



Common borders. Common solutions.

Eutrophication indicators at the national level - Romania

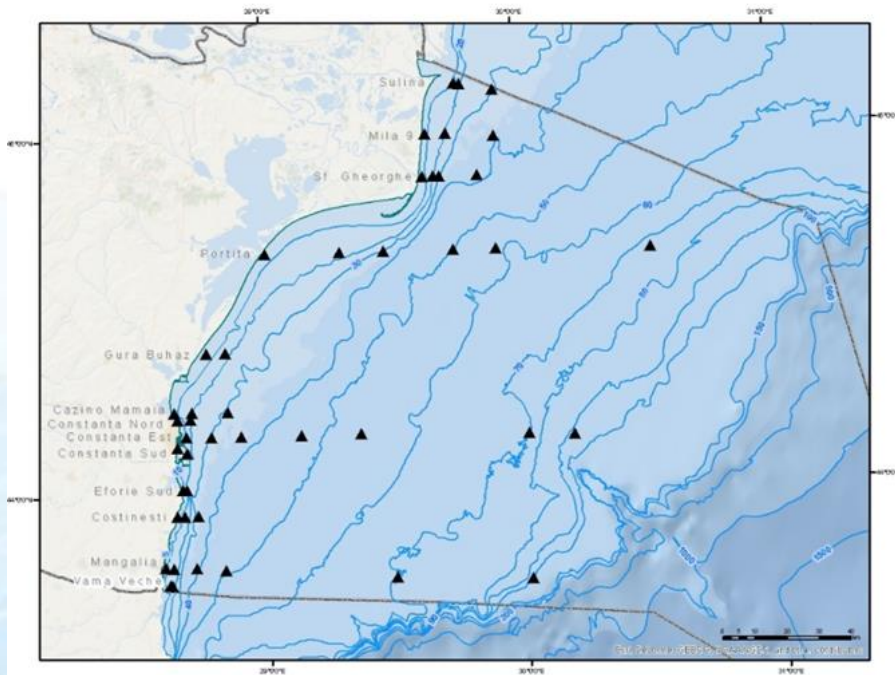
Luminita Lazar, Laura Boicenco, Oana Marin, Oana Culcea, Valeria Abaza

National Institute for Marine Research and Development "Grigore Antipa" (NIMRD), Constanta

ANEMONE Workshop
19 - 20 June 2019, Istanbul, Turkey

Common borders. Common solutions.

Overview of the existing eutrophication parameters



Integrated Marine Monitoring Network

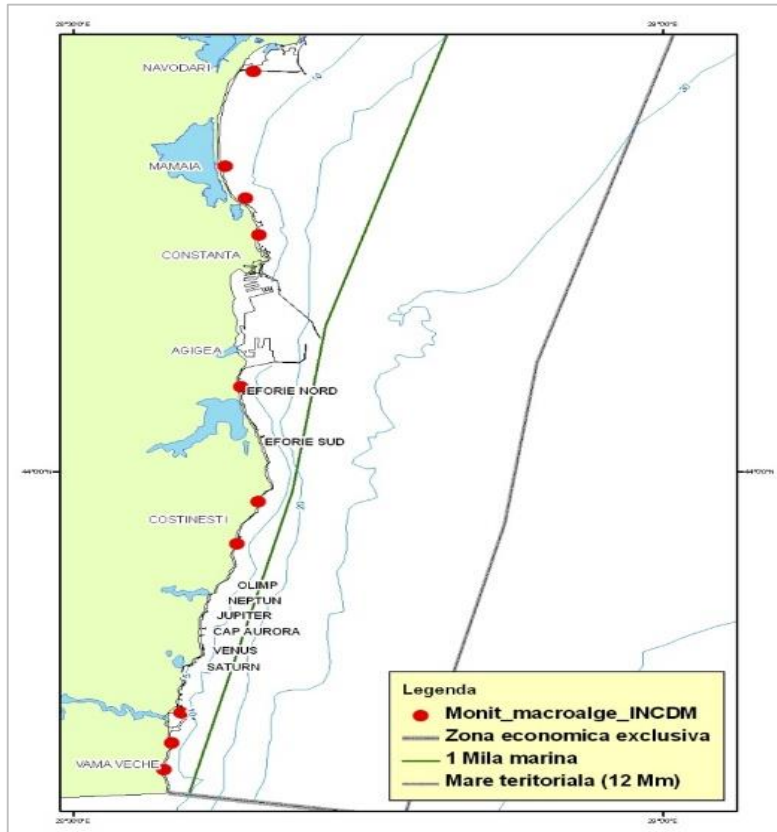
Monitoring stations network:

The national marine monitoring network covers the national transitional, coastal and marine waters, and is represented by 45 permanent stations, which reach down to 100 m depth and approx. 65 nm from the base line, positioned on 13 transects arranged along the Romanian coastline.

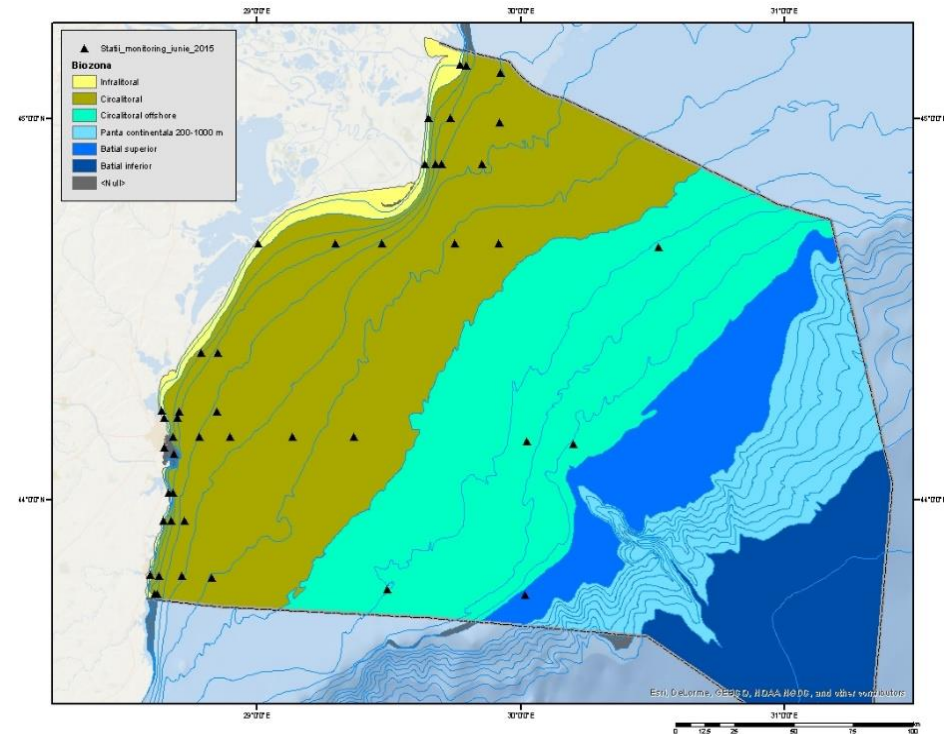
Assessment areas:

- **BLK_RO_RG_TT03_ Waters with variable salinity** – waters with variable salinity located in the north, under the direct influence of the Danube, from the mouth of the river in the Black Sea, south to the Portița, at depths of up to 30m. The waters are delimited by the average seasonal salinity up to 8.0 PSU and an annual average up to 14.5 psu;
- **BLK_RO_RG_CT_Coastal waters** - are the coastal water from the central to the south (from Portița to Vama Veche), from the base line to the isobath of 30m. The waters are delimited by the average seasonal salinity 8-16 PSU and an annual average up to 16.0 PSU;
- **BLK_RO_RG_MT01_Marine Waters** – the marine waters area from the 30 m isobath to 200m; The waters inside and outside the continental platform, delimited by the average seasonal and annual salinity in the range 16 – 17, 5PSU;

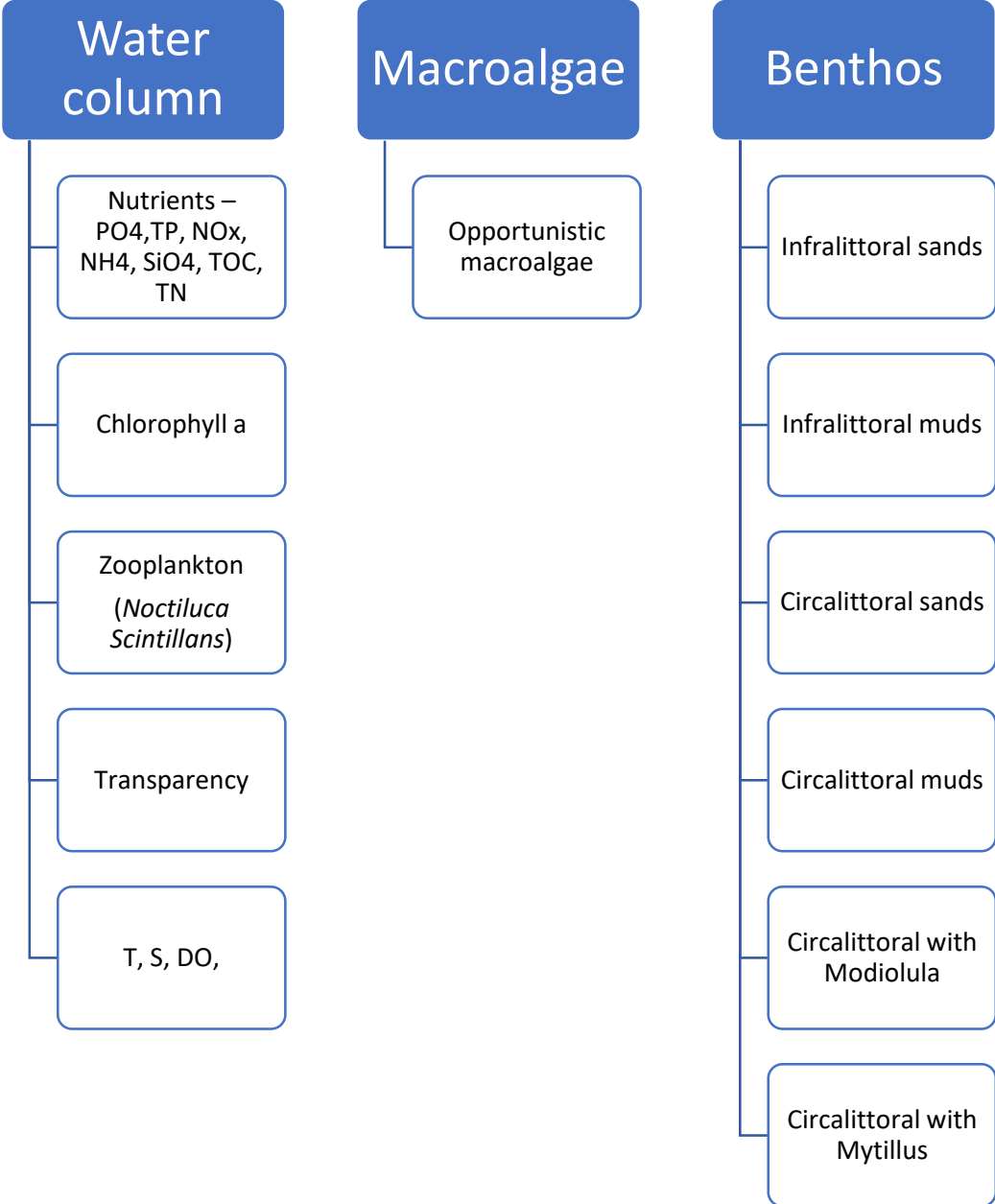
Overview of the existing eutrophication parameters monitoring



Macroalgae Monitoring Network



Benthos Monitoring Network



Parameters included in the national marine monitoring programme, D5

Monitoring cruises are conducted 1-2 times/year but preferably 4 times/year;

Common borders. Common solutions.



- Scientific cruises with the R/V “Sea Star 1” are generally organized 2 times/year;
- **Water column** samples, are collected with Nansen bathometers;
- **Zooplankton** samples collected with a Juday net type with internal diameter 36 cm, mesh filter 150 mm and length of 1.5 m.
- **Phytobenthos** samples are collected from the coastal zone, at the maximum depths that phytobenthos is distributed. At each depth range, three samples are collected (from meter to meter, e.g. 0m, 1m, down to the maximum distribution range). Sampling will be done using a square frame with a side of 20 cm.

-**Macrozoobenthos** sampling is performed differently according to substrate type, as follows: on hard bottoms situated in near-shore waters, either natural or artificial, samples are collected by scuba diving using a frame of 20x20 cm placed on substrate, and all biological material within the frame is collected and placed into a plastic bag. On soft bottoms, samples are taken onboard a sampling vessel using a Van Veen grab with an 0.1m² surface, according to the methodology agreed at the Black Sea level.

- **In situ** measurements – CTD and Secchi disc

The samples are processed and analysed in the specialized laboratories of INCDM, using “Methods for seawater analyses” (Grashoff, 1999) and other specific references.

Procedures for quality assurance and control of data are applied, including participation in European programs for intercomparison of analytical data, such as: QUASIMEME and Eurofins Denmark, and also using certified reference materials and internal standards;



Project funded by the
EUROPEAN UNION



Common borders. Common solutions.

- Eutrophication monitoring is included in the national monitoring programme, adapted to MSFD and BSIMAP requirements, financing being assured by Ministry of Water and Forestry, and also through contribution of various scientific projects;
- Existing data sets allow trends assessment for the last 50-60 years in some cases (nutrients, T, S, DO).

Results are included in:

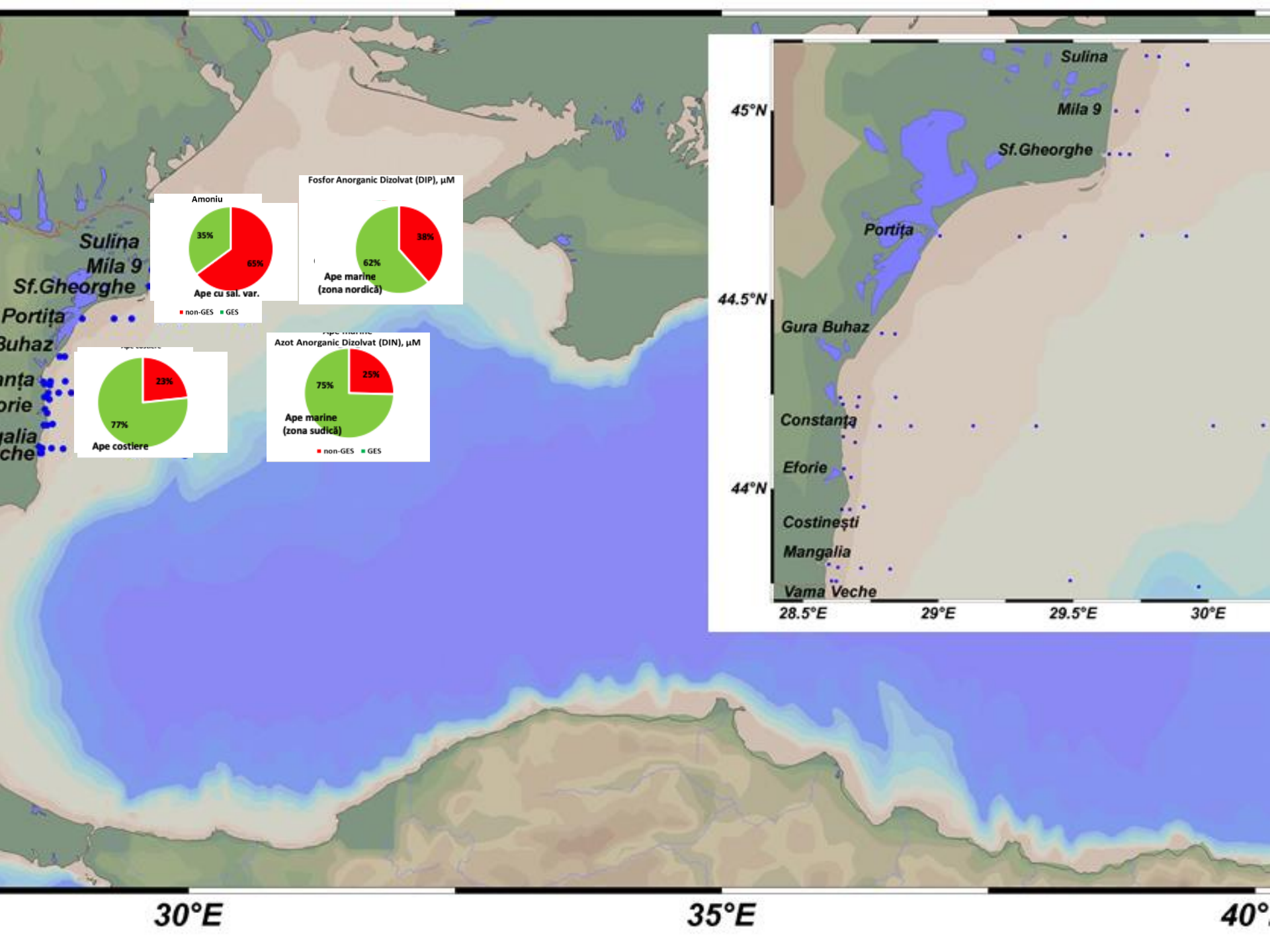
- ✓ National monitoring reports, Ministry of Water and Forestry (MWF);
- ✓ Scientific projects reports;
- ✓ Contributions to the National Report on the State of Environment in Romania, National Agency for Environmental Protection;
- ✓ Reports to Black Sea Commission, Pollution Monitoring and Assessment (PMA) Advisory Group;
- ✓ Report on the Initial assessment (IA) of Black Sea waters, MSFD art. 8,9,10; **2006 – 2011** period, MWF;
- ✓ Report on the Re-evaluation of IA, MSFD art. 17, **2012 – 2017** period, MWF;



Assessment of Black Sea eutrophication status

Report on the Re-evaluation of IA, MSFD art. 17 DESCRIPTOR 5

- Evaluation was based on the criteria:
 - D5C1 (primary) – Nutrients concentration
 - D5C2 (primary) – Chlorophyll a concentration
 - D5C3 (secondary) – Harmful Algal Blooms
 - D5C4 (secondary) - Transparency
 - D5C5 (primary) – Bottom Dissolved Oxygen
 - D5C6 (secondary) – Opportunistic macroalgae
 - D5C8 (secondary, can substitute D5C5) - Macrozoobenthos
- Available data for 2012 – 2017 were processed, statistically analyzed and evaluated against the proposed target values which define Good ecological status
- Assessment areas: waters with variable salinity (BLK_RO_RG_TT03), coastal waters (BLK_RO_RG_CT) and marine waters (BLK_RO_RG_MT01).



30°E

35°E

40°E

Assessment of the ecological status by assessment areas for D5, 2012 – 2017

		Depth							
		0-5m	0-5m	5-20m	5-20m	30-50m	30-50m	50-100m	50-100m
		Warm season	Cold season	Warm season	Cold season	Warm season	Cold season	Warm season	Cold season
Variable salinity waters	D5C1	Red				Grey			
	D5C2	Red	Grey	Red	Grey	Grey			
	D5C3	Green	Green	Green	Green	Grey			
	D5C4	Red				Grey			
	D5C5	Grey	Grey	Green	Grey	Grey			
	D5C6	Grey							
	D5C8	Green				Grey			
Coastal waters	D5C1	Red				Grey			
	D5C2	Red	Grey	Red	Grey	Grey			
	D5C3	Green	Green	Green	Green	Grey			
	D5C4	Red				Grey			
	D5C5	Grey	Grey	Green	Grey	Grey			
	D5C6	Red	Grey	Grey	Grey	Grey			
	D5C8	Green	Green	Green	Green	Grey			
Marine waters	D5C1	Red							
	D5C2	Grey	Grey	Grey	Grey	Red	Grey	Red	Grey
	D5C3	Green							
	D5C4	Grey	Grey	Grey	Grey	Red	Grey	Red	Grey
	D5C5	Grey	Grey	Grey	Grey	Green	Grey	Grey	Grey
	D5C6	Grey							
	D5C8	Grey	Grey	Grey	Grey	Red		Green	
OOAO	Red								

Primary criteria	Secondary criteria	Non applicable criteria	non-GES	GES
Blue	Yellow	Grey	Red	Green



Knowledge gaps and research needs

- Harmonizing parameters and updated legislation for WFD and MSFD
- Extent of the monitoring for open waters – taking into consideration remote sensing (Chlorophyll a) and modelling
- Monitoring of atmospheric deposition as an important source of N
- Integrated assessment of eutrophication
- Distinguish between natural variability (including climate change) and anthropogenic impact.
- Identification of critical nutrient loading thresholds beyond which the whole system is changing into an alternative steady state;

