Improving environmental monitoring in the Black Sea in the context of Blue Economy

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http://emblasproject.org/

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9th International Black Sea Symposium
Blue Growth as a driver for regional development
Project objectives

• EU/UNDP, April 2014 – May 2018, GE, RF, UA observers BG, RO, TK

Overall objective:
• To improve protection of the Black Sea environment

Specific objectives:
• To improve availability and quality of Black Sea environmental data in line with the MSFD, WFD-coastal waters and Black Sea Strategic Action Plan (2009) needs
• To improve partner countries’ ability to perform marine environmental monitoring along MSFD, WFD principles, taking into account the Black Sea Diagnostic Report II
Relations to EU strategies and programmes

- **Black Sea Synergy Environmental Partnership**
  - Added value to the citizens of the region while ensuring environmental sustainability
  - Environmental cooperation, enhancing biodiversity and protection of the Black Sea ecosystems, collecting and exchange of environmental data on marine and coastal areas

- **Coordination with the Black Sea Commission and Black Sea Economic Cooperation Organisation**

- **European Neighbourhood Policy**
  - Eastern Partnership
  - Cross-Border Cooperation
MSFD – All EU marine waters to achieve 'good environmental status' by 2020

EMBLAS - 8 out of 11 descriptors
Sampling stations in the Joint Black Sea Survey 2016
including NPMS UA, NPMS GE, JOSS UA-GE and JOSS RF
## Status classification schemes

<table>
<thead>
<tr>
<th>WFD - ecological status (coastal waters)</th>
<th>High</th>
<th>Good</th>
<th>Moderate</th>
<th>Poor</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSFD - environmental status (territorial waters)</td>
<td>GES</td>
<td>Not GES</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Indicative status assessment

Macrophytobenthos

Macrozoobenthos - Georgia
Indicative status assessment

Eutrophication – BEAST index

Composite satellite image of the chlorophyll-a concentration
Marine mammals
Environmental Monitoring in the Black Sea

Floating marine macro litter - Results 2017

Legend

BS2017

0.0 - 10
10 - 20
20 - 50
50 - 100
100 - 200
200 - 300
300 - 400
400 - 500
500 - 800

Top Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic pieces 2.5cm - 50cm</td>
<td>43.25%</td>
</tr>
<tr>
<td>Other plastic/poly styrene items</td>
<td>15.35%</td>
</tr>
<tr>
<td>Polystyrene pieces 2.5 cm -</td>
<td>9.10%</td>
</tr>
<tr>
<td>Cover / packaging</td>
<td>8.68%</td>
</tr>
<tr>
<td>Bag</td>
<td>8.29%</td>
</tr>
<tr>
<td>Foam</td>
<td>2.95%</td>
</tr>
<tr>
<td>Plastic bottle</td>
<td>2.95%</td>
</tr>
<tr>
<td>Plastic container</td>
<td>1.41%</td>
</tr>
<tr>
<td>Paper packaging</td>
<td>1.21%</td>
</tr>
<tr>
<td>Synthetic rope</td>
<td>1.14%</td>
</tr>
<tr>
<td>Other paper</td>
<td>1.12%</td>
</tr>
<tr>
<td>Other rubber</td>
<td>0.70%</td>
</tr>
<tr>
<td>Sheets</td>
<td>0.53%</td>
</tr>
<tr>
<td>Wood boards</td>
<td>0.49%</td>
</tr>
<tr>
<td>Beams / Dunnage</td>
<td>0.46%</td>
</tr>
<tr>
<td>Plastic pieces &gt; 50cm</td>
<td>0.37%</td>
</tr>
<tr>
<td>Other metal</td>
<td>0.32%</td>
</tr>
<tr>
<td>Balloons</td>
<td>0.25%</td>
</tr>
<tr>
<td>Cans</td>
<td>0.23%</td>
</tr>
<tr>
<td>Other textiles</td>
<td>0.23%</td>
</tr>
</tbody>
</table>
### EU WFD priority substances – chemical status

<table>
<thead>
<tr>
<th>NPMS UA</th>
<th>Status</th>
<th>JOSS GE-UA</th>
<th>Status</th>
<th>NPMS GE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UA_2</td>
<td>PFOS, benzo(a)pyrene, Hg</td>
<td>JOSS_1</td>
<td>Hg</td>
<td>GE_1</td>
</tr>
<tr>
<td>UA_5</td>
<td>PFOS, benzo(a)pyrene</td>
<td>JOSS_2</td>
<td>benzo(a)pyrene, Hg</td>
<td>GE_2</td>
</tr>
<tr>
<td>UA_7</td>
<td>PFOS, benzo(a)pyrene</td>
<td>JOSS_9</td>
<td>Hg</td>
<td>GE_3</td>
</tr>
<tr>
<td>UA_8</td>
<td>PFOS, benzo(a)pyrene</td>
<td>JOSS_10</td>
<td>Hg</td>
<td>GE_4</td>
</tr>
<tr>
<td>UA_11</td>
<td>PFOS</td>
<td>JOSS_11</td>
<td>Hg</td>
<td>GE_5</td>
</tr>
<tr>
<td>UA_12</td>
<td>PFOS</td>
<td>JOSS_13</td>
<td>benzo(a)pyrene, Hg</td>
<td>GE_7</td>
</tr>
<tr>
<td>UA_13</td>
<td>PFOS</td>
<td>JOSS_16</td>
<td>Hg</td>
<td>GE_8</td>
</tr>
<tr>
<td>UA_14</td>
<td>PFOS</td>
<td>JOSS_19</td>
<td>Hg</td>
<td>GE_9</td>
</tr>
<tr>
<td>UA_15</td>
<td>PFOS, benzo(a)pyrene</td>
<td>JOSS_23</td>
<td>PFOS, benzo(a)pyrene</td>
<td>GE_10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JOSS_25</td>
<td></td>
<td>GE_11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GE_12</td>
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<td>GE_13</td>
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<td>GE_14</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>GE_15</td>
</tr>
</tbody>
</table>

#### Black Sea Specific Pollutants in water and biota

- **Whole fish**
  - Pesticides TPs: 62%
  - Stimulants: 11%
  - Industrial chemicals: 11%
  - Pharmaceuticals & PCPs: 7%
  - Psychotropic drugs & Drugs of abuse: 1%

- **Fish muscle tissue**
  - Pesticides: 44%
  - Stimulants: 13%
  - Industrial chemicals: 13%
  - Pharmaceuticals & PCPs: 9%
  - Psychotropic drugs & Drugs of abuse: 1%

- **Mussels**
  - Pesticides: 41%
  - Stimulants: 7%
  - Industrial chemicals: 12%
  - Pharmaceuticals & PCPs: 12%
  - Psychotropic drugs & Drugs of abuse: 1%

- **Ukraine**
  - Drugs of abuse: 1.3%
  - Industrial chemicals: 0.3%
  - Pesticides: 4.1%
  - Pharmaceuticals & PCPs: 3.7%
  - Naturally occurring compounds: 2.3%
  - Psychotropic drugs: 3.2%
  - Stimulants: 0.9%

- **Open Sea**
  - Drugs of abuse: 0.2%
  - Industrial chemicals: 0.3%
  - Pesticides: 5.0%
  - Pharmaceuticals & PCPs: 1.5%
  - Naturally occurring compounds: 3.3%
  - Psychotropic drugs: 1.5%
  - Stimulants: 0.3%

- **Georgia**
  - Drugs of abuse: 0.5%
  - Industrial chemicals: 1.5%
  - Pesticides: 8.1%
  - Pharmaceuticals & PCPs: 0.9%
  - Naturally occurring compounds: 3.4%
  - Psychotropic drugs: 25.0%
  - Stimulants: 1.2%
Selection of river water samples from JDS3 (68) and EMBLAS seawater samples (55)
DEET detected in many seawater samples from the Black Sea.

Example of point and widespread detection.

Monensine detected only at 1 sampling station.
Environmental Monitoring in the Black Sea

Screening of REACH compounds in samples from the Black Sea

Interactive heatmap available at http://norman-data.eu/NORMAN-REACH
Joint Black Sea Surveys 2016 (EMBLAS-II) - The distribution of classes of bacteria among the samples from different layers

MZB, fish, diatoms, macrophytes, bacteria in JDS4 2019
The Cousteau Society – MoU with EMBLAS
http://emblasproject.org/archives/2320
Joint Black Sea Surveys and National Pilot Monitoring Studies

EU/UNDP projects

EMBLAS-II: April 2014 – May 2018
EMBLAS+: March 2018 – 30 months

Synergies??
Environmental Monitoring in the Black Sea

http://emblasproject.org/archives/2361

http://emblasproject.org/archives/1702
NPMS UA 2017 - Alive Pectinidaes found in the depth 20-30 m in the Zernov’s phyllophora field
Environmental Monitoring in the Black Sea