

MARINE STRATEGY FRAMEWORK DIRECTIVE MSFD Workshop

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ECRAN 60681

WFD vs MSFD

Eutrophication - still a significant issue for
coastal and marine waters



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Structure of the presentation

- Shortly about eutrophication
- Eutrophication at the EC
- Nutrients limitation requirements
- Issues to consider
- Black Sea MoU goals
- Anticipated effects of reducing N and P in the DRB District



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Shortly about eutrophication....

European policy has consistently identified eutrophication as a priority issue for water protection.

Eutrophication: a complex phenomenon because large natural variations in the nutrient supply to the aquatic environment.

Eutrophication is a phenomenon caused by the over-fertilisation of the sea by plant nutrients, usually compounds of nitrogen and phosphorus, due to human activity.

This enrichment most commonly results in the **excessive stimulation of phytoplankton growth** but may also trigger the **growth of larger plants (macrophytes)** on the sea floor in shallow areas. "Plant nutrients" mainly refers to inorganic compounds of nitrogen and phosphorus, but also dissolved silica.



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Eutrophication at the EC

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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Nutrients limitation requirements

Nutrient limitation occurs when the presence of one of these substances is insufficient for the continued growth of a particular community or species.

Marine systems are generally considered to be nitrogen limited whereas freshwater plankton systems are generally phosphorus limited.

The nutrient requirements of individual species varies however, and a disturbance in the ratio of nitrogen, phosphorus, silica and perhaps iron, will result in changes in the composition of a particular plankton community.

All four nutrients should be considered as limiting.



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Danube - Black Sea Region



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Issues to consider (1)

Typical **succession** of events during the eutrophication process, because:

- The phytoplankton is not evenly distributed in the sea, neither in space nor time.
- Planting plants influenced by tides and currents.
- A large set of observations is necessary in space and time.
- The examination of spatial and temporal variability of phytoplankton requires laborious work of microscopic identification and counting.
- Phytoplankton are microscopic free-floating aquatic plants.



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Issues to consider (2)

- There is evidence of some recovery in Black Sea ecosystems, due to:
 - the collapse of the economies of many of the Danube and former Soviet countries,
 - the measures taken to reduce nutrient discharge in the upper Danube countries, and
 - the implementation of a ban in polyphosphate detergents in some countries.
- Still, the ecological status of the 1960s is not yet reached.
- It is anticipated that nutrient discharges are – in line with the expected economic growth - likely to rise again, with consequent damage to the Black Sea, unless action is taken to implement nutrient discharge control measures.



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Restoring the Black Sea: MoU ICPDR and ICPBS, 2001

Framework for implementing common strategic goal:

The long-term goal in the wider Black Sea Basin is to take measures to reduce the loads of nutrients ... discharged to such levels necessary to permit Black Sea ecosystems to recover to conditions similar to those observed in the **1960s**.



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Common Strategic Goals

- Long-term goal: to permit Black Sea ecosystems to recover to conditions observed in 1960s
- Intermediate goal: to avoid nutrients load exceeding those in the mid of 1990s
- Harmonization of standards to assure comparable assessment
- Assessment and reporting on ecological status and input loads
- Adoption of strategies for pollution reduction while assuring economic development in the region
- Analysis of results achieved by 2007 and review of measures to achieve the long term goal



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The Black Sea eutrophication problem in perspective

Environment and Climate
Regional Accession Network **ECRAN**

Recent data has shown that the current nutrient loading to the Black Sea is much lower than in the period of the seventies and eighties but appears to remain higher than in the 1960s.

Data for N and P, observed by the Romanian Marine Research Institute on Black Sea shelf waters indicate that the phytoplankton growth in the Romanian shelf area seems to be limited by P; this 'observation area' is some 60 km east from Constanta.

For Orthophosphate-P, data are available since 1963, for the sum of inorganic N (ammonium-N, nitrite-N and nitrate-N) since 1980, i.e. the N to P ratio can be observed since 1980.



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Environment and Climate
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Required actions

The impacts of eutrophication are not limited to the coastal margins. The entire Black Sea ecosystem has been altered by the combination of eutrophication and the intruding of opportunistic alien species.

The actions required to attain the MoU goals should not be costly and may be achieved through a mechanism of basin-wide joint implementation including country commitments and external grants and loans.

Such actions fall within the following areas:

- Reform of agricultural policies.
- Improved waste water treatment
- Rehabilitation of essential aquatic ecosystems.
- Changes in consumer practices (including use of P -free detergents).
- Establishing of an appropriate legal frame.

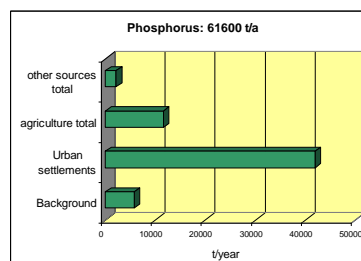
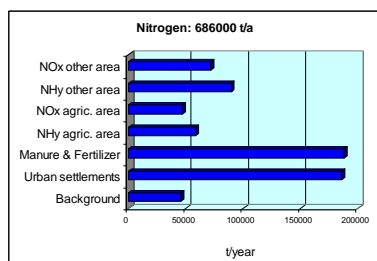


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Sources of N emissions in the DRBD



- 686 kt of N and 61,6 kt of P annually emitted into the DRB.
- Main contributors for both N and P emission - agglomerations not served by sewerage collection and wastewater treatment
- For N pollution - the input from agriculture (fertilisers, manure, NO_x and NH_y) is the most important (totalling 43% of total emissions)
- For P emissions - agriculture is the second largest source.



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Programme of Measures in the DRBD

- **Urban WWT (and certain industry)** - implementation of the UWWTD by EU MS and the reported measures of Non EU MS
- **Introduction of phosphate-free detergents**
- **Agriculture**
 - Implementation of EU ND - Action programs established in the EU MS (applied as *whole territory approach* or *Nitrate VZs*) - aims to limit the amount of nitrate permitted and applied and the resulting concentrations in surface waters and groundwaters
 - Implementation of Best Agricultural Practice (BAP) – for non-EU MS - a key action is ensuring adequate storage capacity for manure generated on farms and the application of advanced techniques for spreading manure.
 - **Other to control of diffuse pollution** - supported by the RDP 2007-2013 on **voluntary – incentive base**



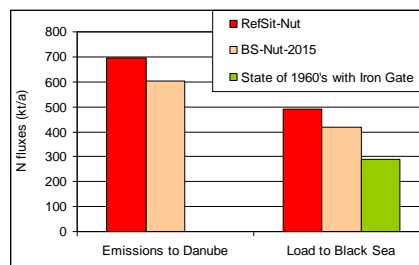
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Anticipated effects of the Measures

Nitrogen emissions and loads



- Nitrogen emissions to surface waters in 2015 will be approx. 12% lower in comparison with present state.
- The load to the Black Sea will reach a level that is below the present state but still far above (40%) that of the 1960's.
- This means that the situation in the DRBD and the Black Sea will improve but not ensure the achievement of the management objectives and the WFD environmental objectives by 2015.



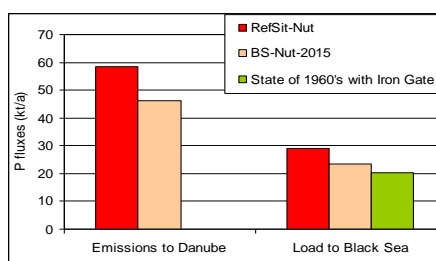
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Anticipated effects of the Measures

Phosphorus emissions and loads



- P emissions will be in 2015 about 25 % lower.
- Load to the Black Sea will reach a level, which is still 15 % above the level in the 1960's.
- The load to the Black Sea will reach a level that is below the present state but still far above (40%) that of the 1960's.
- This means that the situation in the DRBD and the Black Sea will improve but not ensure the achievement of the management objectives and the WFD environmental objectives by 2015.



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Thank you!!



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