



“Towards coordinated monitoring in the European Regional Seas”

**FINAL conference of the pilot projects (IRIS-SES,
BALSAM & JMP NS/CS)**

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Proposals for joint/coordinated monitoring: outcomes of IRIS-SES case studies

F. Alemany & Act. 4 IRIS project team

- **In relation to the elaboration of JMPs IRIS-SES have been working mainly in three lines:**

- **Already existing JMPs in which most of countries in the region are implied.**
- **Monitoring programs potentially useful for MSFD that are actually carried out in most of countries in the region, but without any formally agreed common protocols**
- **Pilot “improved” surveys in the field**

- The **specific objectives** in each one of these lines have been:

- **Already existing JMPs:** Elaborate proposals for adapting these monitoring programs to MSFD requirements, optimizing them to address as much MSFD descriptors as possible, taking advantage of synergies and considering cost-effectiveness issues
- **Not formally coordinated/standardized monitoring programmes:** Elaborate proposals for improving the international coordination of these programs and for facilitating the implementation of standardized protocols
- **Pilot surveys in the field:** Demonstrate in a practical way the feasibility of taking advantage of current sampling schemes for MSFD purposes and carrying out MSFD oriented complementary sampling activities within the framework of monitoring surveys realized in relation to other directives.

- The case studies finally developed in each one of these lines have been:

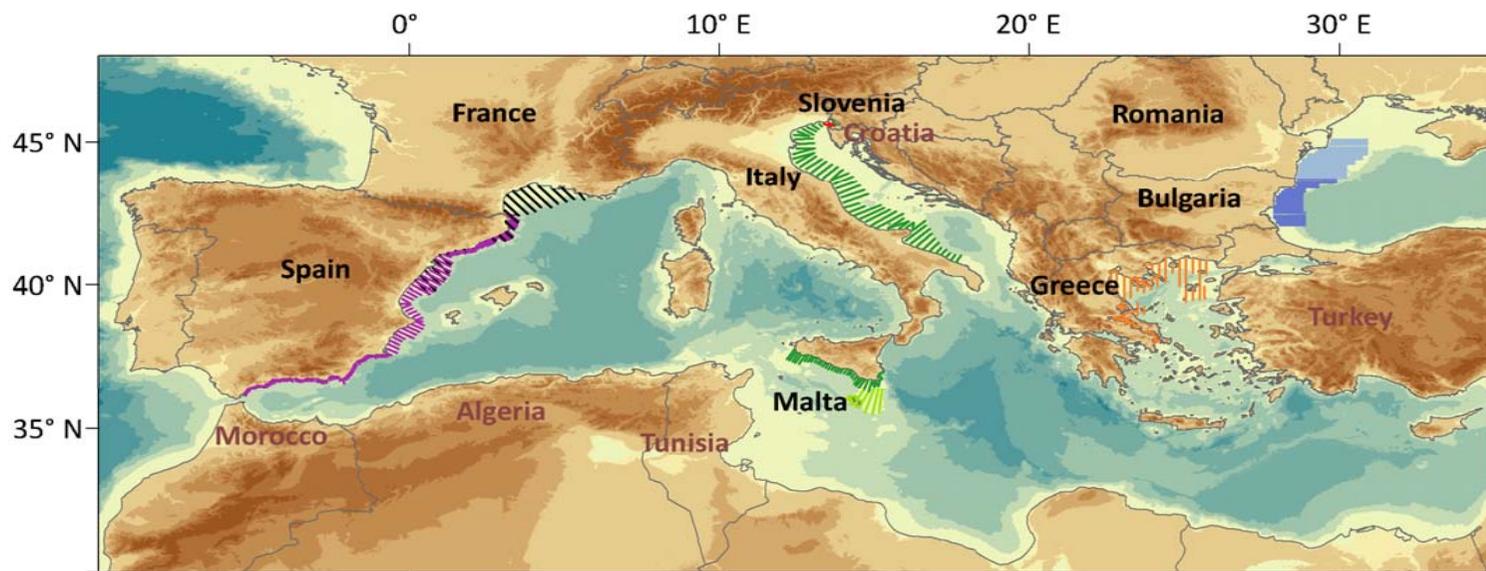


- **Already existing JMPs:** The selected monitoring programs have been the UE fisheries **Data Collection Framework (DCF)** acoustic and trawl **surveys MEDIAS and MEDITS**, the **MEDPOL** monitoring programs on **eutrophication and contaminants** and all **the monitoring system** implemented in relation to **WFD**
- **Not formally coordinated/standardized monitoring programmes:** Two case studies have been analyzed, the **monitoring of Seagrasses** and the **monitoring programs** carried out **within MPAs**
- **Pilot surveys in the field:** Two pilot actions have been realized, one dealing with complementary sampling activities within **MEDITS trawl surveys** and another on the use of continuous hydrographic monitoring systems within “classic” single stations oriented surveys, as well as integration of D5 Eutrophication and D7 Hydrographical conditions, the **Spanish RADMED surveys**

FOLLOWING, AS EXAMPLES OF THE OUTPUTS FROM IRIS PROJECT IN THESE CASE STUDIES, SPECIFIC ASPECTS OF SOME OF THEM ARE SUMMARIZED:

- **MEDIAS surveys potential improvements: description, opportunities and difficulties**
- **MEDPOL eutrophication monitoring as MSFD JMP: structure of the report**
- **MEDPOL pollutants: suggestions of improvement**
- **WFD monitoring: Usefulness for MSFD requirements**
- **MPAs monitoring programs in the Med, analysis of current state and suggestions for improvement**
- **MEDITS pilot project: adaptation to MSFD requirements**

The MEDIAS survey is nowadays conducted annually by 9 EU Countries under the EU Data Collection Framework (DCF) and the general aim is to produce information on small pelagic species for management decisions, principally, anchovy (*Engraulis encrasicolus*) and sardine (*Sardina pilchardus*), addressing directly **Descriptor 3**.



However, it presents the potential of being used as platform to address some of the sampling requirements of other descriptors, both from biological samples already available or from additional sampling activities taking advantage of “free” hours (from dawn to sunset, for example).

Thus, in the prospected shelf areas, MEDIAS surves could potentially address, at relatively low cost (extra team and crew for night work, additional fuel).



- **Descriptor 1: Biological diversity (ongoing pelagic trawl, additional night plankton tows...)**
- **Descriptor 2: Non-indigenous species diversity (ongoing pelagic trawl, additional night plankton tows...)**
- **Descriptor 3: Populations of commercial fish / shell fish**
- **Descriptor 4: Food webs (from Pel. Trawls samples)**
- **Descriptor 5: Eutrophication (additional plankton sampling)**
- **Descriptor 7: Alteration of hydrographical conditions (CTDs)**
- **Descriptor 8: Contaminants in sediments (additional dredges)**
- **Descriptor 9: Contaminants in biota (from Pel.Trawl samples)**
- **Descriptor 10: Marine litter (additional plankton tows for microplastics)**

In green: directly addressed; in red, potentially adressed from actually available samples; in blue, potentially adressed through feasible complementary additional sampling





- **However, the MEDIAS surveys differ in terms of:**
 - **Vessel characteristics (length, capacity for scientific personnel...)**
 - **Area extent to cover (e.g. GSA's)**
 - **Survey time (e.g. number of days)**
 - **Topography of prospected areas...**
- **Moreover, each country, depending on their needs and capabilities, already uses its survey as a platform to collect complementary data through additional sampling activities (e.g. DEPM data; top predators data, as marine birds, etc..), which are not necessarily related to MSFD, and such additional sampling activities are not homogeneous.**
- **Summing up, the potential of these platforms to monitor other MSFD descriptors rely, principally, on the vessel capacity and the survey design (i.e. trawling during the day or at night), which can be different among countries.**
- **In conclusion, to incorporate new sampling activities related to MSFD in a standardized and homogeneous way is not an easy task. However, even without adding new sampling activities, merely from the already available samples, several MSFD descriptors can be addressed, whenever additional funding for samples analysis be provided.**



		R/V	Country	Area to cover (nm2)	Nº of days
70		Miguel Oliver (formerly Cornide de Saavedra 67)	Spain	8829 (Iberian coast)	33
30		L'Europe	France	3300 (Gulf of Lions)	30
35		Dallaporta	Italy/Malta	2700 (Sicily channel)	16
		Dallaporta	Italy/Slovenia	16317 (West Adriatic Sea)	40
36		Bios DVA	Croatia	13578 (East Adriatic Sea)	30
26		Philia	Greece	9000	40



Objective

Contribute with technical and methodological recommendations to the design of a MSFD joint monitoring program for the different sub-regions of the Mediterranean Sea based on the ongoing Eutrophication monitoring that the EU Member States are obliged to do under the Barcelona Convention

Scheme of the document

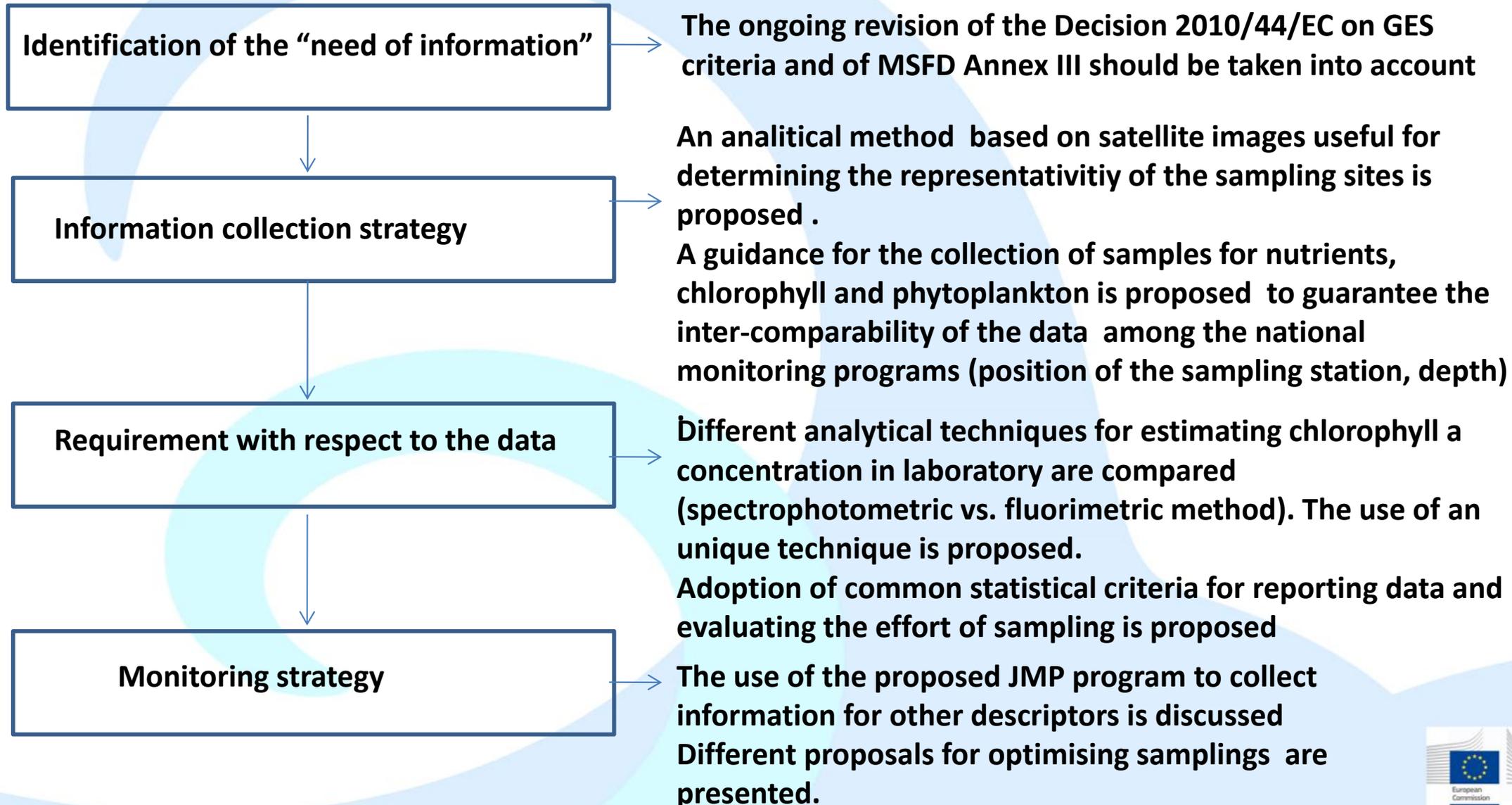
1. Introduction
 - 1.1. Principles for designing monitoring programs based on the MSFD
 - 1.2. Need of information for eutrophication assesment.....
 - 1.3. Objective
2. Analysis of the ~~eutrophication monitoring strategy of MEDPOL~~.....
 - 2.1. Background
 - 2.2. Analysis of the information collection strategy of MEDPOL.....
 - 2.3. Requirements with respect to the data.....
 - 2.4. Monitoring strategy
3. Proposal of a JMP of eutrophication.....
 - 3.1. Recommendations for harmonization of information and data collection.....
 - 3.2. Recommendations for harmonization of the monitoring strategy.....
 - 3.3. Examples of JMP
4. References.....

1st part. Guidance principles for designing the JMP

2nd part. Critical analysis of MEDPOL from MSFD prospective

3rd part. Technical proposal for improvement & adaptation

Summing up, the eutrophication monitoring strategy of MEDPOL has been analysed according to the application of the so-called “monitoring cycle” that consists of discriminating between what information and data are required and how the data are collected, following the next steps (Zanpoukas et al. 2014, JRC):, and the following recommendations are proposed:



• Similarly, the report dealing with the future JMPs on contaminants based on MEDPOL (Coordinators M. Dasenakis and T. Paramana) include the following recommendations to satisfy the requirements of MSFD.



- Establish a "dense" sampling network (considering MEDPOL phase III monitoring network) – covering further areas where gaps were noticed. This network should be decided on the basis of regional cooperation (integration with Black Sea) especially among neighboring countries to ensure adequate spatial coverage and saving of resources.
- Implement common protocols and harmonized/intercalibrated analytical methodologies to ensure comparability of results
- Integrate modern technologies in the analysis, such as ICP-MS and ICP-AES which permit the determination of very low concentrations.
- Investigate the use of other parameters (e.g. Emergent Pollutants)
- Investigate the use of other sentinel species (e.g. *Xiphias sp.*)
- Investigate the use of biomarkers (EROD activity, stress on stress, acetylcholinesterase activity, metallothionein content and frequency of micronuclei occurrence)
- Keep an even flow of data reporting, with a widely accessible data base.

The report on the applicability of WFD monitoring systems to MSFD descriptors (Coordinator K. Pagou) have identified the following links



QUALITY ELEMENT	WFD PARAMETER	MSFD DESCRIPTOR	PARAMETERS & INDICATORS
HYDROMORPHOLOGICAL	SUBSTRATE CURRENT VELOCITY, SPEED	D6, D7, D1	GRANULOMETRY CURRENT VELOCITY, SPEED
PHYSICOCHEMICAL CONDITIONS	NUTRIENT CONDITION, TEMPERATURE, SALINITY, TRANSPARENCY, TN, TP, DISSOLVED OXYGEN	D1, D5, D7	NUTRIENT CONDITION, TEMPERATURE, SALINITY, TRANSPARENCY, TN, TP, DISSOLVED OXYGEN, PARTICULATES, EI INDEX
BIOLOGICAL ELEMENTS	PHYTOPLANKTON, BENTHIC MACROINVERTEBRATES, MACROALGAE, ANGIOSPERMS	D1, D2, D5, D6	BENTHIC MACROINVERTEBRATES BENTIX, MULTIMETRIC , MACROALGAE (EEIc) PREI
SPECIFIC CONTAMINANTS	PRIORITY SUBSTANCES CHEMICAL STATUS ANNEX X	D8	TRACE METALS AND PRIORITY SUBSTANCES

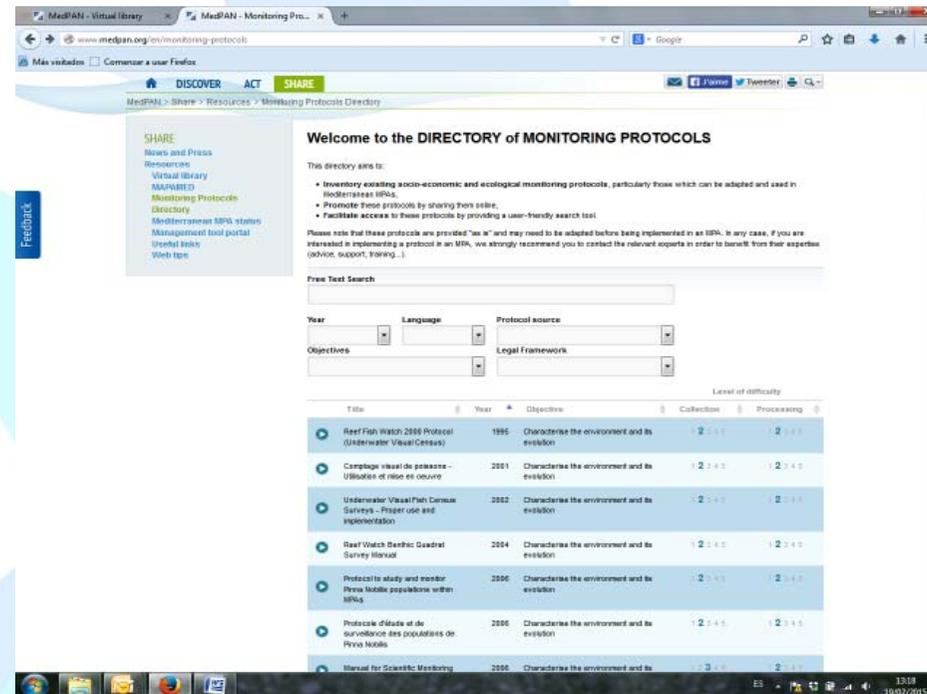
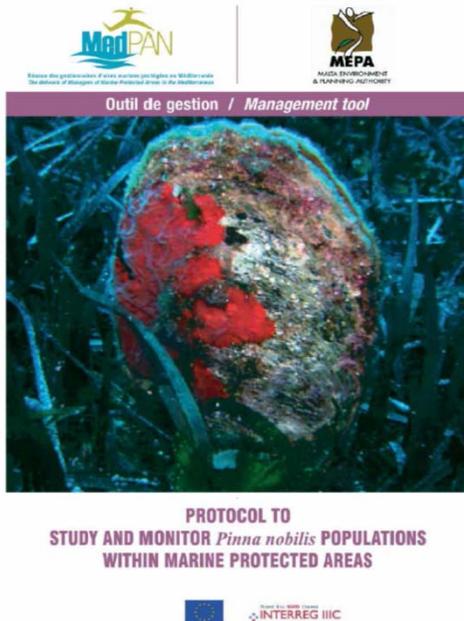
From: Biological Quality Elements acquired through the WFD monitoring address several Descriptors of the MSFD (Simboura et al. 2015):

Monitoring coastal MPAs according to MSFD requirements

Coordinator S. Deudero



- **REPORT contents:**
 - Assessing suitability of the current monitoring programs to MSFD requirements
 - Analysis of current coordination level
 - Proposals for JMP implementation → Standardization to European level
 - Proposals for improving international and national coordination



1. Assessing suitability of the current monitoring programs to MSFD requirements:



- The ongoing monitoring programs in MPAs address several MSDF descriptors. For example, only the monitoring programs in Med Spanish MPAs can provide data for
 - D1. Biodiversity (habitat, species): specially focused on Europe's most valuable and threatened species and habitats as *Posidonia oceanica*, *Scyllarides latus*, *Eunicella singularis*, *Pinna nobilis*...;
 - D2. Non-Indigenous species;
 - D3: Commercial fish;
 - D4: Food webs;
 - D5. Eutrophication (in Spanish MPAs only ZEPIM Coastal lagoon Mar Menor, Murcia)
 - D6. Seafloor integrity



2. Analysis of current coordination level at international scale



- MedPAN Organisation- Network of MPAs managers (www.medpan.org)
- The MedPartnership: MedPAN South Project and MedMPAnet Project (www.medmpanet.rac-spa.org)
- IUCN-Med marine programme (www.IUCNmed.org) → Identifying Priority Representative Areas and Species
- Natura 2000 Network, EU Commission
- Follow up recommendations and booster implementation of UNEP/MAP activities supporting the Barcelona Convention for the implementation of the Ecosystem Approach, including the establishment of MPAs in Open Seas Areas, including Deep Sea
- GFCM FAO for commercial species, FRA (Fishery Restricted Areas) www.gfcmonline.org/maps/fras/
- RAC/SPA (Regional Activity Centre for Specially Protected Areas) SPAMI List of Specially Protected Areas of Mediterranean. in order to promote cooperation in the management and conservation of natural areas (www.rac-spa.org/)
- CIESM Mediterranean Science Commission (<http://www.ciesm.org/>)



3. Proposals for implementation of joint monitoring programs → Standardization to European level



- To create a network of transnational MPAs where common monitoring programs are established
- To create a program on MPAs monitoring (similar to MEDITS, MEDIAS in fisheries; MEDPOL for pollution...)
- Take advantage of the uniqueness of species and habitats within MPAs for setting common GES reference points.

4. Proposals for international coordination

- Follow up recommendations and booster implementation of UNEP/MAP activities supporting the Barcelona Convention for the implementation of the Ecosystem Approach, including the establishment of MPAs in Open Seas Areas, including Deep Sea
- CIESM as an international forum of scientific matters
- MEDPAN as the international network of MPAs managers



Synthesis, gaps, recommendations



International level:

- A vast array of international institutions within Med, both dealing with MPAs administration/management (UE Commission DG Environment, DG MARE; UNEP/MAP EcAp Barcelona Convention, RAC/SPA, GFCM FAO) and scientific matters (MEDPAN, UICN, CIESM)



Need to enforce coordination

- Several protocols exists and efforts on harmonization and standardisation are obliged within the MSFD



Need to enforce standardization

- EcAp is setting protocols with indicators (common, proposed, candidates) and along with MEDPAN can provide the scientific and administrative/governance advice and coordination on the MPAs monitoring in the Med basin



Synthesis, gaps, recommendations



National level:

- Ongoing monitoring programs at MPAs are established at several EU countries with different objectives and conservation priorities. A high hierarchical structure in governance slow down and makes it difficult to progress on common standards and monitoring protocols along the MPAs.



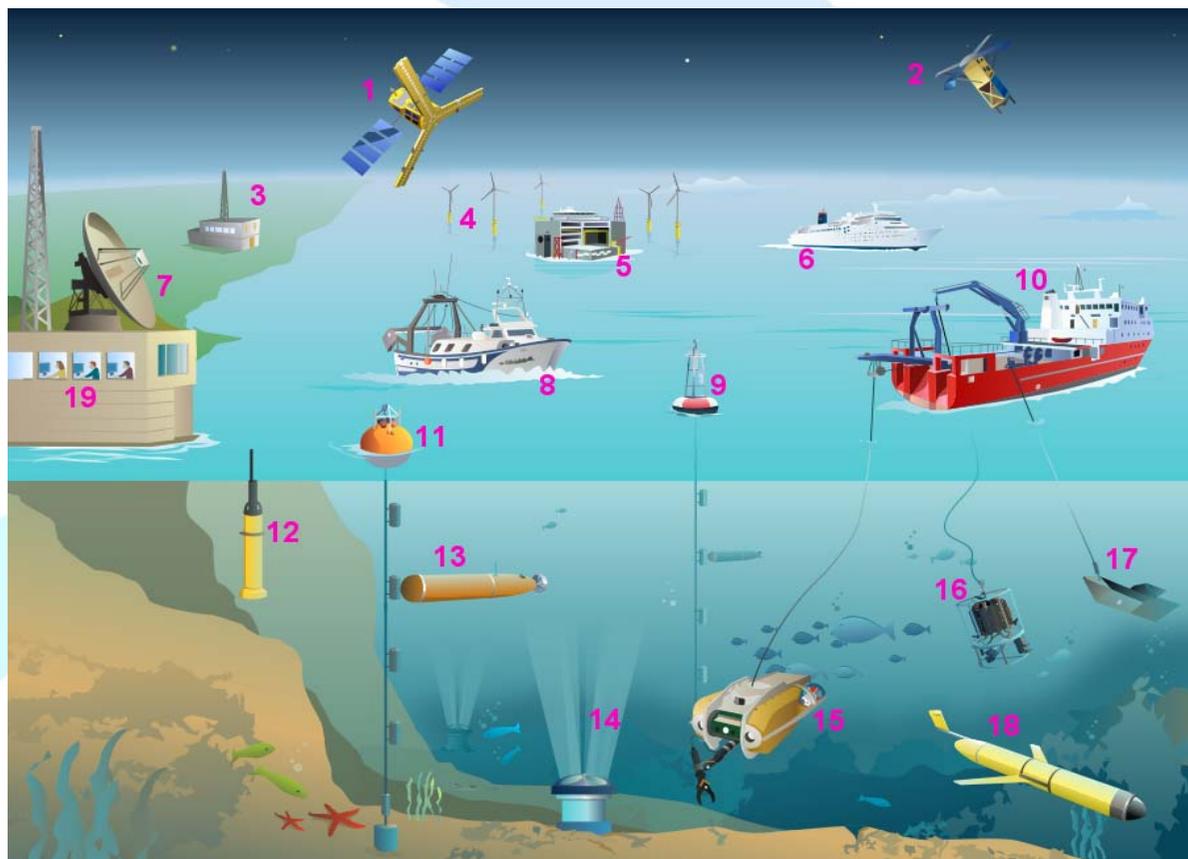
Need to enforce coordination within each country among different institutional levels and geographical extent (local/regional)

- MPAs networks are being created but still more work needs to be done on their implementation and efficiency.
- Sparse available information in MPAs derived of specific programs developed by research institutions and financed by institutions related to management of Fisheries, Environmental and Natural Resources should be taken into account.



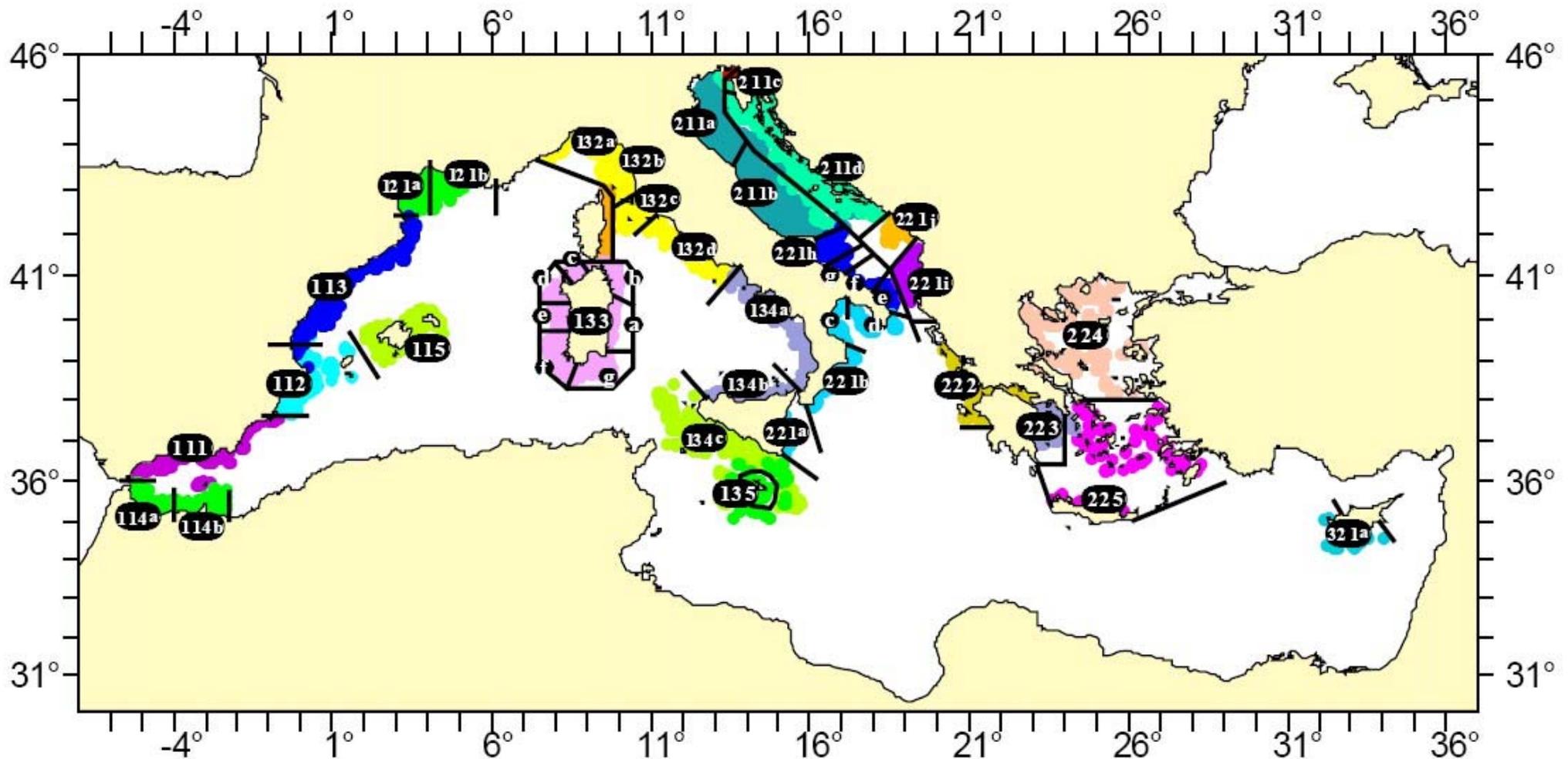
Look for mechanisms for financing continuous monitoring programs at MPAs

Monitoring benthic communities



Cristina García, Beatriz Guijarro, María Valls, Antonio Esteban, Francesc Ordines, Antoni Quetglas and Enric Massutí

DFC MEDITS surveys cover all the trawlable soft bottoms of northern Med coasts from 10 to 800 m depth, constituting an obvious candidate for becoming a future MSFD related monitoring program



MEDITS surveys in Spain

R/V Miguel Oliver



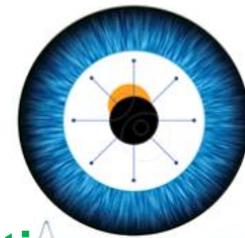
- **Ministry of Agriculture, Food and Environment**
- **Multidisciplinary vessel**
- **Size: 70 x 14 m**
- **GT: 2480 t**
- **Capacity: 18 scientists**
- **Laboratories:**
 - **Fisheries**
 - **Hydrography**
 - **Acoustics**
 - **...**

Potentiality of MEDITS survey in Spain for MSFD



- According to MEDITS protocol, samples should be taken during daylight hours. Therefore, during daylight extra time, sunset and nighttime R/V *Miguel Oliver*, and any other R/V used for MEDITS surveys, constitutes a platform that can be used, if some additional resources are provided, to develop additional sampling.
- The **ongoing sampling** with standard GOC 73 trawl already directly address **descriptor 3 and in part descriptor 1**
- The introduction of **new sampling procedures of organisms collected with the GOC-73** could also generate information for **descriptors 4 (food webs), 10 (litter) and 8 (contaminants in biota)**
- **Additional trawls with epibenthic beam trawls** would allow to reach better estimations of indicators for **descriptors 1 and 6**, and other additional sampling activities, such as **CTD casts and benthic dredges**, would provide data for **7 (hydrographic conditions) and 9 (contaminants)**. Moreover, **non intrusive methods**, as **ROV or photogrammetric sleds**, could be also used to **survey sensitive habitats (e.g. maërl and crinoid beds, coralligenous bottoms) and/or rocky bottoms**.

- **Additional budget**
 - Extra fuel and crew for new sampling
 - Participation/collaboration of more technicians and experts
- **MEDITS sampling (08:00-19:00)**
 - **New data/sampling from GOC-73 catches (descriptors 3 and 1):**
 - Stomach contents analysis (on board)
 - Samples for stable isotopes analysis } descriptor 4
 - Intersex (descriptor 8)
 - Litter (descriptor 10)
- **New sampling (20:00-00:00)**
 - **Beam trawl (better information for descriptor 1 and 6)**
 - Taxa composition and density (number and weight per 500 m²)
 - Length frequency of some fishes, cephalopods and decapods crustaceans



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General conclusions and statements:

- **Several JMPs programs useful for MSFD exists in the Mediterranean and Black sea regions, and with some further coordination and standardization efforts also other national monitoring programs could become MSFD related JMPs.**
- **These programs already provide data for applying the indicators of several MSFD descriptors, and at relatively low cost they could be improved and adapted to fulfill more MSFD sampling requirements.**
- **However, most of these programs in the Med and Black Seas only cover partially the different marine demarcations, being limited to specific habitats or geographical areas and concentrated in coastal areas. Therefore, they should be enlarged to be useful for global evaluations.**
- **There are logistic constrains that must be taken into account ... We should move from theoretical recommendations to realistic and affordable work plans, agreed with the direct responsible of existing monitoring programs.**
- **Moreover, it should be taken into account that each one of these programs have already its own objectives, and that most of them already use all or most of the available capacities... Thus, most of new activities will require some additional resources (support for larger vessels, for additional sampling days and analysis...) and should be agreed with the direct responsible of these monitoring schemes, who should be involved in the design of the future MSFD JMPs from the very beginning of the process.**