MED POL Monitoring and assessment
Monitoring and data availability – LBS Protocol
MED POL Monitoring programme (Phase III since 1996)

a) State and Trend monitoring
Data to prepare periodical assessments of the state and trends in pollution hot spots and coastal areas
- Nutrients/eutrophication in seawater
- Hazardous substances in sediment and biota

b) Monitoring of inputs
Quantification of inputs expressed as pollutants loads from point sources based on the National Baseline Budgets of Pollutant Emissions and Releases

c) Compliance monitoring
Microbiological parameters in bathing waters and shellfish growing waters.

d) Biological effects monitoring (pilot)
Biomarkers to assess exposure to, and impacts of, chemical contaminants at organism level

e) Monitoring of eutrophication (pilot)
Integrated pilot studies in specific eutrophication-threatened marine coastal areas.

Periodic thematic assessment on pollution issues
## Monitoring parameters

**General parameters (T, S)**

**Nutrients (N, P, Si)**

**Water**

- Dissolved Oxygen
- Chlorophyll-a

**Sediments (surface)**

- Trace Metals (Hg, Cd, Pb)
- Chlorinated Hydrocarbons
- PAHs

**Biota**

- *(Mytilus galloprovincialis, Mullus barbatus)*
- Trace Metals (Hg, Cd, Pb)
- Chlorinated Hydrocarbons
## Countries implementing marine monitoring programmes and reporting to MED POL database

<table>
<thead>
<tr>
<th>Country</th>
<th>Monitoring programme in the framework of MEDPOL</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>X</td>
<td>Libya</td>
<td></td>
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<tr>
<td>Algeria</td>
<td>X</td>
<td>Malta</td>
<td></td>
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<tr>
<td>Bosnia &amp; H.</td>
<td>Under preparation</td>
<td>Monaco</td>
<td>Under preparation</td>
</tr>
<tr>
<td>Croatia</td>
<td>X</td>
<td>Morocco</td>
<td>X</td>
</tr>
<tr>
<td>Cyprus</td>
<td>X</td>
<td>Montenegro</td>
<td>X</td>
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<tr>
<td>Egypt</td>
<td>X</td>
<td>Spain</td>
<td>X</td>
</tr>
<tr>
<td>France</td>
<td>X</td>
<td>Slovenia</td>
<td>X</td>
</tr>
<tr>
<td>Greece</td>
<td>X</td>
<td>Syria</td>
<td>X</td>
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<tr>
<td>Israel</td>
<td>X</td>
<td>Tunisia</td>
<td>X</td>
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<tr>
<td>Italy</td>
<td>X</td>
<td>Turkey</td>
<td>X</td>
</tr>
<tr>
<td>Lebanon</td>
<td>Under preparation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Quality Assurance

a) Hazardous contaminants in sediment and biota

The IAEA-MESL has had the prime responsibility of running the data quality assurance programme (DQA) for chemical contaminants for MED POL for the last 30 years.

- Reference methods
- Provision of reference materials and standard solutions
- Training in the analysis of chemical contaminants in sediments and biota
- Training in good laboratory practice, including notably QA/QC procedures
- Laboratory performance studies (inter-comparison exercises, proficiency tests)
- Split sample analysis

b) Nutrients and Chl-a

Mediterranean laboratories are assisted to participate to proficiency tests on the determination of nutrients and Chl-a in seawater organised by QUASIMEME
Aim: The evaluation of the biological effects of pollutants on marine organisms along the Mediterranean coasts

- Sentinel organism: molluscs
- Utilization of biomarkers to evaluate the level of the stress syndrome induced by pollutants in the selected organisms
- Quality Assurance (QA) Program
As part of the MED POL Programme, a Strategic Action Programme (SAP) to address reduction and gradual elimination of land-based pollution was adopted in 1997 and became operational in 2001. The SAP is based on the requirements of the 1996 Land Based Sources (LBS) Protocol.

It contains precise targets and timetables aiming at a gradual and monitorable reduction of selected pollutants and their elimination by the year 2025.

In the framework of the Strategic Action Programme (SAP), a National Baseline Budget (NBB) database has been compiled by MEDPOL on 2003 and updated on 2008.
MED POL holds two databases:

1. **National Baseline Budget database**: 12,500 records

   Releases of pollutants from land based sources reported by the countries. Each record indicating the emission of a substance for a given activity sector and sub-sector, in an administrative region and country. Covers about **100 different substances or groups of substances and parameters**. Country reports provided 2003 and 2008.

2. **Marine Monitoring database**: 34,000 records

   Pollutants and general parameters in seawater, sediments and marine biota reported yearly by the countries since 1998; data from national monitoring programmes. Covers mainly heavy metals, chlorinated pesticides, PCBs and PAHs.
ECAP Ecological Objectives related to pollution and marine litter

EO.5. Human-induced eutrophication is prevented, especially adverse effects thereof, such as losses of biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters

EO.9: Contaminants cause no significant impact on coastal and marine ecosystems and human health

EO.10: Marine and coastal litter do not adversely affect coastal and marine environment
## Contaminants related data (collected and additional)

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Data collected (MED POL Phase IV)</th>
<th>Additional Data needed (?)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.1.1 Concentration of key harmful contaminants in biota, sediment or water</strong></td>
<td>Hg, Cd, Hg, PCBs, halogenated pesticides, PAHs, in sediment and biota*</td>
<td>Contaminants may be added following countries specificities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aluminum (Al) and Organic Carbon (OC) measurements in sediments for normalisation purposes</td>
</tr>
<tr>
<td><strong>9.2.1. Level of pollution effects of key contaminants where a cause and effect relationship has been established</strong></td>
<td>Lysosome membrane stability for general effect (pilote). No cause and effect relationship established for specific contaminants</td>
<td>Development of biomarkers (such as lipofuscin accumulation, neutral lipid accumulation, micronuclei frequencies, oxidative stress, metallothionein content, acetyl cholinesterase activity, peroxisome proliferation, lysosome to cytoplasm ratio, and stress on stress), Imposer (for TBT)</td>
</tr>
<tr>
<td><strong>9.3.1 Occurrence, origin (where possible), extent of significant acute pollution events (e.g. slicks from oil, oil products and hazardous substances) and their impact on biota affected by this pollution</strong></td>
<td>None (REMPEC is following shipping accidents involving oil slicks)</td>
<td>REMPEC to develop oil slick tracking system Method to evaluate impact on biota</td>
</tr>
<tr>
<td><strong>9.4.1. Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood</strong></td>
<td>None</td>
<td>To be developed</td>
</tr>
<tr>
<td><strong>9.4.2. Frequency that regulatory levels of contaminants are exceeded</strong></td>
<td>None</td>
<td>To be developed</td>
</tr>
<tr>
<td><strong>9.5.1 Percentage of intestinal enterococci concentration measurements within established standards</strong></td>
<td>Intestinal enterococci concentration measured</td>
<td>None</td>
</tr>
<tr>
<td><strong>9.5.2. Occurrence of Harmful Algal Blooms within bathing and recreational areas</strong></td>
<td>None</td>
<td>To be developed</td>
</tr>
</tbody>
</table>
## Eutrophication related data (collected and additional)

<table>
<thead>
<tr>
<th>Indicators</th>
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</tr>
</thead>
<tbody>
<tr>
<td>5.1.1 Concentration of key nutrients in the water column</td>
<td>NO3, NO2, NH4, PO4 (or Total N, Total P), SiO4 (occasionally*)</td>
<td>None (improve geographical coverage)</td>
</tr>
<tr>
<td>5.1.2 Nutrient ratios (silica, nitrogen and phosphorus), where appropriate</td>
<td>Possible if ALL nutrient data are collected</td>
<td>None</td>
</tr>
<tr>
<td>5.2.1 Chlorophyll-a concentration in the water column</td>
<td>CHI-a</td>
<td>None (improve geographical coverage)</td>
</tr>
<tr>
<td>5.2.2 Water transparency where relevant</td>
<td>None</td>
<td>Secchi disk</td>
</tr>
<tr>
<td>5.2.3 Number and location of major events of nuisance/toxic algal blooms caused by human activities</td>
<td>None</td>
<td>Record of location and frequency of toxic algal blooms</td>
</tr>
<tr>
<td>5.3.1 Dissolved oxygen near the bottom, i.e. changes due to increased organic matter decomposition, and size of the area concerned</td>
<td>None</td>
<td>DO measurements in bottom waters at selected locations</td>
</tr>
</tbody>
</table>
Monitoring and assessment requirements in the implementation of the ECAP

- Establishment of a regional integrated monitoring programme that takes into account the ecological objectives, operational objectives and appropriate indicators and targets for Good Environmental Status (GES), COP 17, 2012
- Timetable: 2012-2013 to be done under MED POL coordination
- Assessment strategy to be prepared during 2012-2103
- State of environment report 2012 under finalization
Key features of an integrated monitoring programme

- Building on and further developing the values of the current UNEP/MAP MEDPOL monitoring programme
- Extending the scope of monitoring along the lines of ecological objectives to a wider spectrum of issues (including marine pollution and biodiversity) and focusing both on coastal and open sea waters
- Monitoring threats from land based sources as well as from other sources, and recognize the interaction among the threats
- Build synergies with EU MSFD and other monitoring programmes implemented in the region with a view to sharing data and enhancing the effectiveness of environmental monitoring in the MED on the regional and country levels
- Build synergies with the Regular Process of the UN
- Take into consideration cumulative and combined effects of pollution and other kind of pressures (i.e. fisheries)
Priority activities related to monitoring and assessment in the next biennium

- Coordinate the work for defining threshold values (boundaries) in order to assess achievement of Good Environmental Status (GES)
- Coordinate the work for developing environmental targets based on indicators
- Develop an integrated monitoring programme to be implemented in 2014
- Assess the national needs for capacity building for the implementation of the integrated MAP monitoring programme
- The first meeting to discuss on GES and targets with regard to contaminants and eutrophication next week in Sarajevo, BH.