

“Workshop on Eutrophication Reduction Measures under EU Directives in the Domain of Water ”

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ECRAN 62260

**Assessment methodologies and
criteria used for water quality status
classification for marine waters**



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Structure of the presentation

- Main pressures on marine areas
- Main impact on marine areas
- Assessment methodologies and criteria
- Impact and pressures criteria
- Examples of development of new WFD-compliant assessment systems
- Selection of criteria and indicators for eutrophication assessment by MSFD



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Main pressures on marine areas

Marine ecosystems are subject to a number of human-induced pressures associated with a variety of marine activities and developments.

- Fishing
- Aquaculture
- Hydrological changes
- Pollution
- Oil & Gas
- Coastal Infrastructure
- Tourism & Recreation
- Wastewater Discharges
- Shipping
- Dredging



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Main impacts on marine areas

- Oxygen deficiency
- Biodiversity losses
- Ecosystem degradation
- Physical disturbance
- Interference with hydrological processes
- Contamination by hazardous substances
- Systematic and/or intentional release of substances
- Nutrient and organic matter enrichment- eutrophication
- Biological disturbance
- Barrier to species movement
- Noise



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Assessment methodologies and criteria used for water quality status classification

Member States use water quality assessment methodologies and criteria related to eutrophication that have been established in the frame of the Marine Conventions.

The Marine Strategy Framework Directive require monitoring and assessment tools in relation to the eutrophication-related components of 'good environmental status' (which is defined in Art. 3 (4) and (5) of the Directive).

Qualitative descriptors are presented in Annex I of the Directive.

The information available regarding designating sensitive areas under the UWWTD shows that the designation was based principally on nutrient concentrations and chlorophyll concentrations.



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Impact and pressure criteria used in WFD Article 5 risk assessment

From available information for Article 5 the pressure criteria for marine waters were reported based mainly on the presence of surface point sources (sewage) of nutrients loads and surface water run-off.

The impact criteria for marine waters were based mainly on nutrient concentrations and chlorophyll a (direct effect) and occasionally on dissolved oxygen, macrovegetation, etc (indirect effects).



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Examples of development of new WFD-compliant assessment systems

Environment and Climate
Regional Accession Network **ECRAN**

Eutrophication related assessment methodologies and criteria are subject to intercalibration for marine waters.

The eutrophication related biological metrics that are subject to intercalibration in at least some marine water GIGs are: chlorophyll a, phytoplankton, macroalgae, angiosperms and benthic invertebrates.

There is also related work on eutrophication related supporting physico-chemical determinands including nutrient concentrations, transparency and dissolved oxygen concentrations.



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Selection of criteria and indicators for eutrophication assessment by MSFD (1)

Environment and Climate
Regional Accession Network **ECRAN**

For the MSFD qualitative descriptor of “human-induced “Eutrophication” resulted of three different aspects (EC; 2010):

- nutrient levels
- direct and indirect effects of nutrient enrichment
- **eight indicators**, which can potentially be used in the environmental status assessment within the MSFD.



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Selection of criteria and indicators for eutrophication assessment by MSFD (2)

- (1) for nutrient levels: nutrient concentration in the water column; nutrient ratios (silica, nitrogen and phosphorus),
- (2) for direct effects of nutrient enrichment: chlorophyll concentration in the water column; water transparency related to increase in suspended algae; abundance of opportunistic macroalgae; and species shift in floristic composition, such as diatom to flagellate ratio, benthic to pelagic shifts, as well as bloom events of nuisance/toxic algal blooms caused by human activities;
- (3) for indirect effects of nutrient enrichment: abundance of perennial seaweeds and seagrasses adversely impacted by decrease in water transparency; dissolved oxygen changes due to increased organic matter decomposition and size of the area concerned.



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Selection of criteria and indicators for eutrophication assessment by MSFD (3)

The assessment must consider relevant temporal scales and the relationship to nutrient loads from rivers in the catchment area.

The EC decision encourages the use of information and knowledge gathered and approaches developed in the framework of regional sea conventions.



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Thank you!



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