



**Pilot Project - New Knowledge for an integrated management of
human activities in the sea**

IRIS-SES

**INTEGRATED REGIONAL MONITORING IMPLEMENTATION
STRATEGY IN THE SOUTH EUROPEAN SEAS**

www.iris-ses.eu

IRIS-SES 1st Scientific Workshop

Book of Abstracts

Athens, Greece, 22-23 October 2014





Project coordinator: **Dr Kalliopi Pagou**

Grant Agreement: 07.0335 / 659540 / SUB / C





Contents

Monitoring inventory catalogue's design according to the MSFD requirements	1
Integration across descriptors and indicators using the WFD experience and data: a case study based on the Hellenic national monitoring network.....	2
Assesment of the main human activities impacting marine and coastal ecosystems of Mediterranean and Black seas.....	3
Body size dependency of natural variability in marine ecosystems: insights on defining monitoring plans for MSFD	4
Implementation of Marine Framework Directive for Descriptors D1, D5, D6: milestones to cope monitoring plans with natural variability.....	6
Existing monitoring of Mediterranean Sea: a gap analysis.....	8
Assessment of biodiversity monitoring in Mediterranean Marine Protected Areas.....	10
Adaptation and development of Intelligent tools and Basic background features.....	11
Preliminary results of IRIS –SES GIS tools application on Black Sea basinCase of Romanian coastal and marine waters	13
DeCyDe-4-IRIS: a participatory self assessment method towards GES and MSFD integrated monitoring.....	14
Investigating new tools for the determination of GES regarding main chemical pollutants	16
Designing the new monitoring programs to fulfill the requirements of MSFD: Spanish proposals as a reference for future JMP in the Mediterranean Sea	17
Optimization of Existing monitoring programs to fulfill msfd requirements: the iris-ses/medits spanish 2014 surveys pilot project.....	18



MONITORING INVENTORY CATALOGUE'S DESIGN ACCORDING TO THE MSFD REQUIREMENTS

L. LAZAR¹, C. BEKEN², B. TUTAK², S. MONCHEVA³, A. BASSET⁴, F. COZZOLI⁴, M. RENZI⁴, F. ALEMANY⁵, N. BOJANIC⁶, K. PAGOU⁷, C.TSANGARIS⁷, S. REIZOPOULOU⁷

¹ National Institute for Marine Research and Development "Grigore Antipa", 900581-Constanta, Romania

² TUBITAK-Marmara Research Center, ECPI, P.O Box 21, 41470, Gebze-Kocaeli, Turkey

³ Institute of Oceanology, Bulgarian Academy of Sciences, P.O.Box 152, 9000, Varna, Bulgaria

⁴ Department of Biological and Environmental Sciences and Technologies, University of the Salento, SP Lecce-Monteroni, 73100 Lecce, Italy

⁵ Spanish Institute of Oceanography (IEO), Corazón de María, 8, 28002 Madrid, Spain

⁶ Institute of Oceanography and Fisheries (IOF), Setaliste I. Mestrovica 63, 21000 Split, Croatia

⁷ Hellenic Centre for Marine Research, Institute of Oceanography, P.O.BOX 712, 19013 Anavyssos, Greece

*Corresponding author: llazar@alpha.rmri.ro

Abstract

The catalogue of the monitoring programs carried on six MS: from the Black Sea (Romania, Bulgaria) and from the Mediterranean Sea (Croatia, Greece, Cyprus, Italy, Spain) and one candidate country, Turkey (with monitoring both in the Black Sea and Mediterranean Sea) was done in the frame of the IRIS-SES project. The scope of the cataloging the monitoring activities and parameters was to link and collect the existing information related to national/international marine monitoring programs in the Mediterranean and Black Seas in order to catalogue the existing knowledge that will form basis for an efficient and effective MSFD monitoring. The design of the catalogue took into consideration all descriptors from MSFD monitored in SES riparian countries (only EU MS). The reporting sheets have been developed based on DIKE DG/2013/02 rev document "Reporting on monitoring programmes under MSFD Article 11" prepared by ENV D2 and MRAG on 18/06/2013. Thus, due to collaboration with HELCOM (MORE project) we modified the parameters sheets used by them to prepare the monitoring programmes review in the Baltic Sea, grouping as for WG DIKE document recommendations. The catalogue considered all the information relevant to MSFD art.11 reporting and was compressed in a (meta)database which can be utilized in different ways to filter the dataset/programs for different regions or parameters, as well as according to the descriptors or EC Directives it serves.



INTEGRATION ACROSS DESCRIPTORS AND INDICATORS USING THE WFD EXPERIENCE AND DATA: A CASE STUDY BASED ON THE HELLENIC NATIONAL MONITORING NETWORK

SIMBOURA, N., M. TSAPAKIS, A. PAVLIDOU, G. ASSIMAKOPOULOU, K. PAGOU, H. KONTOYIANNIS, CH. ZERI, E. KRASAKOPOULOU, E. ROUSSELAKI, N. KATSIARAS, S. DILIBERTO, M. NALETAKI, K. TSIAMIS, V. GERAKARIS, P. DRAKOPOULOU, P. PANAYOTIDIS

Abstract

A tested methodology is presented to integrate across biological, physical and chemical elements pertaining to various descriptors of MSFD (biodiversity, sea floor integrity, eutrophication, contaminants) to assess the environmental status based on the data obtained from the monitoring of water quality in the Hellenic coastal waters within the Water Framework Directive (WFD). An adapted decision tree for integrating the WFD results in the Basque country was applied. The physicochemical status was evaluated based on the eutrophication index developed for the Eastern Mediterranean waters. Evaluation of the biological quality was based on the use of metrics developed for the phytoplankton biomass, benthic macroinvertebrates and macroalgae. A multimetric approach for integrating diversity and biotic (sensitivity) benthic indicators is also presented.



ASSESSMENT OF THE MAIN HUMAN ACTIVITIES IMPACTING MARINE AND COASTAL ECOSYSTEMS OF MEDITERRANEAN AND BLACK SEAS.

DIDIER SAUZADE¹, CARLA MURCIANO VIRTO¹

¹ Plan Bleu, 13007 Marseille, France

*Corresponding author: dsauzade@planbleu.org

Abstract

MSFD implementation as well as the ecosystem based management initiatives promoted by the MAP as well as the BSC requires developing programmes of monitoring to assess environmental targets. Following the DPSIR approach, these targets may refer to Pressure, State or Impact. Pressure-based targets are used to articulate the desired or acceptable level of a particular pressure which would not prevent the achievement or maintenance of GES. Such targets are attractive as they can be much more easily related to management measures and are often easier and more cost effective to monitor than state or impact-based targets. Preparation of a monitoring programme thus implies assessing the main human activities impacting marine and coastal ecosystems. In the Framework of the IRIS-SES project, two data bases have been developed as contributions to the state of the play preliminary to the development of regional joint monitoring programmes in the southern European seas: i) inventory of international regulations reviewing regional and international regulatory bodies which may involve monitoring and their requirement concerning monitoring of pressures on marine ecosystems and the reporting obligations; ii) Socioeconomic characterization - present and in trend- of principal human activities influencing marine ecosystems. Regulations and activities have both been linked to MSFD descriptors to facilitate elaboration of joint monitoring programmes.



BODY SIZE DEPENDENCY OF NATURAL VARIABILITY IN MARINE ECOSYSTEMS: INSIGHTS ON DEFINING MONITORING PLANS FOR MSFD

A. BASSET¹, F. COZZOLI¹, F. ALEMANY², C. ARVANITIDIS³, C. BEKEN⁴, N. BOJANIC⁵, L. BOICENCO⁶, L. LAZAR⁶, S. MONCHEVA⁷, K. PAGOU³, A. PÉREZ RUZAFÁ⁸, M. PINNA¹, S. REIZOPOULOU³, M. RENZI¹

¹Department of Biological and Environmental Sciences and Technologies, University of the Salento, SP Lecce-Monteroni, 73100 Lecce, Italy

²Spanish Institute of Oceanography (IEO), Corazòn de Maria, 8, 28002 Madrid, Spain

³Hellenic Centre for Marine Research, Institute of Oceanography, P.O.BOX 712, 19013 Anavyssos, Greece

⁴TUBITAK-Marmara Research Center, ECPI, P.O Box 21, 41470, Gebze-Kocaeli, Turkey

⁵Institute of Oceanography and Fisheries (IOF), Setaliste I. Mestrovica 63, 21000 Split, Croatia

⁶National Institute for Marine Research and Development "Grigore Antipa", 900581-Constanta, Romania

⁷Institute of Oceanology, Bulgarian Academy of Sciences, P.O.Box 152, 9000, Varna, Bulgaria

⁸Departamento de Ecología e Hidrología, Facultad de Biología, Regional Campus of International Excellence "Campus Mare Nostrum", University of Murcia, 30100 - Murcia, Spain

*Corresponding author: alberto.basset@unisalento.it

Abstract

Assessing 'natural' variability of structural and functional components of ecosystems is a main target of MSFD, responding to the need of disentangling biological responses to anthropogenic stresses from those on which human impact is minimal. The scale and the extent of ecosystem components variability are main determinants of ecological patterns and process. Moreover, variability within ecosystems depends on both internal ecosystem dynamics and larger scale drivers and processes. Here we focus specifically on natural variability of biotic ecosystem components and ecosystem processes, which are either descriptors or parameters of relevance in the MSFD monitoring scheme.

Metabolic theories have highlighted how the individual body size can be considered as a main, intrinsic driver of variation in populations and communities functional properties. Indeed, individual energetic and behaviour show body size dependent variation according to an $x/4$ rule. Cascading deterministic effects of individual level size-dependencies have been demonstrated on both population and community levels as well as on functional properties.

In the presentation:





- ⇒ We develop a conceptual analysis of the implication of body size dependencies of individual energetic and behaviour on scale and extent of natural variability in the individual, population and community parameters considered in the MSFD;
- ⇒ We present an example of phytoplankton parameter assessments with changing temporal scales of assessment in order to account for the natural variability of cell densities in the phytoplankton guilds; and
- ⇒ We infer from implications of biological parameter size dependencies on MSFD monitoring plan accounting for natural variability and derive operational proposals for adaptive monitoring plans.



IMPLEMENTATION OF MARINE FRAMEWORK DIRECTIVE FOR DESCRIPTORS D1, D5, D6: MILESTONES TO COPE MONITORING PLANS WITH NATURAL VARIABILITY.

Spatial and temporal extent of monitoring water column and seabed habitats indicators, based on their scales of natural variation

M. RENZI¹, F. COZZOLI¹, F. ALEMANY², C. ARVANITIDIS³, R. BALBÍN², C. BEKEN⁴, N. BOJANIC⁵, L. BOICENCO⁶, F. CARDIGOS⁷, S. DEUDERO², L. GIANNOUDI³, L. YEBRA², L. LAZAR⁶, J.L. LÓPEZ JURADO², J. MERCADO², S. MONCHEVA⁸, K. PAGOU³, A. PÉREZ RUZAF⁹, M. PINNA¹, A. QUETGLAS², S. REIZOPOULOU³, J. RUIZ², G. SHTEREVA⁸, N. SIMBOURA³, V. SLABAKOVA⁸, N. STREFTARIS³, K. STEFANOVA⁸, A. BASSET¹

¹Department of Biological and Environmental Sciences and Technologies, University of the Salento, SP Lecce-Monteroni, 73100 Lecce, Italy; ²Spanish Institute of Oceanography (IEO), Corazón de María, 8, 28002 Madrid, Spain ³Hellenic Centre for Marine Research, Institute of Oceanography, P.O.BOX 712, 19013 Anavyssos, Greece ⁴TUBITAK-Marmara Research Center, ECPI, P.O. Box 21, 41470, Gebze-Kocaeli, Turkey ⁵Institute of Oceanography and Fisheries (IOF), Setaliste I. Mestrovica 63, 21000 Split, Croatia ⁶National Institute for Marine Research and Development "Grigore Antipa", 900581- Constanta, Romania ⁷University of Açores (UAC), Ladeira da Mãe de Deus, 9501-855 Ponta Delgada, Portugal ⁸Institute of Oceanology, Bulgarian Academy of Sciences, P.O.Box 152, 9000, Varna, Bulgaria ⁹Departamento de Ecología e Hidrología, Facultad de Biología, Regional Campus of International Excellence "Campus Mare Nostrum", University of Murcia, 30100 - Murcia, Spain

Corresponding author: alberto.basset@unisalento.it

Abstract

A major source of complexity in marine ecosystem monitoring is represented by the fact that ecosystem processes occurring across different spatial and temporal scales. The implementation of the monitoring strategies applied in accordance to Marine Framework Strategy Directive (MFS, 2008/56/EC) is a step-by-step process, which should be focus on the potential of scale dependence in the observed dynamics and should be able to integrate the effect of mediating factors operating at different scale levels. Nevertheless, the correct definition of monitoring efforts for each indicator needs to reach a well-defined knowledge on the actual assessment of the "object" of monitoring including ranges of natural variability in terms of spatial and temporal natural fluctuations. Unluckily natural fluctuations are not yet well defined in marine environments for all of the MFS indicators. For these reasons the achievement of MFS goals could be severely affected by the lack of knowledge which led to the lack of clear and rationale criteria on the basis of which to align and cope the scale of



the assessment with the ecosystem natural fluctuations. Hereby we address the design of monitoring programmes concerning water column and seabed habitats integrity indicators (Descriptors D1, D5, D6) by discussing spatial and temporal extent of monitoring based on their scales of natural variation. The multiple layer approach developed on mesoscales could allow reducing mistakes due to sampling and methodological limits and could allow reducing problems ranging within the comprehension of mechanisms to the anticipation of consequences. The opportune mesoscale is dependent on the indicator considered and range within 0.5 – 100 km for the spatial scale and from 0.2 to 12 months for the temporal scale.



EXISTING MONITORING OF MEDITERRANEAN SEA: A GAP ANALYSIS

F. COZZOLI¹, M. RENZI¹, F. ALEMANY², C. ARVANITIDIS³, R. BALBÍN², C. BEKEN⁴, N. BOJANIC⁵, L. BOICENCO⁶, F. CARDIGOS⁷, S. DEUDERO², L. GIANNOUDI³, L. YEBRA², L. LAZAR⁶, J.L. LÓPEZ JURADO², J. MERCADO², S. MONCHEVA⁸, K. PAGOU³, A. PÉREZ RUZAFÁ⁹, M. PINNA¹, A. QUETGLAS², S. REIZOPOULOU³, J. RUIZ², G. SHTEREVA⁸, N. SIMBOURA³, V. SLABAKOVA⁸, N. STREFTARIS³, K. STEFANOVA⁸, A. BASSET¹

¹Department of Biological and Environmental Sciences and Technologies, University of the Salento, SP Lecce-Monteroni, 73100 Lecce, Italy; ²Spanish Institute of Oceanography (IEO), Corazón de María, 8, 28002 Madrid, Spain ³Hellenic Centre for Marine Research, Institute of Oceanography, P.O.BOX 712, 19013 Anavyssos, Greece ⁴TUBITAK-Marmara Research Center, ECPI, P.O. Box 21, 41470, Gebze-Kocaeli, Turkey ⁵Institute of Oceanography and Fisheries (IOF), Setaliste I. Mestrovica 63, 21000 Split, Croatia ⁶National Institute for Marine Research and Development "Grigore Antipa", 900581- Constanta, Romania ⁷University of Açores (UAC), Ladeira da Mãe de Deus, 9501-855 Ponta Delgada, Portugal ⁸Institute of Oceanology, Bulgarian Academy of Sciences, P.O.Box 152, 9000, Varna, Bulgaria ⁹Departamento de Ecología e Hidrología, Facultad de Biología, Regional Campus of International Excellence "Campus Mare Nostrum", University of Murcia, 30100 - Murcia, Spain

Corresponding author: alberto.basset@unisalento.it

Abstract

The Marine Strategy Framework Directive (2008/56/EC) of the European Parliament and of the Council (17th June 2008) establishes a framework for community action in the field of marine environmental policy. A crucial issue will be to improve the existing marine monitoring programs to cover the MSFD requirements. The comparison and identification of gaps in the existent national monitoring is a first step to include new parameters and frequencies of observation according to all relevant Directives and specially to MSFD.

Our report is a first, integrated, cross-state assessment of the present state of Mediterranean monitoring networks. Data on monitoring stations have been provided from all member states of IRIS-SES + Croatia and joint in a unique georeferenced dataset. We used the cross-classification to build contingency tables of the counts at each combination of factor levels. Distances from coastline, densities of sampling stations, spatial overlap across descriptors, were also reported.





As main results, we observed a large heterogeneity across MS on the parameters measured for each descriptors, on the density of sampling stations and on the frequency of sampling. Larger gaps have been identified for the descriptors Mammals, Birds, Reptiles (D1, D4, D6), Litter (D10), Energy & Noise (D11). The outputs from this work will be included into a GIS planning tool (Activity 3) including many scales and levels on which the MSFD Directive has been built on, such as the characteristics level (e.g. biological features, physicochemical features), pressure and impact, indicator/threshold, spatial (location of monitoring stations) and temporal (frequency-periodicity) across regions-subregions-countries.



ASSESSMENT OF BIODIVERSITY MONITORING IN MEDITERRANEAN MARINE PROTECTED AREAS

REIZOPOULOU S¹, PAGOU, K¹, LAZAR L², BASSET A³, COZZOLI F³, KARAGEORGIS A¹.,
DRAKOPOULOU P¹, KYRIAKIDOU C¹, PINARDI N⁴

¹ Hellenic Centre for Marine Research, 46km Athinon-Souniou, Mavro Lithari, Anavyssos, Athens-Greece

² National Institute for Marine Research and Development "Grigore Antipa"

³ Department of Biological and Environmental Sciences and Technologies, University of the Salento, SP Lecce-Monteroni, 73100 Lecce, Italy

⁴ Istituto Nazionale di Geofisica e Vulcanologia, Via Aldo Moro 44, 40127 Bologna, Italy

Abstract

Monitoring of Marine Protected Areas (MPAs) is an important part of MSFD implementation monitoring strategy aiming not only to evaluate the environmental status of these areas, but also to contribute to MSFD article 13 requirements. According to Article 13 of MSFD, spatial protection at EU level should be addressed to coherent and representative MPA networks that adequately cover the diversity of species and habitats and ecosystems.

Monitoring in marine protected areas is essential for determining reference conditions, defining GES and assessing the effectiveness of protection measures. Within IRIS-SES project, a case study in the Mediterranean was performed on the sampling requirements of Biodiversity related Descriptors 1, 2, & 6 in Marine Protected Areas, integrating the knowledge to the thematic portal on Marine Protected Areas of the EmodNet MedSea CheckPoint. An evaluation of spatial protection adequacy and monitoring efficiency in key Mediterranean habitats, i.e. seagrass *Posidonia oceanica* meadows, is presented.



ADAPTATION AND DEVELOPMENT OF INTELLIGENT TOOLS AND BASIC BACKGROUND FEATURES

DRAKOPOULOU P.¹, KYRIAKIDOU CH.¹, LAIAKI M.¹, MAINA I.¹, KAVVADAS S.¹,
KARAGEORGIS A.¹ & PAGOU, K¹.

¹Hellenic Centre for Marine Research, 46km Athinon-Souniou, Mavro Lithari, Anavysos, Athens-Greece

Abstract

The development of a software/GIS platform is mandatory and is aligned with the integration of GIS concept to the initial phases of MSFD monitoring and assessment cycle. The GIS activities concern 1) a Geo-database design and construction of main geographic, thematic features and Monitoring programmes and 2) development of intelligent tools that are designed for specified MSFD descriptors. The aforementioned will be served in a web GIS application (WMS, WPS) hosted at the computing centre of HCMR and will be freely available upon request.

1. Basic Layers - Geo-database

A basic set of open-access (existing EU databases) GIS layers have been collected and will be used as generic information for all 11 MSFD Descriptors for Mediterranean and Black sea. They include coastline, bathymetry, Marine Protected Areas, habitats, Sea level, Water bodies (WFD), Sites for Habitats Directive and Birds Directive, Monitoring stations (WFD) etc. Furthermore, it is included Ocean and atmospheric processes such as Water clarity (turbidity), Salinity, Temperature etc. All these layers will be available in the 'Partners' area of IRIS-SES website.

2. Development of Intelligent tools

The selected indicators for the intelligent tools are:

MSFD Descriptor 3 FISHERIES

Fishing pressure and effort estimation and visualization

A GIS toolbox has been created in order to calculate the total number of vessels by GSA area and by gear type: trawlers, coastal or purse seines. The tool can be used in the Mediterranean sea and Black sea regions. The total area is divided into thirty GSA sub-areas. A second GIS toolbox has been developed to calculate the production and the total number of vessels by a National Statistical Division and by gear type: trawlers, coastal and purse seines. A third GIS toolbox has been developed to estimate the fishing effort from trawlers, expressed as days*GT, by GSA area.

MSFD Descriptor 5 EUTROPHICATION

A GIS toolbox has been developed to calculate the environmental status of study area as a colored grid using station-based, time and depth integrated data such as chlorophyll-a, nutrients, DO etc. The tools can be functional both in the Mediterranean and Black sea regions. The indices that have been included for the GIS tool development are Chl- α , Nutrients (NH₄, NO₂, NO₃, PO₄), EI and TRIX. The index selection and development depends on the sea region under study. Specifically, three sub-regions have been selected: Western Mediterranean (Type IIIW), Eastern Mediterranean (Type IIIE) and Black Sea (Type CW-BL1), according to



the Official Journal of the European Union (L332/36 10.12.2008).

MSFD Descriptor 8 / Descriptor 9 POLLUTION

A general deficiency in generating a GIS tool for contaminants (D8-D9) has been identified. The literature does not provide any widely accepted policy on the assessment of pollution in waters, sediments and seafood. Therefore, the data for the case study areas (Saronikos Gulf, Mediterranean coast of Spain, Danube River Delta) have been collected and organized in terms of station-coordinates-parameter in Excel files. The Legislation thresholds on various contaminants have been listed and a GIS application for the analysis and visualization of pollution status according to ERL-ERM (Long, 1995), Directive 2006/44/EC and EC REGULATION No 1881/2006 is under construction. Two main categories of contaminants are considered, PAHs and Metals (Cd, Hg, Cu, Pb, Zn) in Sediment, Seawater and Seafood. The toolbox for PAHs in Sediment has already been developed.



PRELIMINARY RESULTS OF IRIS –SES GIS TOOLS APPLICATION ON BLACK SEA BASINCASE OF ROMANIAN COASTAL AND MARINE WATERS

SPINU¹, L. LAZAR¹, V. COATU¹, A. OROS¹, D. TIGANUS¹, K. PAGOU², A. KARAGEORGIS², P. DRAKOPOULOU², C. KYRIAKIDOU²

¹ National Institute for Marine Research and Development "Grigore Antipa", 900581-Constanta, Romania

² Hellenic Centre for Marine Research, Institute of Oceanography, P.O.BOX 712, 19013 Anavyssos, Greece

*Corresponding author: aspinu@alpha.rmri.ro

Abstract

The paper presents preliminary results of the IRIS-SES GIS tools application for Romanian waters.

The Black Sea is a border sea of Europe considered an enclosed sea in the planetary ocean with a very small link with the Mediterranean basin. The Romanian coast is an area with a high instability, substantial amount of natural processes, Danube huge load impact and physical and economic activities.

Geographic Information System through specific data and functions is an indispensable tool in terms of MSFD. Characteristic of Geographic Information System (GIS) is how data and spatial information are acquired, stored, managed and displayed, especially the abilities for spatial analysis. GIS also provides efficient **tools** for rapid production of new layers, thematic or synthetic maps and other visualizations.

During Activity 3 (Adaptation and development of intelligent tools), 3 GIS tools have been developed – Eutrophication- Chlorophyll, Nutrients and Eutrofication Index (BEAST for Black Sea), Fisheries and Contaminants. These instruments have been adapted to local conditions of the Black Sea.

BEAST (Black Sea Eutrophication Assessment) is based on the principle of "One out, all out", approaches based on the Water Framework Directive implemented on Marine Strategy Directive principles (Causes - nutrient levels, nutrient enrichment direct effects, indirect effects of nutrient enrichment). BEAST uses reference values and acceptable deviation in assessing ecological status that includes 5 classes.



DECYDE-4-IRIS: A PARTICIPATORY SELF ASSESSMENT METHOD TOWARDS GES AND MSFD INTEGRATED MONITORING.

XENIA I. LOIZIDOU¹, DIMITRA ORTHODOXOU¹ AND MICHAEL I. LOIZIDES¹

¹ ISOTECH Ltd Environmental Research and Consultancy
www.isotech.com.cy

Abstract

In order to serve the needs for GES of MSFD, and have a strategic role in the decision making process, the DeCyDe-4 method has been adapted to IRIS's needs and the DeCyDe-4-IRIS tool has been developed. The aim is threefold:

- To develop a strategic decision support method and framework that supports the decision makers and the stakeholders to understand and justify the main issues that are involved in the process of decision-making and the trade-offs between different decision alternatives.
- To enhance experts and key actors involvement and create an engagement toolbox and
- To develop a self- assessment tool for GES and integrated monitoring efforts, supporting IRIS's aim for *sustainability of achievements*. The tool will remain in operation and be part of the monitoring process, after the end of the project.

The process of the implementation of the DeCyDe-4-IRIS method in IRIS regional workshops consists of the following 8 steps, structured in four successive parts, from A to D. Involvement and commitment of key actors and stakeholders, through their active participation is a pre-requisite for the success of any effort.

PART A: Preparatory work

1. TheDeCyDe-4-IRIS factsheets for Descriptors 5 and 8/9: The information that partners will have to report appears in the attached factsheet and includes:
 - a. what is being monitored (adding the 5 most important parameters at the top),
 - b. How, i.e. the method of monitoring
 - c. what is the baseline concentration in the particular region, what is the upper level set by national or European legislation and what are indicative values recorded in that specific region.

2. Mapping of key actors and stakeholders

PART B: Set the DeCyDe-4-IRIS score boards

3. Developing the DeCyDe-4-IRIS "score board": Based on the **existing situation**, that will be derived from the DeCyDe-4-IRIS factsheets in each region,
4. Developing the Source-pollutant Matrix per descriptor



5. Developing the list of *Abatement Measures* per source/industrial sector

PART C: The DeCyDe-4-IRIS self assessment tool

6. *The DeCyDe-4-IRIS self-assessment tool - Scoring through ranges to identify the problems*

PART D: Towards GES: Gaps and needs and best use of monitoring infrastructure among neighboring countries

7. *Identifying the gaps and making proposals on how to fill them*
8. *Recognizing the needs on*
 - a. What are the monitoring/measurement needs in each country or region.
 - b. What are the major barriers for stakeholders/ key actors involvement

The DeCyDe-4-IRIS method was developed for two descriptors (5 and 8/9), and will be implemented at the regional level during the IRIS regional stakeholder meetings that will be held during the project.



INVESTIGATING NEW TOOLS FOR THE DETERMINATION OF GES REGARDING MAIN CHEMICAL POLLUTANTS

M.DASSENAKIS¹, T.PARAMANA¹, E.LOUROPOULOU¹, V.PARASKEVOPOULOU¹,
O.CHALKIADAKI¹, F.BOTSOU¹

Laboratory of Environmental Chemistry, University of Athens, Greece

Abstract

Setting quality standards concerning the main chemical pollutants in the marine environment for the achievement of GES according to the relevant descriptors and criteria set by MSFD constitutes a rigorous task due to the complexity of the elements involved. The existing values are not always satisfactory as they fail to depict the actual environmental status of the area.

The great number of elements and compounds (organic, inorganic, complexes etc) - the most significant pollutants in each area, the experimental procedures and analytical methods used, the matrix of interest (seawater, sediment, biota), the exchanges between various environmental compartments and matrices, the ecotoxicological data have to be considered .

Scientific studies can revolve around two parallel main axes;

1. Evaluation of existing data for the assessment of the pollution level of each area as well as pressures/impacts identification. We need to choose statistical methods, specify the existing gaps and organize GIS tools. We must also evaluate the quality of old data and try to use them in ecotoxicological models.
2. Development of new methodologies for the monitoring of the marine environment that shall facilitate the characterization of an area as in GES or not. These methodologies must use speciation analysis and focus on the effects of pollutants on marine ecosystems by determining their mobility, bioavailability, bioconcentration, biomagnification etc. The methodologies must also be accurate, easy and cost-effective and try to address issues of regional consistency and comparability in the framework of MSFD. The use of biomarkers and bioindicators can also be very useful to this direction.

We shall present some examples of preliminary researches in this field and ideas for future studies.



DESIGNING THE NEW MONITORING PROGRAMS TO FULFILL THE REQUIREMENTS OF MSFD: SPANISH PROPOSALS AS A REFERENCE FOR FUTURE JMP IN THE MEDITERRANEAN SEA

F. ALEMANY¹ & IEO IRIS-SSES PROJECT TEAM

¹Centre Oceanogràfic de Balears, Instituto Español de Oceanografía (IEO), Muelle de Poniente, s/n, Palma de Mallorca, Spain

Abstract

The timetable defined by the European Commission for the implementation of the Marine Strategy Framework Directive stated that the Member States should have elaborated the proposals for MSFD monitoring programs by 15th July 2014. The IEO, as member of the Spanish Marine Strategies development team coordinated by the Ministry of Agriculture and Environment, has been the organism in charge of such task, which have been carried out working simultaneously in four directions:

- Scientific and technical discussions about the indicators.
- Compilation of an inventory of existing monitoring programs, making a critical review of their usefulness for MSFD and proposal for their integration into the future MSFD monitoring programs.
- Developing detailed proposals of future MSFD monitoring programs within them, incorporating already existing programs once adapted and optimized to fulfill the requirements of MSFD and developing new ones to fill the gaps detected.
- Discussion with the diverse authorities responsible for marine monitoring, in order to reach agreements on the design of such future monitoring programs.

As a result of this process three documents, which are now open to public consultancy (available at <http://www.magrama.gob.es/es/costas/participacion-publica/Programas-seguimiento-EM.aspx>, in Spanish), have been elaborated: Doc 1 Proposals of Indicators, Doc 2 Analysis of Existing Programs and Doc 3 Proposals of Monitoring Programs.

In the elaboration of such proposals all the recommendations from the UE to ensure their harmonized implementation in all the European regions, it is that they must be coordinated (in concepts and parameters), compatible (with existing requirements), coherent (regarding sampling strategies), consistent (in methodologies and standards) and comparable among Member States. Thus, they have been structured taking into account the already existing programs related to other Directives (Habitats, Birds, WFD) and Regional Conventions, as Barcelona convention in the case of Mediterranean Demarcations.

These documents must be considered still as open proposals, since even the Commission Decision 2010/477/UE is nowadays being revised and the final steps to ensure a complete international coordination through the design of true Joint Monitoring Programs, which constitutes the goal of ongoing EU projects as IRIS, is still pending. However, these national proposals will necessarily constitute the basis for these future JMP. Thus, in this presentation some examples of MSFD monitoring programs proposals for Spanish Mediterranean Demarcations are described, with the aim they constitute a reference for the planning of future JMP to be developed within IRIS-SSES Project.



OPTIMIZATION OF EXISTING MONITORING PROGRAMS TO FULFILL MSFD REQUIREMENTS: THE IRIS-SES/MEDITS SPANISH 2014 SURVEYS PILOT PROJECT

F. ALEMANY¹ C. GARCIA², B. GUIJARRO¹, A. ESTEBAN³, A. QUETGLAS¹ & E. MASSUTÍ¹

¹Centre Oceanogràfic de Balears, Instituto Español de Oceanografía (IEO), Muelle de Poniente, s/n, Palma de Mallorca, Balears, Spain

² Centro Oceanográfico de Málaga, Instituto Español de Oceanografía (IEO), Puerto Pesquero, s/n, Fuengirola, Málaga, Spain.

³ Centro Oceanográfico de Murcia, Instituto Español de Oceanografía (IEO), Varadero nº1, San Pedro del Pinatar, Murcia, Spain.

Abstract

One of the main European Commission recommendations for the design of the future MSFD monitoring programs is that they should be based on existing programs, and another one is that available resources be optimized at maximum. One of the ways to achieve this objective is to take advantage of the capacity of large sampling platforms, as research vessels, for carrying out a multidisciplinary sampling, addressing several MSFD descriptors within the same survey. On the other hand, MSFD monitoring programs must be coordinated internationally, especially within regions and sub-regions, even promoting Joint Monitoring Programs to take advantage of the synergies derived from international cooperation. Within this context, the MEDITS demersal trawl surveys carried out in the Mediterranean Sea as part of Common Fisheries Policy Data Collection Framework are ideal potential candidates to be integrated in the MSFD monitoring programs, constituting the basis for a MSFD Joint Monitoring Program in the region. However, logistic constraints make sometimes very difficult to change the sampling protocols already in use, and also it is difficult to make precise cost/benefit analysis of changes in these current sampling schemes. Because of that, with the aim of exploring the capacities of MEDITS surveys to address several MSFD descriptors and evaluate the cost of these additional sampling operations, within the IRIS-SES project a Pilot Action has been carried out in during the 2014 MEDITS surveys realized in 2014 in GSAs 01, 02, 05 and 06. Specifically, in addition to the routine sampling related to CFP objectives, the following types of sampling operations addressing MSFD descriptors were realized:

- Sampling of benthic communities by means of epi-benthic sledge (Descriptor 1: Biodiversity)
- Sampling of tissues of target species for stable isotopes analysis (Descriptor 4: trophic webs).
- Sampling of tissues from the main commercial species for diverse pollutants analysis (Descriptor 9: pollutants in biota)
- Sampling of sediments for pollutants analysis (Descriptor 8: pollutants in sediments)
- Quantification of solid residuals over sea bottom (Descriptor 10: Marine litter)

The sampling operations and resulting samples in relation to each one of these descriptors are described in detail in this presentation.