River Water Quality

Section **1**: Water Framework Directive

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ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ
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The Water Framework Directive 2000/60/EC (WFD)

WFD Technical Elements

Section Contents

1. The WFD Purpose
2. Deadlines
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Section Goals

To understand the key objectives of the WFD, and the different ways of monitoring water bodies, the frequency of monitoring, and the key quality elements to assess the water quality.

Section Outcomes

Learn about how to assess the ecological quality, status or potential of water bodies, the frequency of monitoring, the typo characteristic conditions of references sites in order estimate the ecological quality ratio leading to the five scale quality class system.

The content of this lecture is based on the:

- **Water Framework Directive – 2000/60/EC** of the European Parliament and the Council of 23rd of October 2000 for establishing a framework for Community action in the field of water policy. Official Journal of the European Communities, L327/1, Luxembourg
- **Guidance 1: Working Group 2.6 - WATECO (2003)**. Economics and the Environment - The Implementation Challenge of the Water Framework Directive. Office for Official Publications of the European Communities, Luxembourg, pp. 274.
- **Guidance 2: Working Group on Water Bodies (2003).** Identification of Water Bodies. Office for Official Publications of the European Communities, Luxembourg, pp. 28.
- **Guidance 3: Working Group 2.1 - IMPRESS (2003).** Analysis of Pressures and Impacts. Office for Official Publications of the European Communities, Luxembourg, pp. 157.
- **Guidance 4: Working Group 2.2 - HMWB (2003).** Identification and Designation of Heavily Modified and Artificial Water Bodies. Office for Official Publications of the European Communities, Luxembourg, pp. 118.
- **Guidance 6: Working Group 2.5 - Intercalibration (2003).** Towards a Guidance on Establishment of the Intercalibration Network and the Process on the Intercalibration Exercise. Office for Official Publications of the European Communities, Luxembourg, pp. 54.

- **Guidance 7: Working Group 2.7 - Monitoring (2003)**. Monitoring under the Water Framework Directive. Office for Official Publications of the European Communities, Luxembourg, pp. 160.
- **Guidance 8: Working Group 2.9 - Public Participation (2003).** Public Participation in Relation to the Water Framework Directive. Office for Official Publications of the European Communities, Luxembourg, pp. 214.
- **Guidance 9: Working Group 3.1 - GIS (2003).** Implementing the Geographical Information System Elements (GIS) of the Water Framework Directive. Office for Official Publications of the European Communities, Luxembourg, pp. 166.
- **Guidance 10: Working Group 2.3 - REFCOND (2003).** Rivers and Lakes - Typology, Reference Conditions and Classification Systems. Office for Official Publications of the European Communities, Luxembourg, pp. 94.
- **Guidance 13: Working Group 2A (2003).** Overall approach to the classification of ecological status and ecological potential. Office for Official Publications of the European Communities, Luxembourg, pp. 53.
- **Guidance 13: Working Group 2.5 - Intercalibration (2005).** Guidance on the Intercalibration Process 2004-2006. Office for Official Publications of the European Communities, Luxembourg, pp. 31.

The WFD Purpose

- A legislative framework to protect & improve the quality of all water resources surface (rivers, lakes, groundwater, transitional & coastal water) and underground within the European Union (Article I)

Innovations :

- ✓ Clear deadlines with ambitious objectives
- ✓ Introduction of the River Basin as management level
- ✓ Cross border international cooperation
- ✓ "Combined approach" for pollution prevention & control
- ✓ Promotes sustainability in water uses
- ✓ Floods & Droughts mitigation
- ✓ Public participation in water management (stakeholders, NGOs etc)
- ✓ Economic analysis of water uses – pricing policies

Deadlines

- **2003** - Incorporation of WFD into the national laws
- 2004 - Development of classification & monitoring schemes (economic analysis in IMPRESS Analysis)
- 2006 - Operational monitoring programs
- 2007 - Start of monitoring
- 2008 - Public presentation of River Basin Management Plans (RBMP)
- 2009 - Monitoring completion & publishing of RBMP
- 2010 - Review Characterization & Monitoring Programs
- **2015** - "Good status" for all European waters & effective RBMP

Articles

1 & 2	Purpose & Definitions
4	Objectives: best possible ecological & chemical status
8	Monitoring of surface water & groundwater status
9	Cost recovery for water services
10	Point & diffuse pollution sources
11	Programme of measures
13	River Basin Management Plans
14	Public information & Consultation
16 & 17	Strategies against pollution
23 & 24	Penalties & Implementation

THE MAIN ANNEXES OF THE WFD

ANNEX I INFORMATION REQUIRED FOR THE LIST OF COMPETENT AUTHORITIES

ANNEX II SURFACE AND GROUNDWATERS (Typology.pressures, impacts)

ANNEX III ECONOMIC ANALYSIS

ANNEX IV PROTECTED AREAS

ANNEX V SURFACE WATER STATUS

- Detailed guidance on monitoring, classification, programme of measures assessment, causes of failing objectives, intercalibration and reporting
- Groundwater monitoring, transboundary flow, long-term trend evaluation, assessing reversal of trends

ANNEX VI MEASURES TO BE INCLUDED WITHIN THE PROGRAMMES OF MEASURES

ANNEX VII RIVER BASIN MANAGEMENT PLANS

ANNEX VIII INDICATIVE LIST OF THE MAIN POLLUTANTS

ANNEX IX EMISSION LIMIT VALUES AND ENVIRONMENTAL QUALITY STANDARDS

ANNEX X PRIORITY SUBSTANCES

Monitoring

- Monitoring according to WFD Art.8 and Annex V
  - ✓ Network designed to provide a coherent & comprehensive overview of ecological & chemical status within each river basin & water body category
  - ✓ Covers Hydro-Morphological elements, Physical-Chemical Parameters & Biological Quality Elements indicative of the status
- Characterization according to WFD Art.5 and Annex II
- Presentation of monitoring results in the first RBMP update (end of 2015 & every 6 yr. after that) chemical status & ecological status/potential

Quality Elements

	Rivers (flowing waters)	**Lakes**	**Transitional**	**Coastal**
Biological Quality Elements	-Macrophytes -Benthic Invertebrates -Fish Fauna	-Phytoplankton -Macrophytes -Benthic Invertebrates -Fish Fauna	-Phytoplankton -Macrophytes -Benthic Invertebrates -Fish Fauna	-Phytoplankton -Macrophytes -Benthic Invertebrates
Supportive Hydro-morphological Elements	-Hydrological status -River continuum & Connectivity -Morphological conditions	-Hydrological status -Morphological conditions	-Morphological conditions -Tidal conditions	-Morphological conditions -Tidal conditions
Chemical – Physical parameters	-General (salinity, Oxygen, pH, Conductivity, nutrients) - Priority substances & EQS Compliance	-General (salinity, Oxygen, pH, Conductivity, nutrients) - Priority substances & EQS Compliance	-General (salinity, Oxygen, pH, Conductivity, nutrients) - Priority substances & EQS Compliance	-General (salinity, Oxygen, pH, Conductivity, nutrients) - Priority substances & EQS Compliance

Frequency & Sampling of Monitoring

Monitoring types

- **3 types**: surveillance, operational & investigative
- Intensity of monitoring is **risk and pressure proportional**
- Monitoring Types, Frequency & Timing are Case-Specific

Types of Monitoring (Surveillance)

Surveillance Monitoring

Why: - Validate the impact assessment procedure

- Serve as basis for future monitoring programmes,
- Assess long-term changes in natural conditions & others resulting from anthropogenic activity

Where: - At points of significant water flow (> 2500 km² catchment)

- At rivers crossing a Member State boundary,
- At sampling sites identified under the 77/795/EEC

Types of Monitoring (Surveillance)

Surveillance Monitoring

Frequency:

- **Biological parameters** from 6 months to 3 years,
- **Hydro-morphological** every 6 years (hydrology continuously),
- **Physical-Chemical** every 3 months (priority substances every month)

➢ Rivers providing drinking water monitored 4-12 times/year

✓ **BUT** countries can adjust frequency & timing according to specific conditions & needs

Frequency of Monitoring

Quality Element	Rivers	Lakes	Transitional	Coastal
Biological				
Phyto-Plankton	6 months	6 months	6 months	6 months
Other aquatic flora	3 years	3 years	3 year	3 year
Macro invertebrates	3 years	3 years	3 years	3 years
Fish	3 years	3 years	3 years	
Hydromorphological				
Continuity	6 years			
Hydrology	continuous	1 month		
Morphology	6 years	6 years	6 years	6 years
Physico-Chemical				
Thermal Conditions	3 months	3 months	3 months	3 months
Oxygenation	3 months	3 months	3 months	3 months
Salinity	3 months	3 months	3 months	
Nutrient Status	3 months	3 months	3 months	3 months
Acidification Status	3 months	3 months		
Other Pollutants	3 months	3 months	3 months	3 months
Priority Substances	1 month	1 month	1 month	1 month

Quality elements control frequency in surveillance monitoring type according to the WFD

Types of Monitoring (Operational)

Operational Monitoring

Why: - Establish and monitor the status of rivers being at risk to fail the environmental objectives

- Monitor rivers that receive priority list substances

Where: - At sufficient points according to the sources of pollution/disturbance (hot spots)

How often: - Frequency chosen by MS on a case-by-case basis. General set of rules for frequency should be used as a guideline

Types of Monitoring (Investigative)

Investigative Monitoring

Why: - where reasons for any exceedances are unknown

- ascertain causes of failure of environmental objectives
- ascertain magnitude & impact of accidental pollution

Where and how often: Case-specific

Sampling points & frequencies shall be set according to the problem identified

Sampling & Standards of Monitoring

For Standards of methods for sampling, sample handling, identification etc →

Adoption of methods with ISO & EN International standards **OR** equivalent national or international methods

- ✓ such already exist for macroinvertebrate sampling, physicochemical and hydromorphological parameters
- ✓ for the other quality elements, such standards will be developed under the supervision of the WFD Committee
- ✓ Intercalibratrion of methods & results is fundamental for the comparability of the results