



SWOT analysis complete

Milestone 2

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1. Milestone scope

The work detailed in this milestone reports the progress made by Task 1.2.2. The metadata collated in the **DEVOTES Catalogue of Monitoring Networks** was subject to a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to indicate the successes, failings and opportunities in the present monitoring systems especially in relation to the different types of pressures, the biodiversity components and the biodiversity-related Marine Strategy Framework Directive (MSFD) descriptors of Good Environmental Status (GEnS) (i.e. D1: biological diversity; D2: Non-indigenous species; D4: food-webs and D6: seafloor integrity). Milestone 2 presents the overall result of the SWOT analysis of the existing monitoring networks across Europe (i.e. North Eastern Atlantic, Baltic Sea, Black Sea, Mediterranean Sea and Sea of Marmara). A detailed description of the results can be seen in **DEVOTES Deliverable 1.4 – Report on SWOT analysis of Monitoring** (Patrício *et al.*, 2014)

Patrício J, Little S, Mazik K, Thomson S, Zampoukas N, Teixeira H, Solaun O, Uyarra MC, Papadopoulou N, Kaboglu G, Bucas M, Churilova T, Kryvenko O, Moncheva S, Stefanova K, Borja A, Alvarez M, Zenetos A, Smith C, Zaiko A, Danovaro R, Carugati L, Elliott M. 2014. Report on SWOT analysis of monitoring (DEVOTES Deliverable 1.4.). DEVOTES FP7 project, 100 pp.

2. Overall SWOT analysis

Table 1 shows the overall SWOT table of the existing monitoring networks across Europe.

STRENGTHS

Table 1. Overall SWOT analysis: Strengths of the existing monitoring networks across the four European Regional Seas (North Eastern Atlantic, Baltic Sea, Mediterranean and Black Sea) and the Sea of Marmara, based on the monitoring activities reported in DEVOTES Catalogue of Monitoring Networks.

GENS Descriptors

- In all Regional Seas, GENs Descriptor 1 (biological diversity) is addressed through the greatest number of ongoing monitoring programmes.
- The GENs Descriptor 4 (food-webs) is addressed through a considerable number of monitoring activities in the North Eastern Atlantic, Baltic Sea and in the Mediterranean Sea (particularly in Western Mediterranean subregion).
- Most ongoing monitoring programmes simultaneously address more than one GENs descriptor.
- In the Mediterranean Sea, NGOs are increasingly involved in recording and monitoring native and alien species biodiversity (especially for D1 and D2).

Biological Components

- In most regional seas, all eleven biodiversity components identified in the DEVOTES Catalogue of Monitoring Networks are monitored, and several are monitored simultaneously.

Supporting physicochemical data

- The collection of supporting physicochemical data (essential to explain changes in the biological parameters or indicators) is generally common practice in monitoring programmes (around half of the activities in the North Eastern Atlantic, Black Sea and Mediterranean Sea, the vast majority in the Baltic Sea) although is not always associated with all biodiversity components.

Pressures

- Most monitoring programmes address more than one pressure.
- Overall, monitoring undertaken within the North Eastern Atlantic address all pressures considered in the catalogue.
- Some monitoring activities assess 18-20 pressures (e.g. Celtic Sea subregion), demonstrating the potential more efficient and integrated monitoring programmes.
- Nitrogen, phosphorus and organic enrichment are the main pressures covered.

Habitats

- Most monitoring programmes address more than one seabed and water column habitat simultaneously.
- All five water column habitats considered in the catalogue are all addressed by the ongoing monitoring activities.

Others

- In most regional seas, and in particular in the NEA and Baltic Sea, current monitoring practices are built on a strong foundation of scientific knowledge (i.e. good-practice, standardised techniques and methodologies) through a long history of national and international monitoring programmes and networks, policies and EU Directives.
- There is some degree of regional cooperation, supported by RSCs and other international initiatives.
- There are synergies between different policies and instruments operating on different scales (i.e. EU Directives, RSC agreements, and national legislation and initiatives) that enhance recording and monitoring activities.

Table 1. Overall SWOT analysis: Weaknesses (I) of the existing monitoring networks across the four European Regional Seas (North Eastern Atlantic, Baltic Sea, Mediterranean and Black Sea) and the Sea of Marmara, based on the monitoring activities reported in DEVOTES Catalogue of Monitoring Networks.

WEAKNESSES (I)

Geographical coverage

- The major weakness of the catalogue is that it is currently under development and is therefore not a complete representation of all monitoring programmes operating within the regional seas.
- In the analysed version of the catalogue, the Baltic Sea monitoring programmes are not well represented, with contributions from only Lithuania and Germany. Information from Finland, Estonia, Latvia, Poland, Sweden (and Russia) is missing. Further efforts are underway to fill this critical gap.
- The catalogue does not reflect monitoring activities carried out by all six countries that surround the Black Sea. Only Bulgaria, Ukraine and Turkey provided information for the catalogue, therefore, 23% of the region represented by coastline length is not covered.
- Under-reporting in several subregions and detailed reporting in others has contributed to a lack of coherence in the information provided in the catalogue.
- The catalogue currently only provides information on spatial coverage but no indication of the intensity or adequacy (i.e. methodologies) of monitoring.

Spatial aggregation

- The lowest spatial unit of the catalogue is the subregion. Consequently, coverage of monitored attributes (e.g. descriptors, components, habitats and pressures) may be shown as addressed in a subregion, in reality, monitoring is only taking place in a small number of specific sub-sections.

GEnS Descriptors

- In all Regional Seas, GEnS Descriptor 2 (non-indigenous species) is addressed by the lowest number of ongoing monitoring programmes
- The number of monitoring programmes that address Descriptor 6 are limited, particularly in the NEA, Black Sea and Mediterranean Sea. In the Sea of Marmara, this descriptor is not addressed at all.
- The GEnS Descriptor 4 (food-webs) is not addressed through monitoring programmes in the Black Sea and the Sea of Marmara.

Biological Components

- A number of monitoring programmes address single biodiversity components. There is a need for monitoring programmes to become more efficient and robust, integrating several biodiversity components through simultaneous monitoring.
- In all Regional Seas, microbes are the biodiversity component monitored through the lowest number of programmes. Microbes are not addressed at all in the Black Sea and the Sea of Marmara.
- In addition to microbes, marine mammals, birds, angiosperms, macroalgae and fish are not monitored in the Sea of Marmara.
- Cephalopods are addressed through a small number of monitoring programmes in the North Eastern Atlantic and Mediterranean Sea (they are not present in the Baltic Sea and the Black Sea, and for that reason there are no monitoring activities with them as targets).

Table 1. Overall SWOT analysis: Weaknesses (II) of the existing monitoring networks across the four European Regional Seas (North Eastern Atlantic, Baltic Sea, Mediterranean and Black Sea) and the Sea of Marmara, based on the monitoring activities reported in DEVOTES Catalogue of Monitoring Networks.

WEAKNESSES (II)

Pressures

- Monitoring programmes addressing the pressure ‘underwater noise’ are lacking or limited in all seas.
- Monitoring programmes addressing the pressures ‘introduction of radionuclides’, ‘electromagnetic changes’, ‘marine litter’ and ‘introduction of non-indigenous species and translocations’ are also lacking or limited in most regional seas.

Habitats

- Monitoring programmes addressing ice-associated habitats are recorded as completely lacking in all regional seas.
- Monitoring programmes that address bathyal and abyssal habitats (e.g. sediment, rock and biogenic reef) are lacking or limited in all regional seas in which they occur (i.e. North Eastern Atlantic, Mediterranean Sea, Black Sea EU waters).
- Mixed sediment habitats are reported as having no or limited monitoring in the Baltic and Black Seas, along with rare seabed habitats (such as shelf sublittoral rock and biogenic reef) in the Baltic Sea.
- The uneven coverage of habitat types monitored is also reported as problematic both within and between marine regions.
- There are no reported monitoring programmes covering the seabed habitats in the Macaronesian biogeographic region
- In the Sea of Marmara, the monitoring programmes do not specify the type of habitat covered.

Quality assurance (QA)

- QA protocols associated with the monitored biological components vary per component, monitoring country and institute. Overall, QA is not associated with all of the monitored biodiversity components or this information has not been or cannot be provided. There is therefore considerable risk for poor comparability between datasets where QA is not standardised or not included.

Others

- Across all European Seas, there are very few (if any) reported monitoring programmes simultaneously targeting all descriptors, biodiversity components, habitats and relevant pressures.
- Whilst some countries reported programmes carried out by NGOs, others did not.

Table 1. Overall SWOT analysis: Opportunities of the existing monitoring networks across the four European Regional Seas (North Eastern Atlantic, Baltic Sea, Mediterranean and Black Sea) and the Sea of Marmara, based on the monitoring activities reported in DEVOTES Catalogue of Monitoring Network

OPPORTUNITIES

- By highlighting inadequacies in the monitoring currently undertaken in the regional seas, this analysis identifies a number of opportunities to develop new monitoring programmes or to modify and/or expand existing ones and to foster collaboration between countries both within and across regional seas to develop coordinated, harmonized and robust monitoring programmes and networks.
- MSFD monitoring requirements considerably overlap with the requirements of other EU legislation and international agreements, therefore the ongoing programmes should already provide some of the data required for MSFD monitoring.
- Introduction and/or integration of validated external Quality Assurance protocols, standardized verification of analyses and species identification and a focus on upgrading the spatial and temporal resolution of monitoring and inter-calibration procedures ongoing or to be implemented.
- This catalogue demonstrates that single, large monitoring programmes can simultaneously address different descriptors, biological components, habitats and pressures with adequate specificity and thus there is potential for existing monitoring programmes to widen their scope and improve integration of activities.
- There is a lack of monitoring associated with microbes in the context of MSFD but microbial quality of shellfish and bathing waters is routinely monitored. There is an opportunity to expand and adapt this monitoring, learning from past experience.
- An online database of all monitoring programme data accessible to all EU Member States seems feasible.
- There is considerable potential to increase synergies, communication and data sharing between policies to support wider monitoring of components-habitats-pressures
- There is an opportunity to fully align and support the regional seas programmes with the MSFD by providing both the science base and a structured and standardised approach to monitoring.
- The implementation of the MSFD provides the opportunity for collaborative work between EU and non-EU contracting parties to improve and/or develop monitoring programmes to achieve GEnS in some regional seas (i.e. the Black Sea).
- The Sea of Marmara, although not an EU Regional Sea, is the connection between the Mediterranean and the Black Sea (EU seas). Integrating the local ongoing monitoring programmes within the Mediterranean and Black Sea networks will improve coherence in MSFD implementation.
- The findings regarding the inadequacies in the monitoring currently undertaken in the European regional seas form the basis of further research requirements.

Table 1. Overall SWOT analysis: Threats of the existing monitoring networks across the four European Regional Seas (North Eastern Atlantic, Baltic Sea, Mediterranean and Black Sea) and the Sea of Marmara, based on the monitoring activities reported in DEVOTES Catalogue of Monitoring Networks.

THREATS

- The most obvious and significant threat to monitoring is budgetary constraints within EU Member States. A sustainable funding scheme and/or research budget and a rapid response/intervention framework may be necessary to ensure successful integrative monitoring schemes within and across regional seas. In the current economic climate, it is difficult to envision which, if any, EU Member States would be able to provide an appropriate budget for this.
- Each EU member state has a long history of monitoring which has been expanded, modified and developed over time. As a result of these developments, together with methodological differences between countries, integration and holistic assessment of the data (at a regional sea level) may be difficult, time consuming and economically restrictive.
- Member States may be reluctant to generate new monitoring programmes and so rely on existing programmes.
- Lack of Quality Assurance protocols in monitoring programmes may hinder harmonization and comparability across the EU.
- Certain descriptors, biodiversity components, pressures, habitats and even subregions have limited monitoring programmes; such gaps may be an important constrain in monitoring the advances towards achieving the GEnS.
- Intensive monitoring activities, that use destructive methods (e.g. nets, trawls, grabs and frames), can have a negative impact on vulnerable and rare species or habitats.
- Data collected are often not easily available and this might limit their appropriate utilization. Data on monitoring details, scales, methods, sampling and statistical power as well as spatial data and maps are not readily available. Open Access data are still limited.
- Cooperation between EU and non-EU countries is often based on agreements that are non-binding or binding but non enforceable and thus achievement of GEnS in the regional sea may not be particularly difficult.
- Integrating the Sea of Marmara monitoring activities into the European networks it is not straightforward because Turkey is, currently, a non-EU country.