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Results, deliverables and recommendation from GA T1 Monitoring: current situation, needs, requirements for improvement, revision.

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Institute of Oceanology - BAS

Final Meeting - ANEMONE Project
4th – 5th of March 2021, On-line Meeting



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GOAL

To provide the theoretical basis and methodological framework for the regional environmental status assessment generally and in ANEMONE study area: the SoER from the joint cruise and the Reports from the case studies planned in WP2.

TASKS

T1.1 Overview of the monitoring programs and available data and information, identification of knowledge gaps and research needs at national and regional level

T1.2 Workshops on monitoring methods, indicators and tools for integrated environmental status assessment

T1.3 Black Sea Monitoring and Assessment Guideline (BSMAG)



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T1.1 Overview of monitoring programs and available data and information, identification of knowledge gaps and research needs at national and regional level.

Deliverable T1.1.1. completed

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T1.1 Overview of monitoring programs

Review of the legislative framework:

- national legal acts
- regional – BSIMAP 2017-2022,
- European - WFD, MSFD;

Review of the national monitoring programs:

- geographical coverage, frequency and seasonality
- ecosystem components and parameters
- data acquisition methods,
- assessment methods and indicators
- Monitoring Factsheets of Bulgaria and Romania





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T1.1 Review of data availability

Aggregated metadata for selected ecosystem components in the period 2012-2017 (Excel sheets to Geodatabase):

- Pelagic habitats: phyto- and zooplankton communities
- Benthic habitats: zoobenthic communities
- Non-commercial fish
- Marine mammals
- Eutrophication: chlorophyll, nutrients
- Contaminants
- Marine litter: bottom and floating macrolitter



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T1.1 Gap analysis

- Legal framework

- Bulgaria and Romania have fully developed marine monitoring programs under WFD and MSFD.
- Turkey is committed to WFD implementation, while MSFD is not fully adopted but effort is made through projects to promote its implementation.
- In Ukraine the legal framework for coordinated marine monitoring is not in place yet. The national monitoring program covers most of the ecosystem components under MSFD D 1, 4, 6 but is less adequate regarding D5, D8, D9, D10.



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T1.1 Gap analysis

- **Data availability**
 - **Incomplete monitoring programs implementation in terms of the spatial-temporal coverage and the parameters/components encompassed.**
 - **Dispersed monitoring data and information among different research and administrative institutions, therefore not readily available for MSFD utilization.**
 - **Data policy, storage, sharing and interoperability - critical issues for the efficient MSFD implementation, integrated national databases for the marine environment are not present.**



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T1.1 Gap analysis

- Resources and capacity
 - Insufficient funding for comprehensive monitoring
 - Insufficient administrative capacity and human resources
 - Gaps in scientific knowledge: absent or invalidated indicators, revision and calibration of thresholds, differentiate natural variation from anthropogenic impacts, bioaccumulation modeling, integration approaches etc.
 - Insufficient technological development and equipment



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T1.1 Recommendations for improved monitoring

Scientific: 33 research priorities

D1,6 - Develop indicators based on macrozoobenthos longevity for assessment of the adverse effects from physical disturbance by fisheries

D1,4 - Develop indicators for the food web assessment

D2 - Develop indicators for pressure and impact by priority invasive species *Beroe ovata* and *Rapana venosa*

D3 - Overcome data deficiency on the demographic characteristics and stocks of commercial fish

D5 - Validate and revise thresholds (N, PO₄, O₂, chl. a, phytoplankton blooms) or define threshold (Si, epiphytes)



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T1.1 Recommendations for improved monitoring

Scientific: 33 research priorities

D8 - Develop monitoring for the assessment of “novel” compounds such as hormones, veterinary medicines and pharmaceuticals; radionuclides.

D9 - Develop ecotoxicology monitoring and research

D10 - Overcome data deficiency on the amount, composition and spatial distribution of marine macro- and microlitter

D11 - Overcome data deficiency on underwater noise level and its impact on the Black Sea fauna

General: Develop approaches for integrated assessment at the level of parameters, indicators, criteria and ecosystem components

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T1.1 Recommendations for improved monitoring

Technological: apply up-to-date technological approaches

- aerial and satellite imagery (bloom events, oil pollution, seagrass cover);
- plankton recorders (eutrophication, pelagic biodiversity);
- biogeochemical ARGO profilers (eutrophication, pelagic diversity),
- hydroacoustic methods (underwater noise, seabed habitat mapping, fish stocks assessment, cetacean diversity);
- buoy stations equipped with chemical and biological sensors (eutrophication, pelagic biodiversity),
- molecular methods for taxonomy (biodiversity)

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T1.1 Recommendations for improved monitoring

Data and information

- Carry out regular monitoring with the ecologically relevant spatial resolution and temporal frequency to collect adequate data of the parameters and differentiate the natural from anthropogenic impacts;
- Set up national databases for marine environmental data and for the anthropogenic pressures;
- Develop and implement data policy for storage, sharing and interoperability of marine environmental data, improve data and information management;
- Improve the access to national and regional databases and data from projects funded by the EC and other financial instruments.



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T1.1 Recommendations for improved monitoring

Legal and administrative

- **Adopt and fully implement nationally the European and regional legal documents related to marine monitoring and assessment.**
- **Improve the coordination between and within the responsible authorities and other stakeholders of the marine environment;**
- **Ensure sufficient capacity of the competent authorities and organizations (such as human resources, expertise and equipment) to plan and conduct monitoring of the marine environment;**
- **Improve the existing monitoring programs in line with the revised MSFD Annex III and ComDec 848/2017**



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T1.1 Recommendations for improved monitoring

International cooperation

- Enhance the cooperation at the regional Black Sea level for setting common ecological indicators and thresholds for GES, and environmental targets.
- Enhance the collaboration between the Black Sea Commission and the European Commission, and their technical and expert groups on marine monitoring and assessment.



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T1.2 Workshops

**Workshop 1 “Tools and indicators for the integrated assessment of the Black Sea environmental status”,
19 - 20 June 2019, Istanbul, Turkey, hosted by TUBITAK**

Nested Environmental Status Assessment Tool - NEAT: tool for integrated environmental assessment by weighting and aggregation across all indicators within geographically defined Spatial Assessment Units

Chemical Status Assessment Tool - CHASE : multi-metric tool for classification and assessment of “chemical status” of the marine ecosystems with respect to hazardous substances and contaminants





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Workshop 2 “Methodologies for monitoring and assessment of the ecological status under the Descriptors D1,6 - Benthic habitats and Seabed integrity, D1 Biodiversity and D2 Non-indigenous species in Black Sea”,

15 – 16 December 2020, online, hosted by IO-BAS

Benthic Impacts Tool (BIT): decision support tool for quantifying the impact of bottom towed fishing activity on sedimentary habitats

Review of indicators under D1 and D2 in the Black Sea

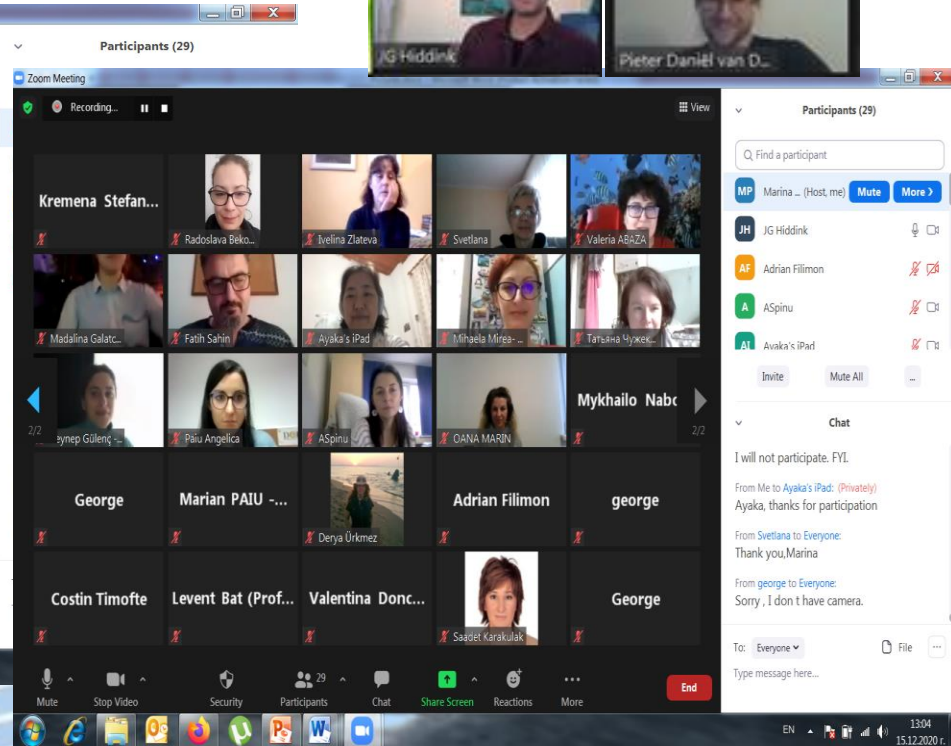
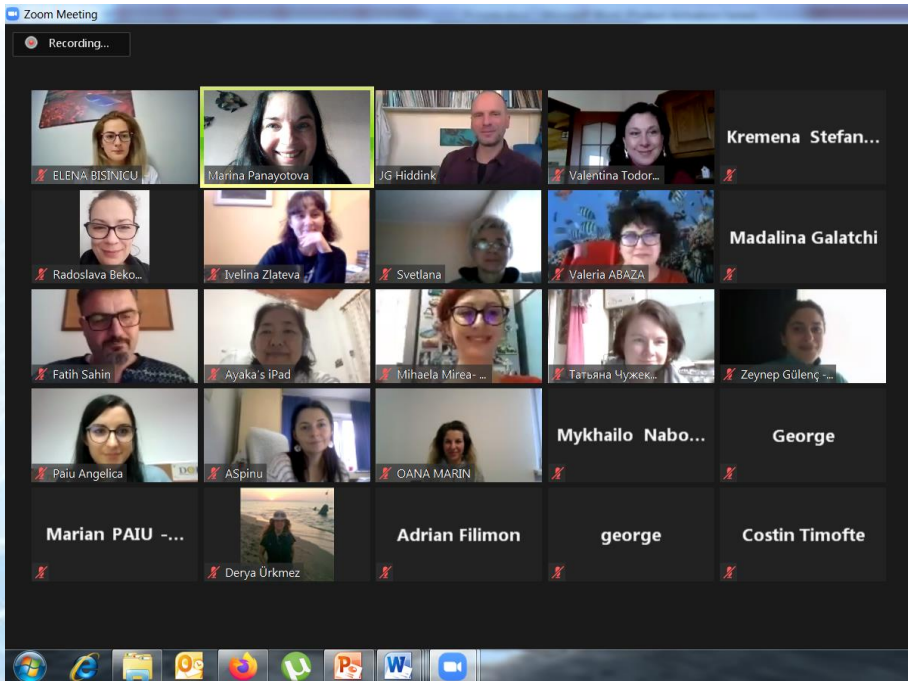
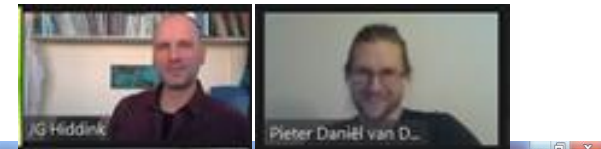


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ANEMONE Workshop 2

Methodologies for monitoring and assessment of the ecological status under the Descriptors D1,6 - Benthic habitats and Seabed integrity, D1 Biodiversity and D2 Non-indigenous species in Black Sea

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Ecological effects on biota

Depend on ratio of ...

- Fraction of organisms killed by a trawl pass; depletion = d : gear specific
- Rate of population recovery = r : species and habitat specific

Fast recovery

Slow recovery

High trawling mortality

Low trawling mortality

Proceedings of the National Academy of Sciences
<https://doi.org/10.1073/pnas.1802379115>

If $F < F_{MSY}$ footprint will be small

Relative rate of fishing mortality (F/F_{MSY})

Regional swept area ratio (yr^{-1})

ratio (SAR, y^{-1})

of cell

fished x speed x width of trawl

4.23 y 0.21

0.22 0.01

Participants (30)

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List of non-commercial fish species with regional importance

At regional level, the species with regional importance are:

- Coastal fish species – *Dasyatis pastinaca*, *Acipenser gueldenstaedtii*, *Syngnathus abaster*, *Hippocampus guttulatus*, *Sciaenops ocellatus*, *Gobius niger*, *Platichthys flesus*, *Pegysa laccaris*.
- Demersal shelf fish species – *Dasyatis pastinaca*, *Gaidropsarus mediterraneus*, *Syngnathus variegatus*, *Hippocampus guttulatus*, *Gobius niger*.
- Pelagic shelf fish species – none.

CeNoBS survey, summer 2019

Decision on GES criteria and methodological standards

Map showing the coastal water bodies (17 colored units), marine assessment units (5 sub-regions), 12 nm (yellow line) and EEZ (green line) of Turkish Black Sea.

Maxine Assessment Units	Name
40 400 m ²	Western Black Sea
16 000 000 m ²	Central-Western Black Sea
13 200 m ²	Eastern Black Sea
	Properly: Koflikmark Impact



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T1.3 Black Sea Monitoring and Assessment Guidelines

Deliverable T1.3.1. advanced draft

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Black Sea Monitoring and Assessment Guidelines

- **Developed in line with the European legal requirements laid down in the Marine Strategy Framework Directive, its revised Annex III and the most recent criteria and methodological standards of COMMISSION DECISION (EU) 848/2017**
- **Represents the first comprehensive regional recommendation on the implementation of a harmonized methodological framework for the monitoring and assessment of the Black Sea environmental status.**



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Black Sea Monitoring and Assessment Guidelines

- Defines the regionally representative ecosystem elements for assessment through compilation of lists of the typical benthic and pelagic habitats and fish species of regional importance.
- Provides a complete overview of the national indicators and thresholds in order to propose regionally agreed criteria and indicators for adverse effects on the state and thresholds for Good Environmental Status (GES), as far as possible, based on the available scientific knowledge.
- Suggests methods for integration of indicators and criteria towards overall status assessment at the level of MSFD descriptors.



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- All tasks accomplished
- Goal achieved: regional methodological framework for improved monitoring and assessment is provided
- Enhanced regional cooperation, especially in the research community
- Raised regional expertise and human capacity

Acknowledgements:

The valuable contribution of all partners is greatly appreciated! Thank you all for your effort and dedicated teamwork!