MSFD Guiding Improvements in the Black Sea Integrated Monitoring System

MISIS project was financed by EC DG Env. Programme "Preparatory action – Environmental monitoring of the Black Sea Basin and a common European framework programme for development of the Black Sea region/Black Sea and Mediterranean 2011".

Period: April 2012 – July 2014

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MISIS Project Summary Report

In 2012, Bulgaria, Romania and Turkey launched the project "*MSFD* Guiding Improvements in the Black Sea Integrated Monitoring System" (MISIS) to be funded by EC as an activity under the EC DG Env. Programme "Preparatory action – Environmental monitoring of the Black Sea Basin and a common European framework programme for development of the Black Sea region/Black Sea and Mediterranean 2011".

MISIS has been initiated as an integrated part of the overall on-going processes of the harmonization of policies of EU-member and non-EU states in the Black Sea region. Also, being supported by the respective Ministries of the Environment of the beneficiaries (Bulgaria, Romania and Turkey), this Project directly assists the step-wise implementation of the MSFD and WFD in Bulgaria and Romania. In Turkey, the Project is implemented in support of the EU integrated Environmental Approximation Strategy (2007-2013) of the Republic.

In the following, we present in short the main actions carried out, as well as the results and products issued within the whole period of the Project's implementation.

Project Activity 1. Monitoring: Contribution to development of national integrated monitoring programmes compliant with the MSFD and the WFD allowing also compliance of beneficiary countries with other international obligations, in particular implementation of the Bucharest Convention and its Protocols

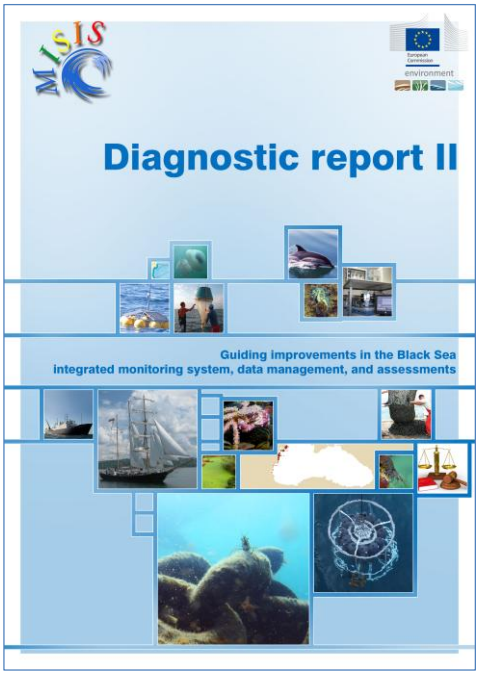
PA 1.1. Pre-project situation in the target countries – Diagnostic report II to guide revision of national monitoring programmes and improvements in data reporting and DPSIR assessments.

The most valuable result of **PA1** is the **Diagnostic Report II**, which was designed to guide revision of national monitoring programmes, as required by the MSFD, and improvements in data reporting and DPSIRR assessments in the MISIS beneficiary countries (Bulgaria, Romania and Turkey). The Report was prepared based on the responses offered by the stakeholders to the two parts of a special *Questionnaire*. Additional materials, such as National Gap Analysis Reports of Bulgaria, Romania and Turkey on the implementation of the BS SAP1996 (BSC Archive), regional BS SAP Implementation Report (http://www.blacksea-commission.org/_publ-BSSAPIMPL2009.asp), BSC Advisory Groups Annual Reports for the period 2006-2011 (BSC Archive), legal and policy documents (national, regional, and global), etc., have been reviewed to compliment the information provided by the questionnaire.

The Report scrutinizes the status of monitoring programmes and data management in the beneficiary countries, as well as the availability of equipment/vessels, the needs in training and harmonization, and the availability of data to comply with the MSFD requirements. The draft Diagnostic Report II was distributed to the MISIS stakeholders for validation of the findings presented and of the conclusions produced. The Diagnostic Report II contains eight sections:

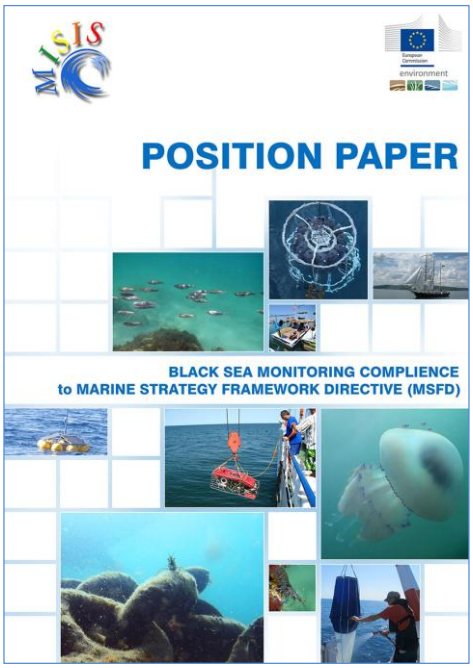
Introduction
I. Monitoring (routine and operational).
II. Data management, data products, QA/QC, assessments.
III. Progress in water quality/GES classifications
IV. Laboratory Infrastructure, Equipment, Vessels
V. Training
VI. Data availability to comply with the MSFD
VII. Harmonization process (needs)
VIII. Conclusions and Recommendations

The Diagnostic Report II, similar to the first Diagnostic (BSC Publications, http://www.blacksea-commission.org/_publ-BSDiagnosticReport2010.asp) identified a lot of gaps (*sensu* monitoring, data management, data availability, etc.), some of them being already reported in the Diagnostic I, which means that they remained unattended during the last 3 years both at the national and regional level. For instance, monitoring does not cover mandatory parameters required by the MSFD, and pressures/impacts are poorly studied, QA/QC in data management is rather not attended in the beneficiary countries, no specific procedures have been identified.



The Report contains 110 Tables and 34 Figures. Each of its sections ends with conclusions and gaps identified, which are in the end summarized and recommendations are given. The conclusions/recommendations cover the following specific issues: gaps in legislation/policy, weaknesses of funding, the need for systematic approach in monitoring and assessments, the insufficiency of data and poor data management, the problems in data reporting, the low level in QA/QC in both monitoring and data management, the low level of capacity building and slow harmonization process.

Although, there are some other problems in the region related to the responsible organizations which provide the budget for monitoring and approve the programs, increasing the deficiencies in monitoring, Diagnostic Report II identifies the poor financial assistance as the root cause of the existing gaps in all the issues. In the beneficiary countries the national funding for the routine monitoring in the Black Sea does not exceed annually 300,000€ per beneficiary country, on the average. In these circumstances, there is a strong need for:



More resources targeted at developing appropriate approaches, tools and practices (education and training) to improve acquisition and management of monitoring data.
Substantially increased funding should be ensured on an annual basis and in time to cover the requirements of the MSFD, in all countries. This can be not only through governmental budgets dedicated to state monitoring, but also through the private sector, and through problem oriented projects (different funding agencies from abroad, for instance, and of course, mostly national).

A summary of the Diagnostic Report II, to help the MISIS stakeholders easier get acquainted with its major findings and recommendations, was produced and named *"Position paper related to Black Sea Monitoring Compliance to Marine Strategy Framework Directive (MSFD)"*.

PA 1.2. Revision of National and Regional Monitoring Programs (based on the reporting needs stemming from multilateral environmental agreements, the WFD and the MSFD, water bodies delineation in Turkey/transfer of experience from BG and RO, promotion of operational monitoring, cost-effectiveness, etc.).

The revised monitoring program is expected to start functioning in 2014 and beyond. MISIS worked in cooperation with DeKos[1] project to ensure no overlapping of activities. The monitoring programme has been modified for 2014-2016 according to the newly identified coastal water bodies in terms of contents in relevance to WFD; however, the monitoring requirements for MSFD still exhibit a complex structure and means. The MSFD monitoring plan needs to be developed starting with pilot cases where few of them have already been integrated to the initial phase (2014-2016) to be modified for the next 3 years.

Information on the development of operational (real-time) monitoring in the Black Sea region has been presented in the Diagnostic report II. Some recommendations have been given. Promotion of operational monitoring took place via the Monitoring Factsheets developed in cooperation with the ARCADIS Project. They mentioned where real-time monitoring will be beneficial.

Related to the ownership of the need to implement the revised national and regional monitoring programs and commitment to sustain the revised monitoring programs (in the mid-term run) there has been ongoing discussion on this matter. During a meeting with ICES experts, an exercise how to calculate the costs of integrated monitoring have been made. In order to price the programme needs to analyze direct and indirect costs of each operation. Unfortunatelly, the yearly costs for countries monitoring programme are not based on the real costs but on the available funds at the moment.

PA 1.3. Assessment of needs regarding laboratory infrastructure, equipment, and training

The availability of equipment and vessels, as well as the laboratory infrastructure are presented in the Diagnostic report II. The review has shown that equipment availability is not the main problem in the beneficiary countries, but the research vessels are old in their majority. Unfortunately, the MISIS Questionnaire has not provided sufficient information on the efficient use of infrastructure/vessels/equipment. Additional information was collected and recommendations on this issue have been addressed in the Diagnostic Report II.

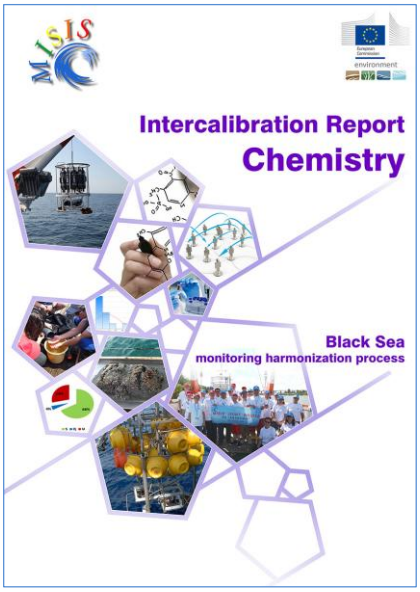
PA 1.4. Elaboration and initial implementation of training programme on monitoring methods

Training Program has been prepared based on the needs of stakeholders described in the Diagnostic II. Additionally, best available practices in capacity building from other regional seas have been taken on board.

During the project series of trainings have been attended by colleagues with subject related especially to D1-Biodiversity (plankton, benthos and fish), D5 - Eutrophication and D8-Contaminants, organized nationally or by other projects (CoCoNet, PERSEUS).

Based on intercalibration exercise for phytoplankton, zooplankton, benthos and chemistry (nutrients, contaminants) laboratory performance of MISIS partner-organizations increased considerably. Four intercalibration reports were prepared in order to assess the comparability of data produced by IO-BAS (Bulgaria), NIMRD (Romania) and SNUFF (Turkey), for application of unified related indicators for assessment of NW Black Sea environmental status in a harmonized way.

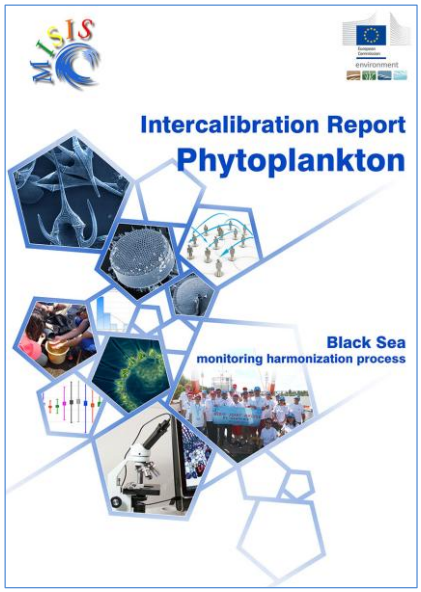
[1] DeKos project dealt with the Turkish monitoring revision taking into account the MSFD Principles



Intercalibration Report Chemistry

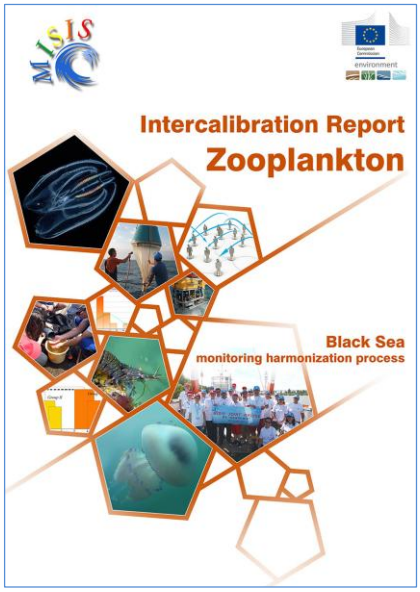
Generally, despite of the methodological differences the analyzed samples were subject of lack of homogeneity which definitively contributes to the results and assessment. The results for Nutrients and Heavy Metals showed satisfactory agreements for the most measurements (75- 81%); in case of Persistent Organic Pollutants, due to lack of data the statistical analysis had no significance and the report is only informative. For Chlorophyll *a* were found satisfactory agreements for all measurements; generally, the precision (ability to reproduce the measurements) within laboratories were found to be high.

Intercalibration Report Phytoplankton



Because the intercalibration exercise reveal differences in the taxonomic skills, the participants met in Varna (23-25 April, 2014), to agree and try to reduce the differences. At the level of taxonomic classes they were partly overcome by revision of the specific biovolumes used, especially for the species for which different geometric shapes were used and those for which the differences in the estimated biovolumes were high. A final list of biovolumes based on agreed shapes was prepared along with correction of some technical errors in the calculations. All protocols were recalculated accordingly, using unified shapes.

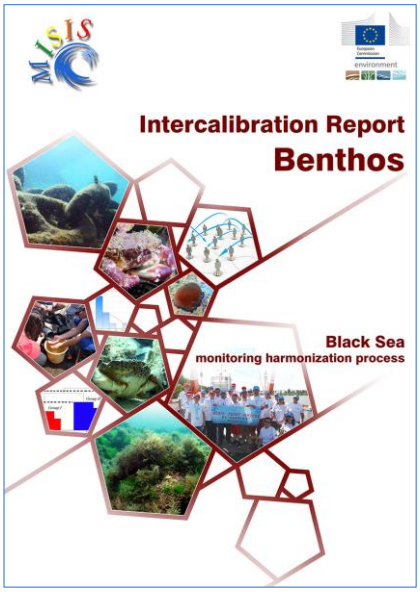
In addition, the NIMRD team prepared a Web phytoplankton identification tool, as a necessity appeared to exchange information on-line and in short time as related to correct identification of species. This web-based platform contains various phytoplankton species (investigated and photographed by means of a light microscope) found during MISIS Joint Cruise.



Intercalibration Report Zooplankton

As a general conclusion, we can consider that all laboratories have obtained good results and the data could be treated as a common data set. According to z-score agreements, satisfactory (z-score ≤ 2) results were obtained for the most measurements (98 %), whereas unsatisfactory (z-score ≥ 3) results in 2 % of cases. The sole unsatisfactory result was related to *Oikopleura dioica* biomass which is calculated in a different way by NIMRD laboratory. Due to the differences in the lists of species reported by the participating laboratories in the exercise (*Acartia clausi* and *Acartia tonsa*, *Oithona similis* and *Oithona davisae*) it was revealed the necessity of organizing common training/exercises to harmonize taxonomic identification.

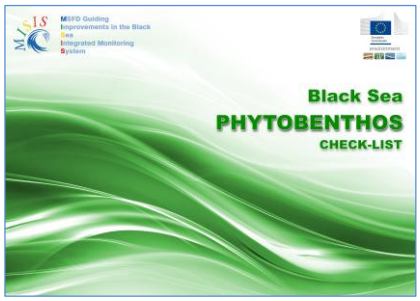
Intercalibration Report Benthos

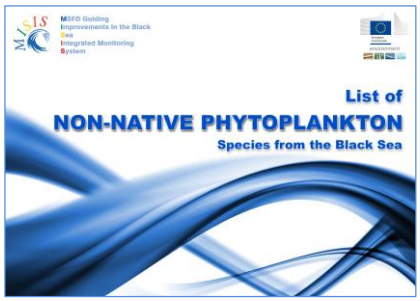


Some dissimilarity were observed between results obtained by the teams who analyzed the samples, explainable through many reasons: the natural variability of species distribution in their habitats; the sampling design; Samples' processing on board (washing, sieving, preserving and staining); the samples' lab processing (taxonomic experts work). The results could be considered only satisfactory from the point of comparability since in both stations analyzed (M10 and M18) there were found significant dissimilarities (>50%) between the results provided by the three teams.

In order to reduce the differences, the Report makes a few recommendations for future intercalibration exercises, among them Elaboration of Standard Operating Procedure within each laboratory either for their own in-house purposes or in relation to specific regional intercalibration projects.

PA 1.5. Analysis of needs in harmonization, design of affordable program for harmonization of QA/QC procedures; Analytical techniques, reporting formats, assessment methodologies, GES, environmental targets and others; Initial implementation of the Harmonization Program.





The Diagnostic Report II contains a Chapter on the needs in harmonization, however, the contacted stakeholders did not pay due attention to this very important issue. A Harmonization Program has been prepared, which analyzes the needs in harmonization at different levels.

Between 12-14 February a MISIS Project Workshop was organized in Istanbul back to back with the 17th BSC CBD AG Meeting with the purpose to advance the harmonization process in the BS region. The participants in the event worked on the regional biological monitoring guidelines, list of BS species, red data list and non-native Black Sea species. All the lists (check list for zooplankton, zoobenthos, macroalgae, red data list, non-native species for phytoplankton and zooplankton), discussed by the MISIS partners, have been delivered to the Black Sea Commission Secretariat and circulated to experts in the region relying on their feedback. The final versions are uploaded on the MISIS website (www.misisproject.eu), transmitted to EMBLAS coordinator and BSC Secretariat for dissemination to other countries specialists (UA, RU, GE).

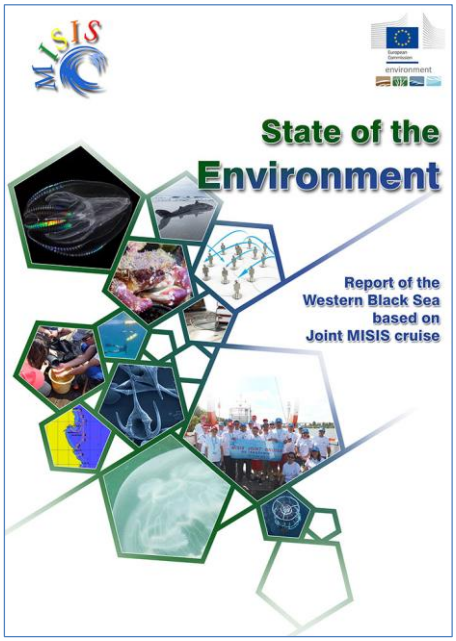
Checklists are comprehensive lists covering all species of a certain group known to occur in a specific area. They are of great importance in providing an overall view of an area's diversity, its species composition and its biological history. Of course, List of species can never be final, as taxonomy develops fast and species names change. Besides, the tools for species identification rapidly improve, giving the opportunity to quality identify species. During the last years many 'new' species have been reported for the Black Sea. However, they are mostly not non-natives, but native species which have been previously misidentified.

EMBLAS I will organize a workshop on harmonization of chemical methods (sampling, processing) for selected priority parameters, but after MISIS ends. Unfortunately, it was not possible to coordinate such initiatives during MISIS lifetime project, as initially planned, but close cooperation will continue as a follow up of MISIS.

PA 1.6. Further development of the institutional framework in the field of marine environmental monitoring

The Diagnostic II contains information on the status of the institutional framework of monitoring in the beneficiary countries. Certainly, there are weakest links in this framework. They are as follows: lack of inter-sectorial cooperation; poor funding for capacity building; overlapping activities or lack of appropriate distribution of responsibilities.

Project Activity 2. Initial testing of the revised monitoring programmes (field and laboratory work), management of data, assessments: Organization of Joint Black Sea Survey (cooperation with other projects – PERSEUS, EuropeAid, Coconet, for instance).

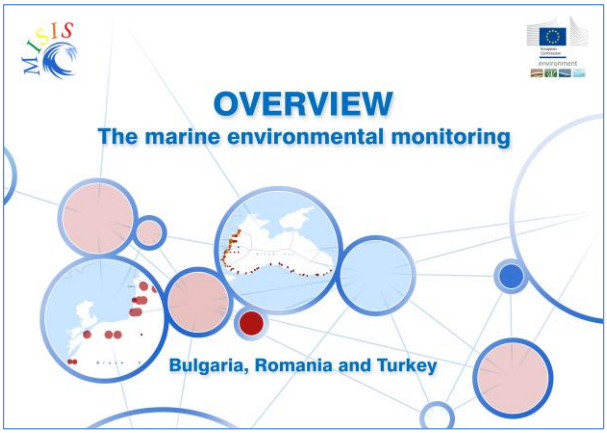


Discussions on the key steps /responsibilities to guide the preparation of cruise program, based on the first findings of the Diagnostic II, were undertaken during the meeting in Varna (29-31 April 2013). The time/duration of the cruise, polygons and parameters, methodology of data acquisition and processing and indicators for GEnS assessment were selected in compliance and relevance to MSFD and BSSAP'2009, aligned to the findings and recommendations formulated in the Diagnostic Report II.

The Joint cruise, conducted between 22 and 30 July 2013 on board R/V AKADEMIK, comprised 3 sampling polygons and 18 stations, selected so as to cover coastal, shelf and open sea pelagic habitats and similar benthic habitats of each partner country, defined according to the Initial Assessment Reports (IAR) of Bulgaria and Romania. An impressive number of water and sediment physical, chemical (including pollutants) and biological samples (1246), related to 125 parameters were measured during the cruise of relevance for indicator based assessment of the Western Black Sea environmental status.
The *"State of Environment Report of the Western Black Sea based on Joint MISIS cruise" (SoE-WBS)* was produced by the collective contribution of scientist from MISIS partner institutes, under the coordination of IO-BAS. Most of the indicators applied in the SoE-WBS originate from the IARs of Bulgaria and Romania, some of them were discussed and agreed during the Joint AG CBD – MISIS Project meeting organized by the Black Sea Commission in Istanbul in 2013 and in addition a number of new potential indicators were tested. For the first time bottom marine litter was quantified in the Black Sea (at 3 coastal and 3 shelf stations in Bulgarian, Romanian and Turkish waters) following the MSFD GES TSG-ML Guidelines; for the first time the BEAST tool was applied for integrated assessment of eutrophication status at WBS basin scale, this is the first synchronized assessment of pollutants at WBS scale.
SoE-WBS is organized in eight Chapters. The General Hydrographic conditions of the WBS and the specific Hydrographic conditions during the cruise are discussed in Chapter I. Out of the 11 Descriptors of MSFD, indicator based assessments of environmental status are provided for 7 descriptors with dedicated Chapters. Special Chapters are dedicated to the formulation of Gaps and Recommendations (Chapter VIII) stemming from the analysis by descriptors.
Although not exhaustive (data from a single cruise only), as the first report based on harmonized indicators the SoE-WBS is expected to contribute to the improvement of national monitoring programs in Bulgaria, Romania and Turkey in compliance to MSFD implementation, as well as assist the Black Sea Commission in the effort to develop integrated monitoring system for the Black Sea at basin-wide scale.

A coordinated cruise with MISIS was organised by the Odessa University on Zmiinyi Island coastal waters in the same period 23 - 25 July 2013 (Technical Report), exchange of data was ensured.

Project Activity 3. Contribution to existing database systems (national, Black Sea Commission, WISE) as far as marine/coastal environment monitoring is concerned**.**



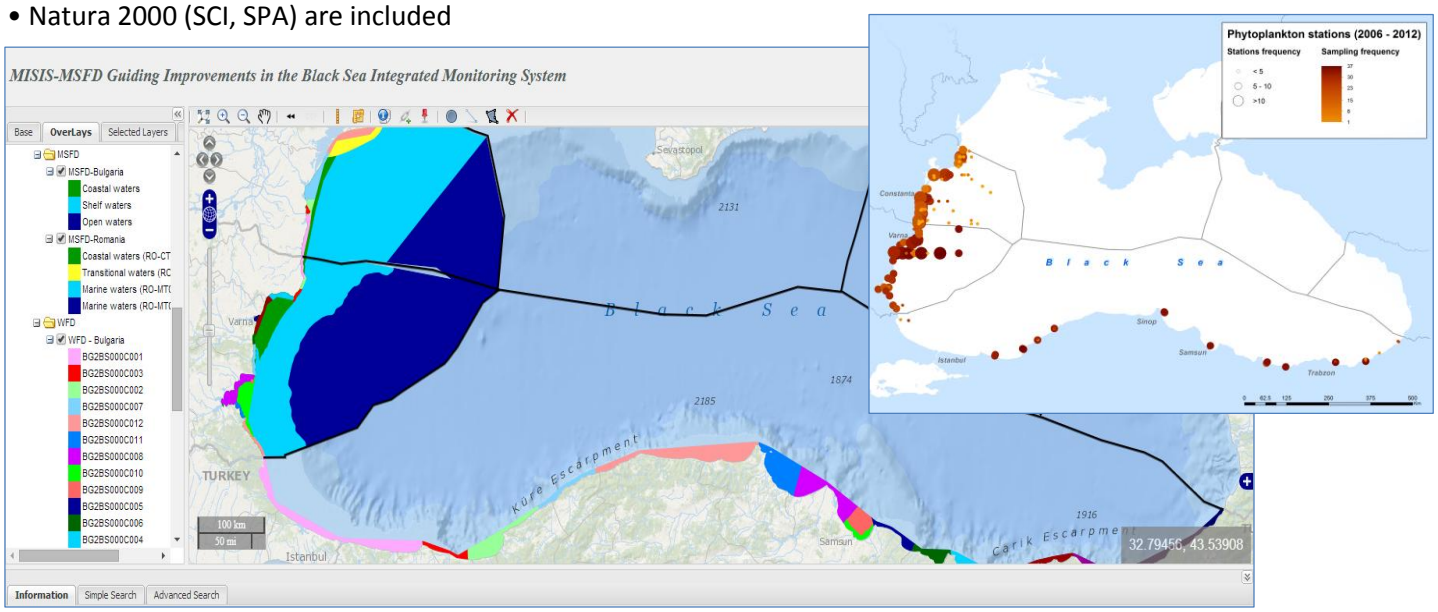
An inventory of data bases at national level was prepared based on the information provided by the stakeholders in the MISIS Questionnaire. Reporting obligations of beneficiary countries to different organizations (e.g. BSC, EEA *sensu* WFD and MSFD) have been overviewed in the Diagnostic II/Part I. The Reporting Formats have been examined and recommendations on harmonization were discussed during the AGs meetings.

All the three beneficiary countries participated in the Sea Data Net / BSScene / UBSS Projects and contributed with data/information to this unified database system. An evaluation of the parameters, number of stations and data sets existing in SeaDataNet has been prepared and results were reported.

An *Overview of the marine environmental monitoring in Bulgaria, Romania and Turkey* was prepared based on the data reported by each partner to BSC and EEA. The document provides information on the number of stations, as well as the number of main biological parameters, nutrients and hazardous substances reported by the three countries in the period 2006-2012.

In order to further develop information management tools in support of decision-making, a WebGIS application (http://smartatlas.misisproject.eu/smartatlas/) with data/information related to the MSFD was created.

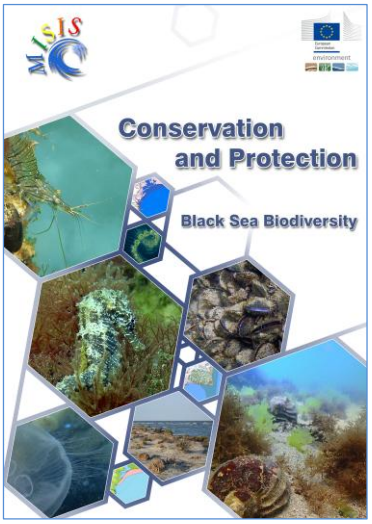
- Information about MISIS Joint Cruise Data have been uploaded; metada are prepared and are uploaded as well under the SeaDataNet
- Water body deliniation in Bulgaria, Romania and Turkey
- Information about monitoring metada (biology, chemistry – 2006-2012) are included
- Monitoring networks of different marine data holders
- Natura 2000 (SCI, SPA) are included



Project Activity 4. Conservation and protection of the Black Sea through establishment of new MPAs with focus on transboundary MPAs and MPAs networking**.**

PA 4.1. Review of the existing and planned protected areas in the Black Sea (Bulgaria, Romania, Turkey) with a special focus on possible deficiencies regarding law enforcement and implementation of management plans, recommendations

Within this activity, the report: "*Conservation and Protection of the Black Sea Biodiversity. Review of the existing and planned protected areas in the Black Sea (Bulgaria, Romania, and Turkey) with a special focus on possible deficiencies regarding law enforcement and implementation of management plans*" has been prepared and presented at the Istanbul meeting of the partners to collect comments. The Report assesses the MPAs-related legislation and policies and identifies the 'gaps' referring to areas where legislation and policy are missing. The prevailing lack of awareness of the remarkable value of Black Sea biodiversity, of the services the Sea renders, and of the consequences and costs of its degradation is of considerable negative impact on the performance of the beneficiary countries in environment protection and especially in biodiversity conservation.



PA 4.2. Harmonization of policies required to identify, designate and manage MPAs. Development of a work programme aimed at identifying, designating, and improving effective management of protected areas (coastal and/or marine). Guidelines, trainings.

Based on the PA4.1 Report and The Diagnostic Report II, the partners had the opportunity to get a better understanding and awareness of problems related to MPAs designation and management within each country and the synergic actions needed for common approaches within the transboundary areas. These findings were applied during a process initiated in the Strandzha-Igneada area for the designation of a first transboundary MPA in the BS region.

The Guideline on MPAs (ECBSea deliverable) was discussed within the PA 4.1. Report and furthermore this has been consulted during elaboration of the Report on expeditions organized in summer of 2013 by Bulgarian and Turkish partners within the protected areas. Based on the data collected in summer 2013, preliminary assessment of the Strandzha-Igneada area was prepared.
Within this activity, 2 training courses (one for the stakeholders on best practices in establishing and managing MPAs and consultation on the design and approach to implementation of the pilot study) and one for scientists (for designing and implementing a grid-based stratified sampling programme for marine habitats and applying digital GIS and database tools for site designation and management planning) have been organized.

PA 4.3. Establishment of transboundary protected areas which currently do not exist.

Following the discussions within the MPAs Working Group, the MISIS partners agreed to initiate the activity foreseen in the second year of the project earlier, namely: selection and designation of the pilot site. After analysis of the documentation produced by the Turkish and Bulgarian partners, and based on the ecological criteria (uniqueness and

rarity, importance for threatened, endangered and declining species and/or habitats, biological diversity, etc.), it was decided the transboundary area Strandzha -Igneada, located between Bulgaria and Turkey, to be selected as a pilot site.

In the second year of the Project common field surveys in the area were planned and implemented (Technical report). In June 2013, 2 mixed teams formed of Bulgarian and Turkish scientists investigated simultaneously the transboundary area. Along with the Bulgarian scientists from IO-BAS, also partners from RO participated in the Strandzha area expedition. In the Turkish part, Igneada, the observations were performed by the SINOP UNIVERSITY, which proposed to the Ministry of Environment and Urban Planning, Turkey, the Igneada area as MPA. The marine part of Strands is included in NATURA 2000 network since 2013.
Within this activity *Report on the Environmental Assessment of the Strandzha-Igneada area* was prepared, based on the data collected in 2012 and 2013, and also on literature review. Besides NATURA 2000 Standard Data Form, the Dossier comprises also the *Draft of the Management Plan* of the transboundary marine area Strandzha–Igneada.

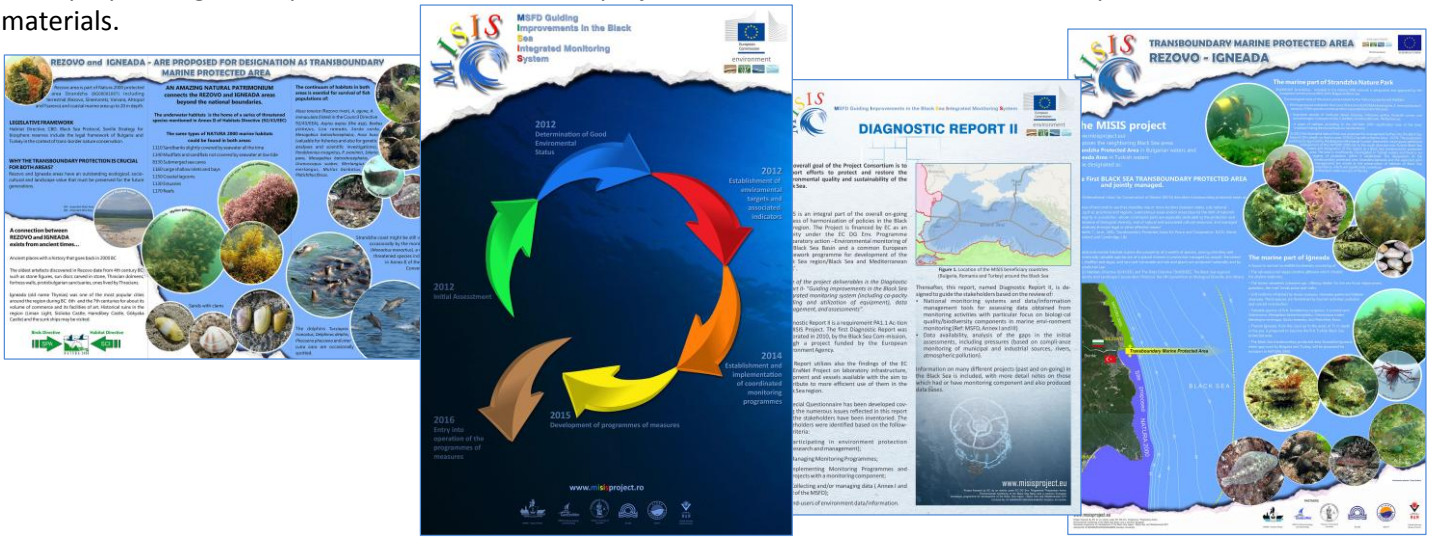
PA 4.4. Activities to raise awareness in MPAs.

This activity valorizes the knowledge gathered within the Project. The results show that it is needed to further develop awareness and tools to promote conservation measures through marine protected areas establishment, especially within the non EU country as Turkey, which still lacks the legislation, targets, programmes and authorities' support, as well as data/information for implementing concrete actions towards the successful identification and designation of MPAs.

Moreover, even in the countries which beneficiate of legislative framework and steps forward have been done for creating MPAs, management tools are still lacking, major difficulties being encountered due to conflicting economic interests, insufficient funds, and poor public awareness, lack of clear obligations and insufficient administrative control and regulation at local and national level. Therefore, this activity stresses upon training courses organizing, round tables to which the main local authorities and public involved in protection and usage of areas having protection regime take part.

Project Activity 5. Dissemination of Knowledge and Best Practices, Public Awareness and Visibility.

In order to organize and implement or to support the implementation of the activities listed above, "Ovidius" University of Constanta together with the consortium members have developed the Project Dissemination Plan. The scope of the dissemination plan was to develop a strategy for the MISIS project results communication/dissemination and, in general, for increase in public awareness on Black Sea environmental problems and activities undertaken to address them.
Beside the project website (www.misisproject.eu), for the development of the project visibility the following materials were prepared: general presentation of the MISIS project, leaflets, newsletters, fact sheets, posters and communication materials.



Project partners organized/participated in the following meetings/events:

Date	Place	Observations
19-20 April, 2012	Constanta, Romania	Kick-off meeting of the project, initial discussions on its implementation.
15-25 August, 2012	Constanta, Romania	International Summer School on Advanced Concepts and Perspectives on the Management of Renewable Energy Sources; The MISIS Project presentation and discussions.
10-15 September, 2012	Constanta, Romania	International Summer School on High Performance Computing and Cloud Computing for Sustainable Development; public awareness raising
31 October, 2012	Varna, Bulgaria	Discuss the Questionnaire Part/II and MISIS objectives and strengthen the stakeholders' involvement in the Project.
2 November, 2012	Constanta, Romania	Meeting with stakeholders, discuss and promote the Questionnaire II
December, 2012	Ankara, Turkey	Meeting with stakeholders, discuss and promote the Questionnaire II.
12-14 February, 2013	Istanbul, Turkey	The CBD reporting format to the BSC, proposal for improvements, narrative reporting; Presentation of the Report "Review of the existing and planned protected areas in the Black Sea in Bulgaria, Romania and Turkey".
12-14 February	Istanbul, Turkey	Advance the harmonization process in the BS region and work on the regional biological monitoring guidelines, list of BS species, red data list and non-native Black Sea species.
29-31 April, 2013	Varna, Bulgaria	Discussions on the key steps /responsibilities to guide the preparation of cruise program.
29-31 May, 2013	Varna, Bulgaria	Guideline on MPAs was attended and discussed for further development.
10-11 June, 2013	Odessa, Ukraine	The EMBLAS Project the kick-off meeting; participation of MISIS project manager; MISIS/EMBLAS coordination and aligning of activities were discussed.
10 December, 2013	Gebze, Turkey	Training workshops for the researchers for designing and implementing a grid-based stratified sampling programme for marine habitats and applying digital GIS and database tools for site designation and management planning
21-24 January, 2014	Constanta, Romania	The ARCADIS Project meetings aimed to identify common parameters and methods as a basis of each country monitoring programmes revision in a compatible way, with participants from Bulgaria and Romania.
23-25 April, 2014	Varna, Bulgaria	Results of intercalibration exercise for phytoplankton, zooplankton, benthos and chemistry
May, 2014	Sinop,Turkey	Dossier presented to the stakholders
June, 2014	Varna, Bulgaria	
May and June, 2014	Sinop, Turkey	Training workshops for the stakeholders on best practices in establishing and managing MPAs and consultation on the design and approach to implementation of the pilot study
23-26 June, 2014	Mahmudia, Romania	Final Meeting
30 September – 3 October, 2014	Istanbul, Turkey	BSC AG CBD meeting together with EMBLAS meeting on GES / Monitoring

The analysis of gaps and recommendations for overall MSFD implementation needs

The analysis of gap and recommendations were prepared by a number of Black Sea experts who have implemented MISIS basing on their long lasting experience in the region and as well using the findings of the MISIS joint survey and the stemmed SoE-WBS produced for the MISIS area (BG, RO and TR waters of the Black Sea).

In this study, some of the GES descriptors were considered. They are water column habitats in relation to D1 and D2, sea bottom habitats in relation to D1, D6 and D2, eutrophication for D5, contaminants and effects for D8 and marine litter for D10.
Besides the specific issues raised for each descriptor practiced in MISIS (see SoE-WBS Report), some key and common (crosscutting) needs are summarized below:

Expansion of COVERAGE of monitoring programmes:
Re-scaling of monitoring programmes which is critical especially for water column habitats is required. This might be in general assumed as increasing the sampling frequencies and the spatial coverage (Higher resolutions in time and space).
Monitoring the open water habitats besides the coastal and shelf areas are needed besides the need of increasing the areal coverage of sea bottom monitoring of habitats, litter, etc.
Monitoring of water column and sea bottom habitats at a pressure gradient from source to non-impact area (usually being the open waters) might be crucial for some cases to assess the human induced impacts.

Integration of advanced TECHNIQUES to the monitoring programmes is necessary to achieve the needs of expanding programmes and to fill in some information gaps mentioned in GES-descriptor based gap analysis above.
These are widely accepted applications named as new, advanced or innovative methods which still requires a lot of infrastructure and human capacity building.
Operational monitoring and observations including remote sensing techniques will improve the monitoring capacity in time and space with an increasing number of parameters (from physics to chemistry and biology).
New generation identification methods of species and barcoding of them will obviously change the speed and sensitivity of species identification work as well as will help to understand much efficiently the ecosystem functions.

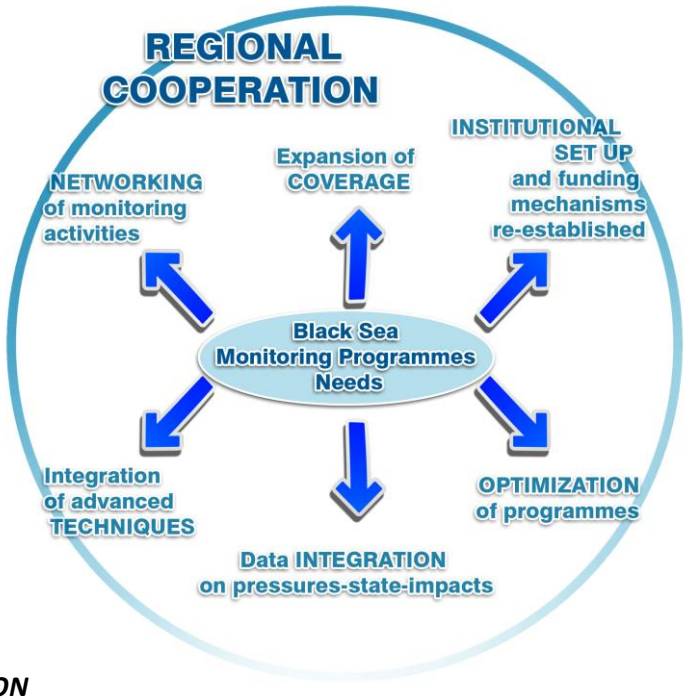
Joint programming of national monitoring activities through a better NETWORKING of activities of different responsible organizations is an obligation at this age. To keep the track, first it is extremely important to sustain what is already achieved in the projects and further on to manage expensive and specific new infrastructures with a common strategy is necessary.
To connect different operational monitoring facilities, multi-purpose use of buoys and to start planning these tools as integrative part of the ongoing routine monitoring programmes should be the way forward.
Obviously, this new concept of monitoring based on networking and integration must be supported with the share of experiences and strategies of human capacity building among different competent and new and responsible institutions.

INTEGRATION of more information and data on pressures-state-impacts should be aimed with new monitoring programmes. This is critically important for almost all descriptors.
For example, a feasible list of contaminants /chemicals established basing on priority and specific pollutants to be monitored in different matrices and their biological effects need to be handled in an integrated way. This approach is also needed for D1/D2/D6, D5 and D10.

OPTIMIZATION of programmes is needed because expansion of the scope of monitoring activities and challenging coordination efforts might fail if the optimization of the programme is not done properly. Therefore, a risk-based monitoring might be targeted which requires a comprehensive pressure analysis first.
Integration of sub-monitoring programmes created for different descriptors would also be a rationalistic approach (like common planning of D8 and D9 and D3 with D10).
Finally, duplication of cruises, infrastructure and databases must be avoided.

INSTITUTIONAL SET UP and funding mechanisms need to be re-established at the national level for efficient implementation of the Directive and more broadly the ecosystem based management.
The re-establishing monitoring activities and the revision of the fundamental mechanisms require a higher level integration of activities of environment, fisheries, transport and other sectorial administrations. This asks for the coordination by a responsible organization and cooperation of competent institutes.
Development of required policy tools might be necessary for the regulation of responsibilities and also technical matters.
Increased funding besides its continuity is necessary and need to be planned at least for 3 (preferably 5-6 years) years programmes.
Feasibility studies also need to be conducted which would support the optimization of programmes.

Gaps and overall MSFD implementation needs for the Black Sea Region



New dimensions for ongoing *REGIONAL COOPERATION*
Besides, the crucial role of the high level adoption tools of Black Sea Commission regional cooperation might be better advanced with joint national efforts and the continuous support of the EU.
Joint Programming of national monitoring efforts among the countries for the region or a sub-region with multi-lateral agreements would be extremely helpful and feasible. By this way, joint surveys -as practices in MISIS- in open waters and sharing of infrastructure would be possible.
A new Activity Center or Advisory Group for the use of existing regional expertise on remote sensing could be established in the frames of Black Sea Commission. However, this can be replaced with other efforts of competent organizations like the IOC initiative to support the development of Black Sea regional cooperation in operational oceanography. As a first step the BSC may try to cooperate with IOC and promote the idea operational monitoring to become an integral part of national monitoring programmes.

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