

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

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Requirements of EC Directives and Regional Conventions regarding eutrophication



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Structure of the presentation

- Eutrophication covered by EU policies
- Eutrophication covered by WFD
- Eutrophication covered by UWWTD
- Eutrophication covered by ND
- Eutrophication covered by MSFD
- Eutrophication covered by Regional Conventions



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Eutrophication in the EU policies (1)

Eutrophication is addressed in several EU policies such as:

- Urban Waste Water Treatment Directive
- Nitrates Directive, and
- Water Framework Directives.
- Marine Strategy
- several piece of EU water legislation (e.g. Bathing Water Directive 76/160/EEC, Fishwater Directive 78/659/EEC)

A number of international conventions address eutrophication in marine waters including Danube, Black Sea, OSPAR (North East Atlantic) and HELCOM (Baltic Sea).



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Eutrophication in the EU policies (2)

- Priority issue for water protection
- Need for an unified conceptual framework to understand eutrophication in all water categories
- The requirement for a conceptual understanding across EU directives (WFD, UWWTD, ND) and regional conventions addressing eutrophication
- Coordination required in several policy areas such as:
 - the harmonisation of assessment methodologies and criteria for agreed eutrophication elements/parameters/ indicators for rivers, lakes, transitional, coastal and marine waters
 - the use of water type-specific objectives for biological and general physico-chemical elements
 - the co-ordination of monitoring and reporting
 - the harmonisation of models for assessing or predicting anthropogenic or natural nutrient loading into inland and marine waters based on nutrient sources information or nutrient sources scenarios (e.g. EUROHARP models)
- the identification of sources of nutrients and possible restoration measures for water bodies.



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Eutrophication in the EU policies (3)

- Eutrophication is addressed in several EU policies.
- Nutrient levels to describe the water quality were introduced in several early pieces of EU water legislation (e.g. Freshwater Fish Directive 78/659/EEC).
- Main directives **defining eutrophication** and **providing measures to combat eutrophication**:

1) The UWWTD (91/271/EEC) addresses the major point sources, in particular the municipal waste water discharges and requests the identification of sensitive areas and compliance with treatment requirements.

2) The Nitrates Directive (91/676/EEC) deals with diffuse pollution of nitrogen from agriculture and requires the designation of nitrate vulnerable zones and application of action programmes

A number of international conventions addressed eutrophication in marine waters including OSPAR (for the North-East Atlantic), HELCOM (for the Baltic Sea), the Barcelona Convention (for the Mediterranean Sea) and the Bucharest Convention (for the Black Sea).



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WFD requirements - eutrophication

The term eutrophication is not explicitly defined in the Water Framework Directive.

The WFD requires MS to classify the ecological status of surface water bodies into one of five ecological status classes; high, good, moderate, poor or bad ecological status.

The ecological status of a water body is an expression of the quality of the structure and functioning of its aquatic ecosystem.

The assessment of eutrophication is strongly implied in the classification of surface water bodies.

The definition of good ecological status for the quality elements 'Phytoplankton' and 'Macrophytes and Phytobenthos' uses very similar wording as the definition of eutrophication used in the UWWT and Nitrates Directives and by OSPAR.

Nutrient enrichment is one of the many different anthropogenic pressures on water bodies that may affect their ecological status. As such, management measures may be required to control nutrient enrichment in order to achieve the WFD objectives.



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UWWD requirements - eutrophication

Article 2.(11) Definition: eutrophication means "the enrichment of water by nutrients especially compounds of N or P, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned".

This definition implicitly defines eutrophication by four criteria:

- enrichment of water by nutrients;
- accelerated growth of algae and higher forms of plant life;
- an undesirable disturbance to the balance of organisms present in the water
- deterioration of the quality of the water concerned.



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Methods for assessing eutrophication

The UWWT Directive does not specify any methods or guideline values for assessing eutrophication

MS developed their **own assessment systems and criteria**, which may consequently lead to different levels of protection of their water bodies.

MS have developed criteria based on the three elements in the definition:

- nutrient enrichment,
- algae or plant life growth and
- other undesirable effects (e.g. oxygen depletion).

When designating sensitive areas, nutrient reduction by further treatment is important.



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Nitrates Directive requirements - eutrophication

ND has an identical definition of eutrophication as the UWWTD. The effects must be caused by the enrichment of water by N compounds rather than by nutrients in general.

ND sections that refer to eutrophication and surface water monitoring are:

- Article 2(i), which defines eutrophication;
- Article 3, on the identification of polluted waters and designation of Nutrient Vulnerable Zones;
- Article 5(6) on the monitoring programmes for the purpose of assessing the effectiveness of action programmes;
- Article 6, on water monitoring for the purpose of the first designation and revision of nitrate vulnerable zones; and
- Annex 1, which specifies criteria for identifying polluted waters.



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MSFD requirements - eutrophication

GES is determined at the level of the marine region or subregion (specified in MSFD Article 4) on the basis of eleven qualitative 'descriptors' specified in MSFD Annex 1.

The descriptor 5 regards eutrophication, which is described as: "Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters."

Annex III (Table 2 'Pressures and Impacts') includes two pressures (i.e. nutrient and organic enrichment) that need to be considered in the determination of GES and that influence compliance with the eutrophication descriptor.



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GES descriptors

MSFD Annex I: eleven qualitative descriptors which describe what the environment will look like when GES has been achieved.

Descriptor 1. Biodiversity is maintained

Descriptor 2. Non-indigenous species do not adversely alter the ecosystem

Descriptor 3. The population of commercial fish species is healthy

Descriptor 4. Elements of food webs ensure long-term abundance and reproduction

Descriptor 5. **Eutrophication is minimised**

Descriptor 6. The sea floor integrity ensures functioning of the ecosystem



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Interlinkages WFD – MSFD

WFD: prevent further deterioration of status, protect and enhance the status of waters and geographical/spatial (overlap: coastal waters)

Measures taken under WFD will contribute to reaching GEnS, under the MSFD, for those pressures where main pressures are land-based activities (e.g. contamination by hazardous substances).

MSFD – WFD OVERLAPS

- The overlap exists particularly in relation to chemical quality, the effects of nutrient enrichment (eutrophication) and aspects of ecological quality and hydromorphological quality
- **WFD and MSFD** - prevent and reduce input of pollution



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Eutrophication in the international conventions

International conventions addressing eutrophication in marine waters:

- OSPAR (North-East Atlantic)
- HELCOM (Baltic Sea)
- Barcelona Convention (Mediterranean Sea)
- Bucharest Convention (Black Sea).



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OSPAR Convention for the Protection of the Marine Environment of the NE Atlantic

The OSPAR Eutrophication Strategy sets the objective to combat eutrophication in the OSPAR maritime area, in order to achieve and maintain a healthy marine environment where eutrophication does not occur.

The implementation of the Eutrophication Strategy takes place within the framework of obligations and commitments of the various Contracting Parties under international agreements.

This includes EC legislation to reduce nutrient discharges and emissions, including the ND, UWWTD, WFD and MSFD.



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OSPAR – eutrophication assessment

OSPAR has developed a harmonised assessment of eutrophication through the Common Procedure to identify the regions of the OSPAR Marine Area in which the recommendations mentioned above apply.

OSPAR defines "eutrophication" as the enrichment of water by nutrients causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned, and therefore refers to the undesirable effects resulting from anthropogenic enrichment by nutrients as described in the OSPAR Common Procedure.

Procedures for assessing eutrophication are stipulated in the WFD and have been developed by OSPAR and HELCOM.



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GES for WFD quality elements

Table 14. Comparison of the normative definitions of good Ecological Status for WFD quality elements (coastal waters) (Annex V 1.1) with OSPAR Ecological Quality Objectives and HELCOM Ecological Objectives.

Quality Element	WFD	OSPAR COMP	OSPAR EcoQO Objectives	HELCOM Ecological Objectives	HELCOM Eutrophication Assessment
Biological quality elements					
Composition, abundance and biomass of phytoplankton	<p>The composition and abundance of phytoplankton taxa show slight signs of disturbance.</p> <p>There are slight changes in biomass compared to type-specific conditions. Such changes do not indicate any accelerated growth of algae resulting in undesirable disturbance to the balance of organisms present in the water body or to the quality of the water.</p> <p>A slight increase in the frequency and intensity of the type-specific planktonic blooms may occur.</p>	<p>No elevated levels (and increased duration) of region-specific phytoplankton indicator species.</p> <p>Maximum and mean chlorophyll a concentrations in during the growing season should remain below elevated levels. (Elevated if concentration > 50 % above background concentrations).</p>	<p>Region/area-specific phytoplankton eutrophication indicator species should remain below respective nuisance and/or toxic elevated levels (and increased duration).</p> <p>Maximum and mean chlorophyll a concentrations during the growing season should remain below elevated levels, defined as concentrations >50 % above the spatial (offshore) and/or historical background concentrations.</p>	<p>Clear water, natural level of algal blooms</p>	<p>Mean summer area-specific chlorophyll a concentrations should remain below elevated levels, defined as mean concentrations less than maximum 50 % above reference concentrations</p>



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HELCOM and the eutrophication

The Baltic Marine Environment Protection Commission (**HELCOM**), also known as **Helsinki Commission**, is an intergovernmental organization governing the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention).

CP: DK, EE, EU, FI, DE, LV, PL, RU, SE.

The Helsinki Convention aims to protect the marine environment of the Baltic Sea from all sources of pollution, and to restore and safeguard its ecological balance.



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HELCOM Nutrient Reduction Scheme

The HELCOM Nutrient Reduction Scheme is a regional approach to sharing the burden of nutrient reductions to achieve the goal of a Baltic Sea unaffected by eutrophication, as agreed on by HELCOM in 2007.

The revision process started in 2008 and has been completed in 2013.

There are two main components of the nutrient reduction scheme:

- **Maximum Allowable Inputs (MAI)** of nutrients, indicating the maximal level of inputs of water - and airborne nitrogen and phosphorus to Baltic Sea sub-Basins that can be allowed to fulfill the targets for a non-eutrophied sea;
- **Country Allocated Reduction Targets (CART)**, indicating how much the HELCOM countries need to reduce nutrient inputs compared to a reference period (1997-2003).



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Setting new targets

1. New eutrophication targets describing good eutrophication status of the Baltic Sea
 2. Improved marine model (BALTSEM) of the Baltic Nest Institute (BNI) Sweden
 3. Calculation of revised Maximum Allowable Inputs (MAI) with BALTSEM, using new eutrophication targets for Baltic Sea sub-basins
 4. Agreement of allocation principles for calculating new Country Allocated Reduction Targets (CART)
- The CART take into account transboundary inputs in order to give the clearest indication of the national reduction demand.**
5. Updated dataset on water - and airborne nutrient inputs for 1994-2010
 6. Calculation of new Country Allocated Reduction Targets (CART)
 7. Scientific documentation of the process



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Thank you!



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