting areas⁸, as for example:

⁸ <http://www.gfcm.org/gfcm/topic/16100/en>

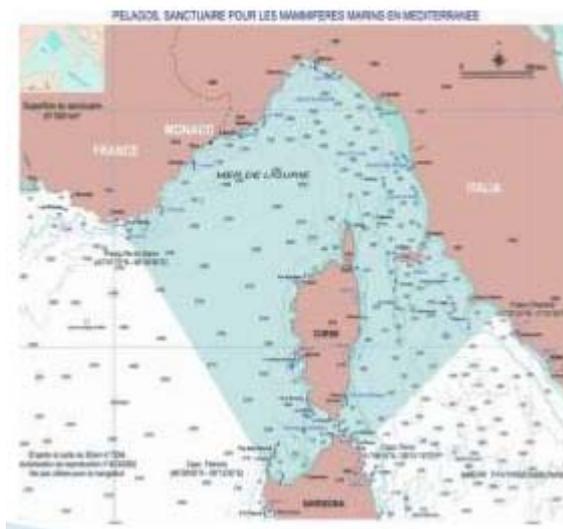
- the establishment of fisheries restrictive areas in order to protect the deep sea sensitive habitats (Rec. GFCM/2006/3)

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

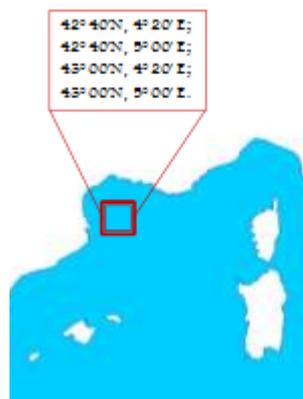
- Lophelia* reef off Capo Santa Maria di Leuca (Italy)
- The Nile delta cold hydrocarbon seeps area (Egypt)
- The Eratosthemes Seamount (Cyprus)



- The establishment of the Pelagos sanctuary for the conservation of Marine Mammals (Rec. GFCM/31/2007/2)



- The establishment of a fisheries restricted area in the Gulf of Lion to protect spawning aggregations and deep sea sensitive habitat (Rec. GFCM/33/2009/1)



- A comprehensive **overview of existing marine protected areas** in the Mediterranean is available with the MedPAN network⁹ (figure 9).

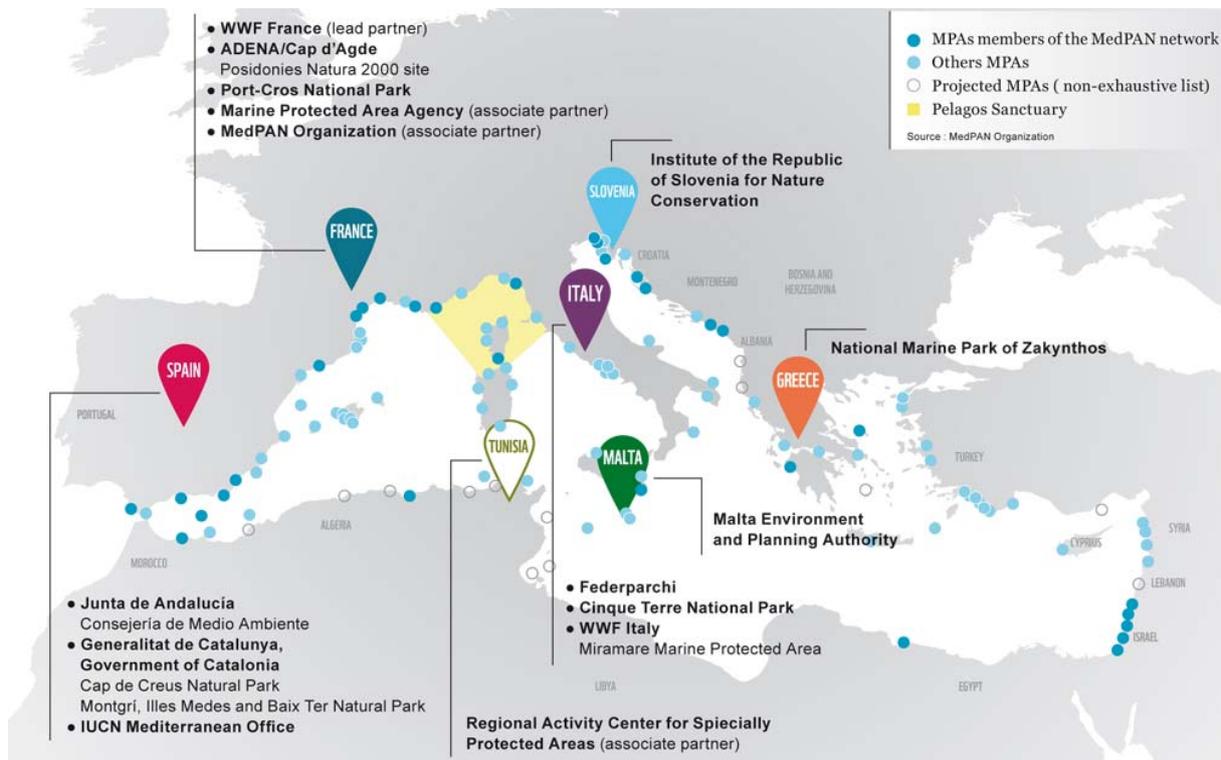


Figure 9 : Map of the MPAs of the MedPAN network

⁹ Network of Marine Protected Areas managers in the Mediterranean (<http://www.medpan.org/en/mnp>)



The EU project MESMA (2009-2013) was cited as focusing on marine spatial planning and aiming to produce integrated management tools (concepts, models and guidelines) for monitoring, evaluation and implementation of Spatially Managed Areas (SMAs). The project results will support integrated management plans for designated or proposed sites with assessment methods based on European collaboration. Their approach will make it possible to compare pressures on an inter-regional level (e.g. Offshore wind farms in the North Sea, Black Sea and Baltic), or a multi-pressure level for a specific region (e.g. Spatially Managed Areas in Fishing, Wind-energy, Geohazards and Tourism in the Black Sea).

The project FISHTRAIN (2001-2004) was also cited as giving insights of management by identifying the needs and requirements of fishermen and other stakeholders located in Mediterranean Sea and by designing a Vocational Training Programme that covered the perceptions and needs of End-Users, able to transmit the knowledge on Sustainable Management of Fisheries.

4. Quality of the information

As part of the questionnaire sent to all CREAM partners was a quality evaluation and comments on the collected data. The questions were about completeness, data validation and error checking, reliability of the information, availability of a written protocol, accuracy and accessibility of the information and a room for free comments.

4.1. Completeness

When referring to a EU monitoring activity (EU Data Collection Programme, EU Water Framework Directive) the data are said complete and without gaps with some exceptions. Outside the EU, completed datasets are the exception, the rule being years with missing information or sporadic monitoring without historical series. Some reasons for stopping the series are 'force majeure' like war (Croatia 1999, Lebanon 2006). Discards and economics are prone to incompleteness due to the difficulty to randomly access the sampled population or to gather all the needed variables.

The scientific surveys at sea are generally complete with the full time series available (MEDITS, MEDIAS, GRUND with 1988-89 and 1999 missing). Some others are discontinued or with a very short time series. Catch assessment surveys and data collection within research projects are generally on short time periods and represent point estimates. Some research projects such as EMODNET are compiling data on a long time series.



4.2. Data validation error checking

Data validation process and error checking may involve several steps such as

- Test of quality : Data entry control and validation
- Test of homogeneity : research of atypical values compared to other samples
- Test of continuity : research of atypical values compared to previous years
- Test of consistency : cross-validation with other sources of information

Very few partners described their means of validating and error checking, but most declared their data were passing through a validation process and stored in a central database. Several said a dedicated software was developed for validation and cross-checking.

From the deliverable 3.1 it is clear that the information is mainly stored in Excel or structured databases. Information documented in books or paper sheets are still quite significant and useful to compare recent points to the past, but the quality of paper information is difficult to evaluate.

4.3. Reliability

99% of the data reported by CREAM partners are said reliable, conform to standard format and definitions. When the data is issued from a sampling protocol, the design is said respectful of the randomness. One of the assessment of reliability made by a CREAM partner summarises it all: 'The data can be considered as the best available'

4.4. Methodology, protocol

Several CREAM partners expressed that there was no agreed methodology for data collection in the Black sea. Other partners expressed that they followed national protocols, or internationally agreed protocols without more explanations. Some partners described in few words their protocols or give reference to a publication. There was the possibility to enter a link to a webpage to enable accessing the methodology easily, and the table below compiles all the methodology links given in the questionnaire.

Programme	Website link
MEDITS	http://www.sibm.it/MEDITS%202011/docs/Medits-Handbook_V5-2007.pdf
Monitoring programmes	http://www.iczmportsaid.uniss.it/images/stories/documents/Action_7_Fishery_vol1.pdf http://www.worldbank.org/projects/P095925/alexandria-coastal-zone-management-project-under-investment-fund-mediterranean-sea-large-marine-ecosystem?lang=en

Programme	Website link
	http://uvt.ulakbim.gov.tr/uvt/index.php?cwid=9&vtadi=TPRJ&ano=108098_8a140b2b067c4f18ff064c3997632ad8
Cath assessment surveys	http://sih.ifremer.fr/Contenus-sih/Acquisition-des-donnees/Observation-des-marees-aux-debarquements http://www.ices.dk/products/CMdocs/CM-2008 http://sih.ifremer.fr/Contenus-sih/Acquisition-des-donnees/Enquetes-Activite-des-flottes/Documentation
Economics	http://sih.ifremer.fr/Contenus-sih/Acquisition-des-donnees/Enquetes-economiques/Documentation
Model	ftp://ftp.fisheries.ubc.ca/Ecopath/webfiles/Ewe%20User%20Guide%205_1.pdf
Biological parameters	http://www.ilkyaz.eu/doc/ilkyaz_2008_4.pdf
EU data collection regulation	https://datacollection.jrc.ec.europa.eu/documents

4.5. Accuracy

Accuracy is the quality of the information expressed as both bias and precision. Bias is difficult to evaluate and often the follow-up of the agreed methodology is the way to avoid bias. Unsurprisingly, the follow-up of agreed methodology is the most used expression in the questionnaire. There are sources of bias reported, such as misreporting of official data, instrumental errors, species identification, scarcity of sampling and change over time in the survey design.

Very few partners reported having estimated the precision of their estimates. Some are expressing that the information exists, and some are expressing doubts on the precision estimates. Eventually, for most of the information, the data can be considered, as in section 4.3, as the best available.

4.6. Accessibility

The general picture is that the standard outputs are public, and the original datasets (individual data) have a restricted access. The restricted access can be of several forms, available under specific agreement, available upon request, available under certain conditions, or meaning that these data are not accessible by anyone else than the country/institute having collected it or by the authority of the country. Some individual data, like economics, are not available at all, by confidentiality rules agreed when undertaking the interviews.



5. Conclusions

There is a large amount of data available for EAF in the Mediterranean and Black Sea. The time series may be discontinued at some locations and the format range from paper sheet to structured databases. There is probably hardly any location gathering all the data needed for ecosystem based fisheries management (EBFM).

The subsections on families of parameters (sections 3.1 to 3.9) are given to be the core information needed for an EAF. The possibilities to use SeaDataNet for abiotic parameters should be investigated further. Fleet and fisheries statistics are compiled through GFCM Task 1 and, although still incomplete, are available on the GFCM public website. Status of marine resources and level of fishing pressures are provided by FAO sub-regional projects, agreed and validated in GFCM and EU/STECF relevant working groups. Fishermen awareness should be undertaken on the ongoing initiatives for a better quantification of by-catches of vulnerable species.

Scientific surveys are an important means to collect biological information and habitat description, but the addition of all surveys in a given year never encompasses the whole Mediterranean and Black Sea area. Biological information and habitat description are predominantly in published documents. Whether the original samples are available for computing or not will have to be investigated if this information is required, or an area-based overview will need to be compiled. The occurrence and spatial distribution of non-indigenous species is also available through published documents.

Economics information is often seen as confidential and difficult to gather and share for analysis. The Mediterranean and Black Sea is no exception to this rule, and very few partners reported economic data, and when available, it was only on an aggregated form. Similarly, pollution and contaminants were scarcely reported, but some EU projects are on their way and may lead to progress in this field of knowledge.

Spatial planning is an essential tool for management in an EAF, and a comprehensive overview of existing marine protected areas in the Mediterranean is available within the MedPAN network. The EU project MESMA (2009-2013) will support integrated management plans for designated or proposed sites with assessment methods based on European collaboration. Their approach will make it possible to compare pressures on an inter-regional level (e.g. Offshore wind farms in the North Sea, Black Sea and Baltic), or a multi-pressure level for a specific region (e.g. Spatially Managed Areas in Fishing, Wind-energy, Geo-hazards and Tourism in the Black Sea).

Considering quality issues, there should be no doubt that the data collected by all CREAM partners are the best available, and that they are predominantly validated and reliable. They are often incomplete or discontinued, they are scattered in terms of geographical dimension and scientific surveys all together do not cover the whole Mediterranean and Black Sea.

Standard outputs and aggregated information are generally available to the public, whereas original datasets have a restricted access. Data is often stored in Excel format which may lead to difficulties



for sharing the information. Data collection protocols are difficult to find or not existing. Only national protocols are referred to, and agreements on regional data collection protocols would be welcome.

When formulating an EAF management plan, lack of data or uncertainty about the impact of the fishery should not be used as an argument for delaying the plan (FAO guidelines for an EAF). Given the uncertainties associated with the lack of knowledge, data, and understanding about the ocean and living marine resources, the precautionary approach is a fundamental and inextricable feature of implementing EAF (Meltzer, 2009).

The next deliverable (D3.3) due in October 2013 will propose indicators, models, methodologies and reference points for the EAF, based on the outcomes of the data mining and quality assessment as reported in deliverables D3.1 and D3.2.

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