

# Monitoring networks currently used in European Seas

Is the marine monitoring for the MSFD fit-for-purpose?

---

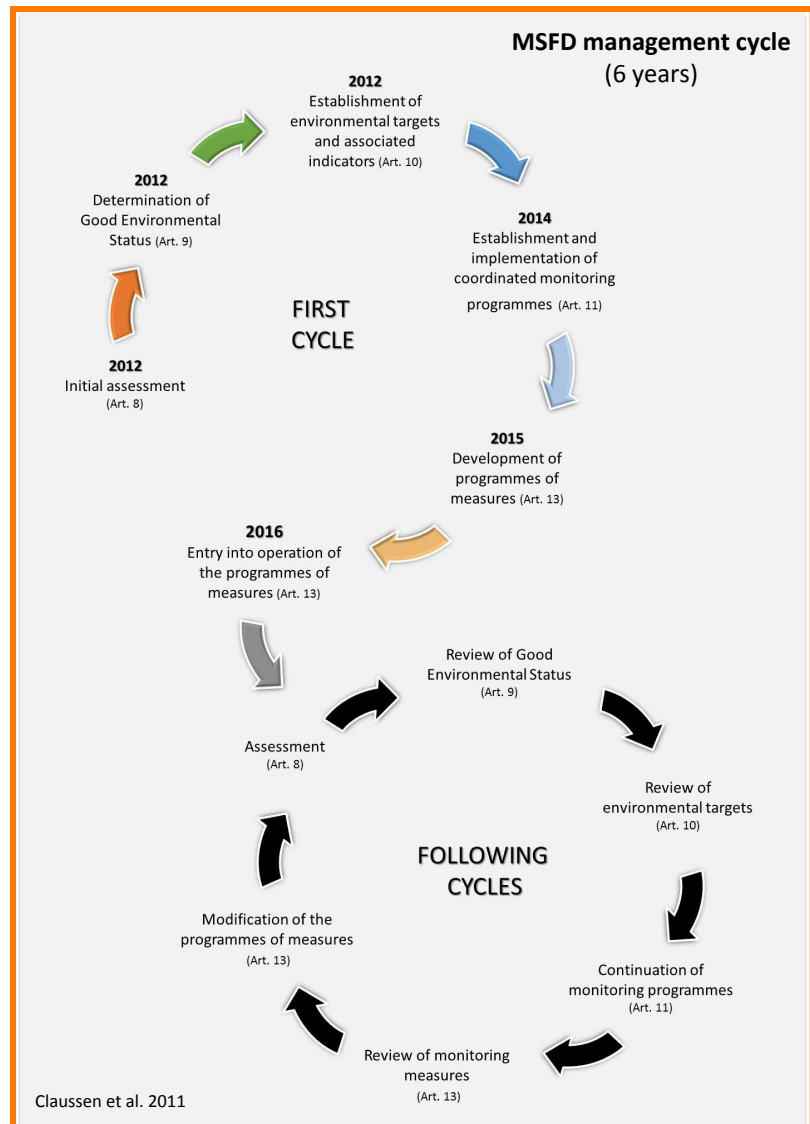
**Joana Patrício**, Sally Little, Krysia Mazik, Nikolaos Zampoukas, Heliana Teixeira, Maria C. Uyarra, Oihana Solaun, Nadia Papadopoulou, Argyro Zenetos, Gokhan Kaboglu, Tanya Churilova, Olga Kryvenko, Snejana Moncheva, Kremena Stefanova, Martynas Bucas, Mike Elliott



## DIRECTIVES

DIRECTIVE 2008/56/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 17 June 2008  
establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)  
(Text with EEA relevance)

- By **2020** EU Member States shall take the necessary measures to **achieve or maintain GEnS** in the marine environment.
- Each MS is required to **develop a marine strategy** for their waters in coordination with other countries within the same marine region or subregion. Coordination is achieved through the **RSC**.
- Coherent **monitoring** forms a key component of the strategy.



## Is the marine monitoring for the MSFD fit-for-purpose?

Critical overview of the monitoring activities in Europe, focusing on MSFD descriptors 1, 2, 4 and 6 :

(North Eastern Atlantic, Baltic Sea, Black Sea, Mediterranean Sea + the non-EU Sea of Marmara)

- what monitoring is being currently performed?
- why is it being performed?
- what pressures is it linked to?
- is it fulfilling its objectives (i.e. is it fit-for-purpose)?





Monitoring has to provide the data to allow assessment methods to classify a marine area as reaching or failing to reach GEnS



## Descriptors

- Biodiversity
- Alien species
- Fish stocks
- Food-webs
- Eutrophication
- Seabed integrity
- Hydromorphology
- Contaminants in the sea
- Contaminants in seafood
- Litter
- Energy

Annex I, 2008/56/EC

## Characteristics

- Physical and chemical features
- Habitat types (from broad and priority habitats under the HD to detailed predominant EUNIS and MSFD types)
- Biological features
- Other features

topography, and bathymetry of the seabed, temperature, ice cover, current velocity, upwelling, wave exposure, mixing characteristics, turbidity, residence time, salinity, DIN, TN, DIP, TP, TOC, O<sub>2</sub>, pH, pCO<sub>2</sub> profiles

phytoplankton, zooplankton, angiosperms, macroalgae, invertebrate bottom fauna, fish, marine mammals, reptiles, seabirds, other sensitive species, non-indigenous/exotic species

Annex II, 2008/56/EC

## Pressures and Impacts

- Physical loss (smothering, sealing)
- Physical damage (changes in siltation, abrasion, selective extraction of living and non-living resources)
- Other physical disturbance (underwater noise, marine litter)
- Interference with hydrological processes (changes in thermal and salinity regimes)
- Contamination by hazardous substances (introduction of radio-nuclides, synthetic, non-synthetic substances and compounds)
- Systematic and/or intentional release of substances
- Nutrient and organic enrichment (input of fertilisers and other N and P-rich substances, input of organic matter)
- Biological disturbance (introduction of microbial pathogens, non-indigenous species and translocations, selective extraction of species)

Annex III, 2008/56/EC

29 Criteria and 56 Indicators for GEnS relevant to the descriptors

Annex, Part B, 2010/477/EU

## Descriptors

- Biodiversity
- Alien species
- Fish stocks
- Food-webs
- Eutrophication
- Seabed integrity
- Hydromorphology
- Contaminants in the
- Contaminant
- Litter

## Characteristics

- Physical and chemical factors

**Comparability** of assessment approaches **within** and **between** marine regions and/or subregions has to be ensured.

Monitoring programmes should be based on and be **compatible** with the **European acquis** (i.e. HD, BD, WFD, CFP, UWWTD, RSC, ...)

symmetry of the  
ice cover, current  
exposure,  
turbidity,  
TN, DIP,  
files

phytoplankton  
and

corate  
s,

Annex III, 2008/56/EC

# DEVOTES Catalogue of Monitoring Networks

## INFORMATION ON:

- Type of monitoring, frequency, time series, contact person, scope of monitoring
- 4 MSFD GEnS descriptors: **D1, D2, D4, D6**
- 11 biodiversity components
- 23 habitats (18 seabed + 5 water)
- 37 pressures
- Supporting PQ data
- Geographical information
- Networks of monitoring
- Monitoring web platforms

Annex 1\_D1.4\_DEVOTES Catalogue of Monitoring networks\_jan2014 - Excel

Joana Mateus Patricio

SECURITY WARNING Automatic update of links has been disabled Enable Content

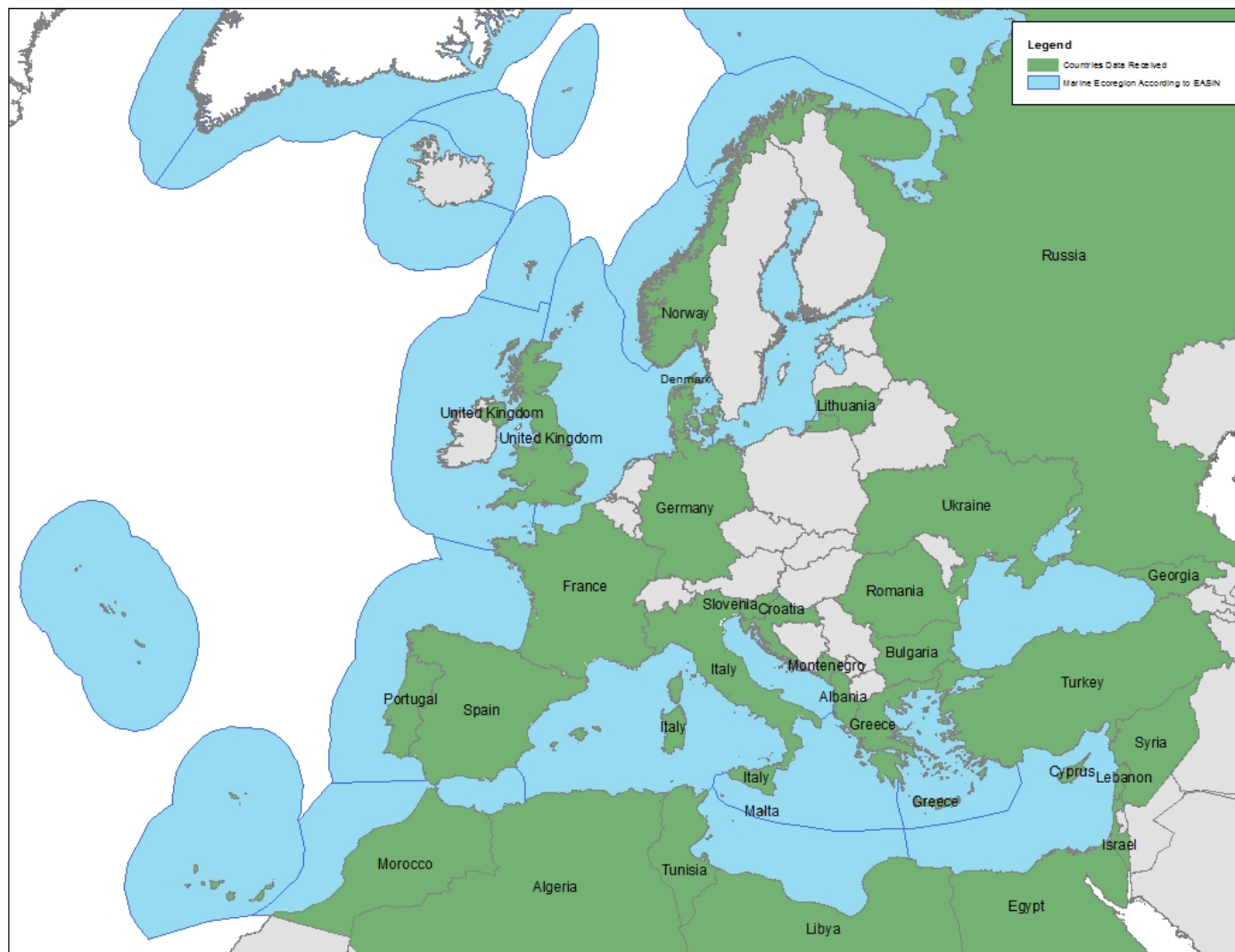
CQ738 9 non-EU

Table for Catalogue on Monitoring Networks (DEVOTES WP1) - List of monitoring networks for GES assessment of Descriptors 1, 2, 4 and 6 of the MSFD																
LEVEL 3 - Monitoring Program level																
Monitoring Program									Scope of monitoring				Relation to GES descriptors			
ID	Code	Monitoring Program name	Monitoring Program link	Source	Type of the monitoring* (check details in spreadsheet "Definitions")	Monitoring frequency	Time series	Contact	Is the monitoring program undertaken or used under the context of a broader program(s)? (open field - if so, insert name)				D1 Biological diversity	D2 Non-indigenous species	D4 Food webs	D6 Seafloor integrity
									International Convention	Regional Sea Convention	EU Directives	National monitoring	Research program			
6	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
7	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
8	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
9	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
10	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
11	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
12	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
13	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
14	UHULL-KM	1	CSEMP - Clean Seas Environm	http://www. Centre for Er	1 surveillance	Annual but c	1993-present. Monitoring stat	Manuel.Nic	OSPAR	EC Dangerous Subs	1	1	1	1	1	1
15	UHULL-SL	2	CSEMP - Clean Seas Environm	http://www. Marine Scot	1 surveillance	year to sub- c	1999-present. 1980-present (B Dr Lynda W	OSPAR	EC Water Framew	1	1	1	1	1	1	1

WP1 - MONITORnetworks catalogue Param & physico-chemical data Definitions Baltic subdivisions MAP

Publically available at: <http://www.devotes-project.eu/deliverables-and-milestones/>



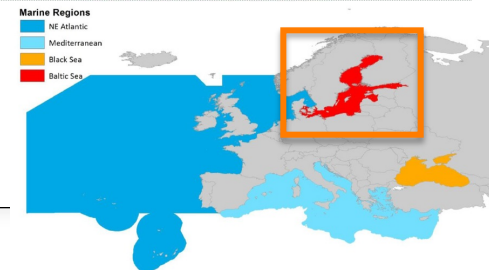


June 2014 version

- 855 entries/  
activities
- 285  
programmes
- 15 MS  
14 non-EU  
countries

Information gathered mainly by national research institutions that are partners in DEVOTES, in collaboration with national authorities not necessarily exclusively corresponding to the national official monitoring activities.





## HELCOM MORE

Overview of the  
marine environmental  
monitoring in the  
Baltic Sea



BALSAM



HELCOM

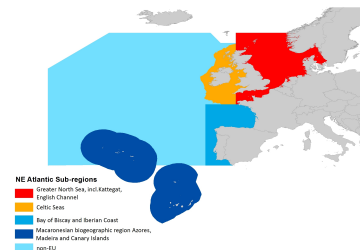


**First Interim Report of the Baltic Sea Pilot Project: Testing New Concepts for Integrated Environmental Monitoring of the Baltic Sea (BALSAM): Information Collected During Cataloguing of Environmental Monitoring in the Baltic Sea**

**28 May 2014**

*This document is the first interim report of the BALSAM project to the European Commission and presents information collected within the project on environmental monitoring of the Baltic Sea (Cataloguing activity). It should be noted that the monitoring information collected in BALSAM is currently being updated and revised in the HELCOM groups and therefore the information presented here is not in the final format and might contain errors. The information is being revised and fed into the HELCOM Monitoring Manual, which is planned to be published online in October 2014, and assist Member States in their MSFD reporting.*

# RESULTS: North Eastern Atlantic



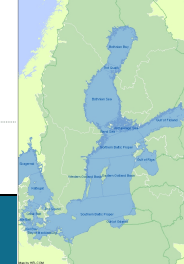
N= 141

North Eastern Atlantic subregions	MSFD Descriptor				Characteristics														Pressures and Impacts
					Habitat types			Biological features											
	D1	D2	D4	D6	Seabed	Water	Mic	Phy	Zoo	Ang	MacAlg	Bin	Fish	Cep	Mam	Rep	Bir		
Greater North Sea	75	30	69	36	12	4	3	17	15	11	12	33	22	3	17	9	17	37	
Celtic Seas	95	32	86	48	17	5	2	15	14	15	14	46	33	1	16	10	10	37	
Bay of Biscay & Iberian Coast	43	9	31	14	14	5	4	13	15	6	6	13	16	4	10	9	15	25	
Macaronesian biog. region	4	1	1	0	0	3	0	1	1	1	1	1	1	1	2	2	3	11	

## HIGHLIGHTS

- Uneven coverage of descriptors D1>D4>D6>D2 (2 or 3 descriptors simultaneously addressed)
- Uneven spatial coverage of regions (lower in Macaronesia).
- All seabed habitats are addressed however not in all subregions. All water column habitats are addressed.
- All biological components are monitored but very few programmes for Microbes, Cephalopods and Reptiles
- Uneven coverage of pressures. Data on a number of pressures is missing and/or patchy at subregional level. Pressures best covered: increase in siltation, selective extraction of living resources, OM enrichment. Only 1-2 programmes cover selective extraction of mearl or seaweed and introduction of radionuclides (the lack of coverage means the pressures are not significant?)
- Most programmes simultaneously assess 4 or fewer pressures but some programmes assess 18-20 pressures.
- Regional coordination: OSPAR Joint Assessment and Monitoring Programme 2010-2014.

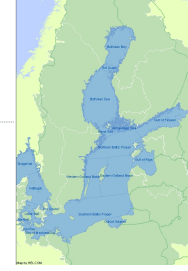
# RESULTS: Baltic Sea



Baltic Sea subregions	MSFD Descriptor				Characteristics														P-C O.F.	Pressures and Impacts
					Habitat types			Biological features												
	D1	D2	D4	D6	Seabed	Water	Mic	Phy	Zoo	Ang	MacAlg	Bin	Fish	Cep	Mam	Rep	Bir			
Bothnian Bay	2	1	2	1	0	1	0	2	2	2	2	2	2	0	2	0	2	5		
The Quark	2	1	2	1	0	0	0	0	2	2	2	2	2	0	2	0	2	5		
Bothnian Sea	2	1	2	1	0	0	0	2	2	2	2	2	2	0	2	0	2	6		
Åland Sea	1	0	1	1	0	0	0	1	1	1	1	1	1	0	1	0	1	5		
Archipelago Sea	1	1	1	1	0	0	0	1	1	1	1	1	1	0	1	0	1	5		
Gulf of Finland	2	1	2	1	0	0	0	2	2	2	2	2	2	0	2	0	2	5		
Gulf of Riga	2	0	2	1	0	0	0	2	2	2	2	2	2	0	2	0	2	6		
Northern Baltic Proper	4	0	4	1	0	0	0	4	4	4	4	4	4	0	4	0	4	7		
Western Gotland	1	0	1	1	0	0	0	1	1	1	1	1	1	0	1	0	1	6		
Eastern Gotland	2	0	2	1	0	0	0	2	2	2	2	2	2	0	2	0	2	5		
Southern Baltic Proper	5	0	5	1	8	3	1	5	5	5	5	5	5	0	5	0	5	13		
Gulf of Gdansk	1	0	1	1	0	0	0	1	1	1	1	1	1	0	0	0	1	5		
Bay of Mecklenburg	1	0	1	1	5	1	1	1	1	1	1	1	1	0	1	0	1	6		
Kiel Bay	1	0	1	1	5	1	1	1	1	1	1	1	1	0	1	0	1	6		
Little Belt	1	0	0	1	0	0	0	1	0	1	1	1	1	0	1	0	1	5		
Great Belt	1	0	1	1	0	0	0	1	1	1	1	1	1	0	1	0	0	5		
The Sound	1	0	1	1	0	0	0	1	1	1	1	1	1	0	1	0	1	6		

N/A





## HIGHLIGHTS

- The existing long-term monitoring programmes in the Baltic Sea make a great platform for the further development of GEnS.
- At least one national monitoring programme is ongoing in each Baltic country.
- Uneven spatial coverage of regions. The number of stations per subregion differs greatly (2 – 214) and also the frequency of sampling.
- Uneven coverage of descriptors: D2 is poorly covered.
- Very few programmes for Microbes in the context of the MSFD.
- Monitoring of mixed bottom habitats is still unsatisfactory in several subregions.
- Regional coordination: HELCOM Monitoring and Assessment Strategy



# RESULTS: Black Sea



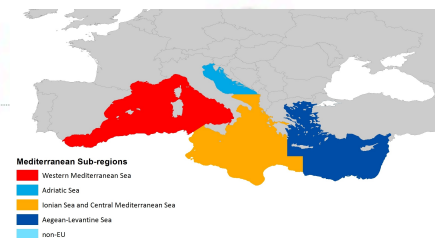
N= 16

Black Sea and Sea of Marmara	MSFD Descriptor				Characteristics														Pressures and Impacts	
					Habitat types				Biological features											
	D1	D2	D4	D6	Seabed	Water	Mic	Phy	Zoo	Ang	MacAlg	Bin	Fish	Cep	Mam	Rep	Bir			
Black Sea EU waters	10	6	2	5	11	3	0	2	2	2	2	2	2	—	3	—	3		18	
Black Sea non-EU waters	7	4	2	1	2	3	0	3	3	1	2	1	1	—	0	—	0		8	
Sea of Marmara	2	2	0	0	1	1	0	1	1	0	1	1	0	0	0	—	0		6	

## HIGHLIGHTS

- Low number of regular monitoring activities.
- Uneven coverage of descriptors D1>D2>D6>D4.
- Uneven spatial coverage of regions: EU *versus* non-EU waters.
- Uneven coverage of components. Microbes are not monitored in the context of MSFD.
- Uneven coverage of pressures. Data on a number of pressures is missing and/or patchy at subregional level. Only 9 pressures monitored. Nutrients and OM enrichment are covered by the highest number of programmes.
- Regional coordination: Black Sea Integrated Monitoring and Assessment Programme (BSIMAP)

# RESULTS: Mediterranean Sea

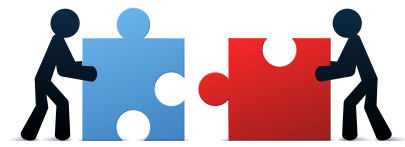


N= 107

Mediterranean subregions	MSFD Descriptor				Characteristics														Pressures and Impacts
					Habitat types			Biological features											
	D1	D2	D4	D6	Seabed	Water	Mic	Phy	Zoo	Ang	MacAlg	Bin	Fish	Cep	Mam	Rep	Bir		
Western Mediterranean	38	14	22	8	14	5	2	6	9	4	5	6	11	5	5	6	6		20
Adriatic Sea	25	6	4	5	12	2	4	3	3	3	4	6	12	4	2	1	0		13
Central Mediterranean incl. the Ionian Sea	12	6	4	5	9	4	1	1	2	2	3	5	7	6	0	0	0		13
Eastern Mediterranean	26	22	6	3	7	2	1	7	18	0	1	7	4	3	0	1	0		16

## HIGHLIGHTS

- Uneven coverage of descriptors D1>D2>D4>D6
- Uneven spatial coverage of regions.
- Uneven coverage of habitats, shallow and shelf habitats are better represented than bathyal and abyssal habitats.
- Uneven coverage of components. Fish, Invertebrates and Phyto/Zooplankton are monitored in all 4 suregions.
- Coverage of Reptiles, Mammals, Birds and Microbes is uneven and fragmented or missing.
- Uneven coverage of pressures. Data on a number of pressures is missing and/or patchy at subregional level.
- Need for further development of assessment methodologies and monitoring networks.



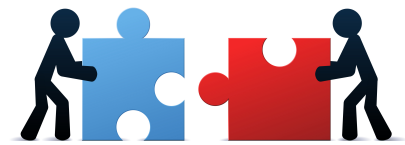
## DESCRIPTORS:

- D1 > D4 > D6 > D2 although in several subregions monitoring programmes for D2 are more numerous than for D4 (e.g. Eastern Med)
- Most programmes simultaneously address more than one descriptor.

## BIOLOGICAL COMPONENTS:

- In most regional seas, the 11 components are monitored and several are monitored simultaneously but there is room for improvement (e.g. increase of components monitored)
- In all regional seas, there is a lack of monitoring associated with Microbes in the context of MSFD. There is an opportunity to expand and adapt this monitoring.
- Monitoring programmes addressing HTL biodiversity components are lacking or limited in all marine regions. As these groups include several endangered/threatened/protected species there is opportunity to address gaps/join forces (RSC/HD/MSFD)
- Most programmes have no or no reported QA associated with the monitoring biological components. Opportunity for defining and/or implementing common QA protocols *versus* risk for poor comparability between datasets where QA is not standardized or not included.





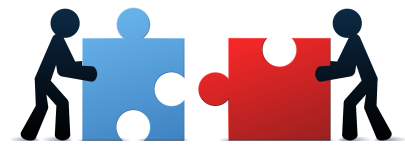
## HABITAT TYPES:

- Most monitoring programmes address more than one seabed and water column habitat simultaneously.
- All five water column habitats are covered at the marine region level.
- Shallow waters are better represented while monitoring for bathyal and abyssal habitats (e.g. sediment, rock and biogenic reef) is limited or lacking in all regional seas in which they occur (NEA, Med and Black).
- Some rare and even protected habitats have limited or no regular monitoring (e.g. Black Sea)

## PRESSURES:

- Most programmes address more than one pressure.
- Some monitoring activities assess 18-20 pressures (Celtic Sea), demonstrating the potential for more efficient and integrated monitoring.
- Nutrients and OM enrichment are the main pressures covered.
- There is limited or no monitoring for the pressures “introduction of radionuclide”, “electromagnetic changes” and “marine litter” in most marine subregions.

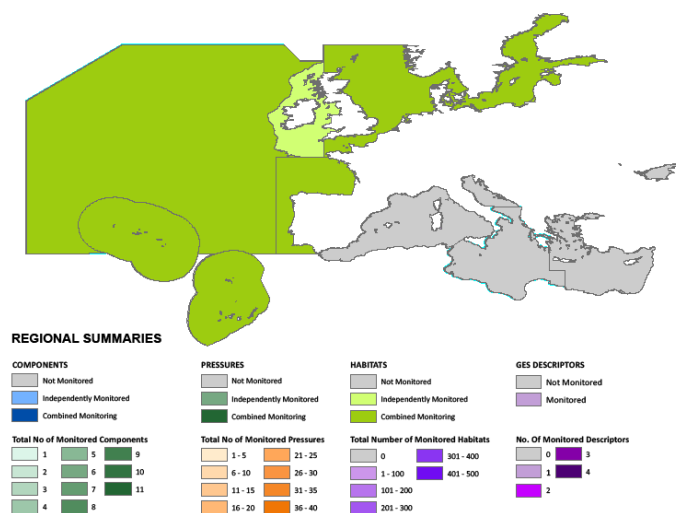




## GENERAL:

- Most EU countries are using their existing monitoring programmes as a starting point for the establishment of MSFD monitoring activities. There is the concern that some of these programmes might not be fit-for-purpose.
- In some regional seas (e.g. NEA and Baltic) current monitoring practices are built on a strong foundation of scientific knowledge through a long history of national and international networks and policies (e.g. OSPAR Joint Assessment and Monitoring Programme 2010-2014, HELCOM Monitoring and Assessment Strategy).
- There is a clear need for collaborative work between EU and non-EU countries to improve and/or develop monitoring programmes to achieve GEnS, particularly in the Med and Black seas.
- There is a good basis on which to build on although several countries will not be able to comprehensively assess the status of the environmental status of their marine areas unless the monitoring is increased intensity and coverage of both areas and components is increased.
- Most programmes provide data to international platforms (e.g. EMODnet, MyOcean2, SeaDataNet, CEDaR, NBN Gateway, DCR, DATRAS, JellyWatch) but the data collected are not easily available.
- The information gathered in this study enhances opportunities for data collation and sharing, coordination and harmonization of monitoring between MS.
- Opportunity that forms the basis of further research requirements.

## Interactive pdfs



Publically available at:

<http://www.devotes-project.eu/deliverables-and-milestones/>

## Report on SWOT analysis of monitoring

Deliverable 1.4

Dissemination level

Public

*This document contains four annexes, including an interactive pdf.  
Please, refer to Annex 2 for instructions of how to use the interactive pdf.*

### LEAD CONTRACTOR

JRC – JOINT RESEARCH CENTRE, EUROPEAN COMMISSION

### AUTHORS

Joana Patrício (JRC), Sally Little (UHULL), Krystia Mazik (UHULL), Shona Thomson (UHULL), Nikolaos Zampoulas (JRC), Heliana Teixeira (JRC), Oihana Solauin (AZTI), Maria C. Uyarra (AZTI), Nadia Papadopoulou (HCMR), Gokhan Kaboglu (DEU), Martynas Bucas (KUCORPI), Tanya Churilova (MHI-NASU), Olga Kryvenko (MHI-NASU), Snezana Moncheva (O-BAS), Kremena Stefanova (IO-BAS), Ángel Borja (AZTI), Maria Alvarez (UHULL), Argyro Zenetos (HCMR), Chris Smith (HCMR), Anastasija Zaico (KUCORPI), Roberto Danovaro (CONISMA), Laura Carugati (CONISMA), Mike Elliott (UHULL).

### SUBMISSION DATE

31 | January | 2014

# Thank you

*The DEVOTES team is gratefully acknowledging the help and metadata information received from the Regulatory Authorities within each MS and numerous **non-DEVOTES experts** !!  
A list will be published on the DEVOTES website along with the new version of the Catalogue of Monitoring Networks*



Grant agreement n° 308392



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under the grant agreement n° 308392

[www.devotes-project.eu](http://www.devotes-project.eu)