



EAQC-WISE recommendations in the light of the implementation of the QA/QC Commission Directive – Needs and perspectives in the context of the CIS Chemical Monitoring Activity (CMA)

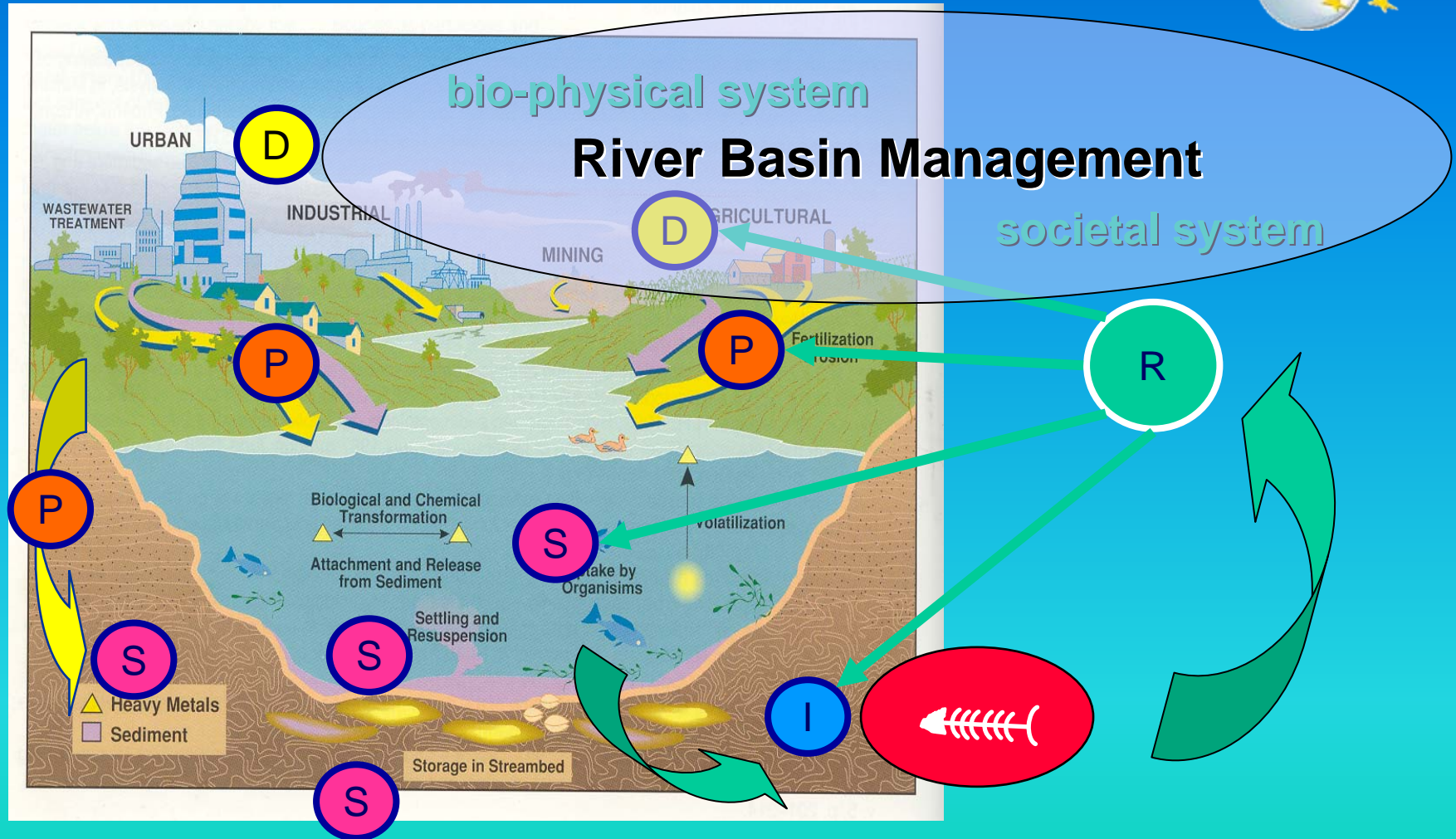
Philippe QUEVAUVILLER

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European Commission - DG Environment
Unit D.2: Water and Marine

Chemical measurements are one of the pillars of river basin management planning: need for system understanding



Base sketch from Meade (1996) and DPSIR from EEA

Chemical monitoring: one of the key elements of the Water Framework Directive 2000/60/EC



- protecting all waters, surface and groundwaters;
- covering all impacts on waters (risk analysis and design of appropriate programmes of measures);
- good quality ('good status') to be achieved, as a rule, by 2015;
- water quality comprehensively defined in terms of biology, chemistry and morphology;
- water management based on river basins;
- **monitoring** programmes for surface and groundwaters, both as a **planning tool and as an assessment instrument**;
- economic instruments: getting the prices right - to promote prudent use of water;
- mandatory public participation;
- ... and complemented/guided by an unprecedented cooperation on implementation.

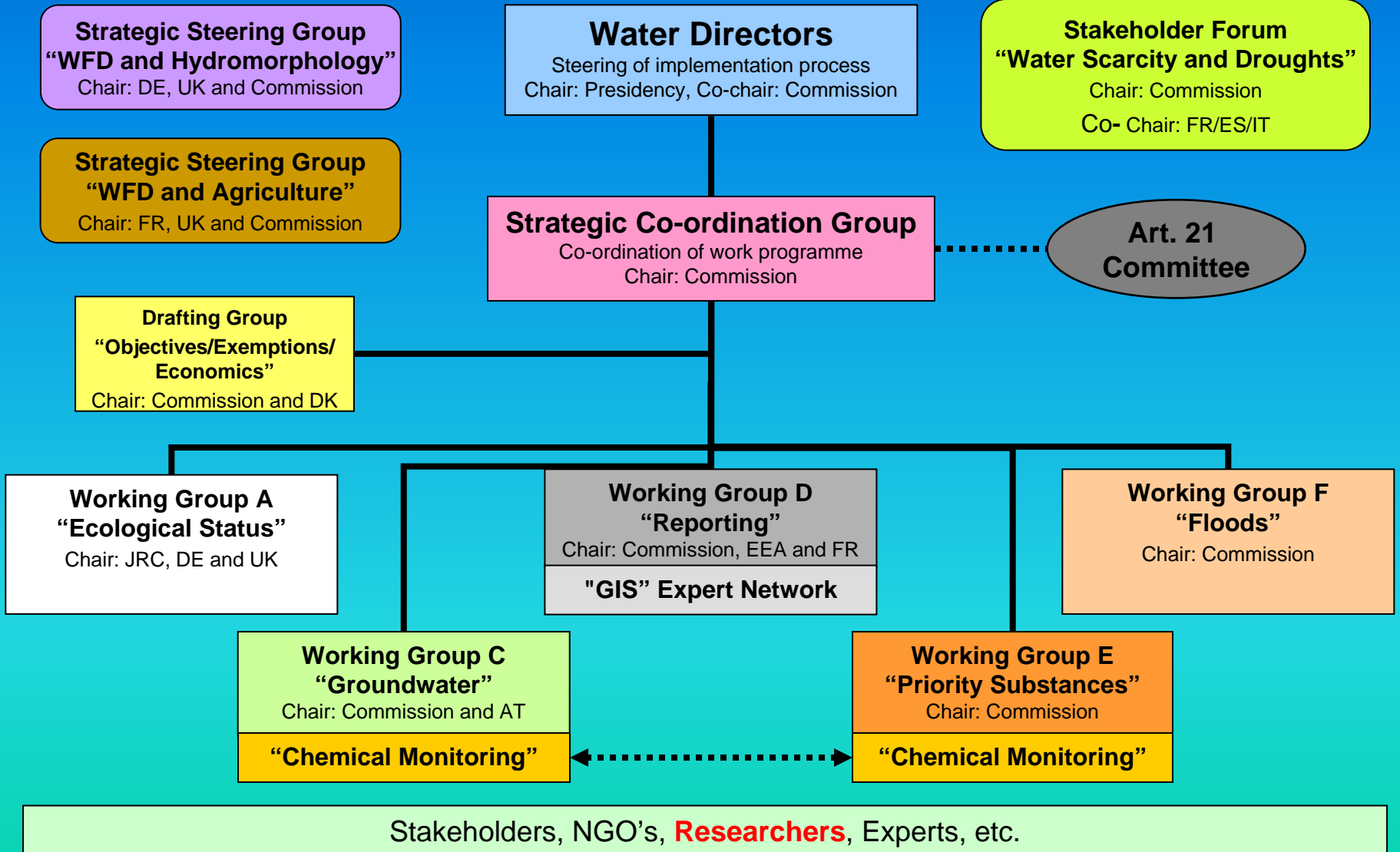
Quality control / quality assurance



- WFD river basin management planning will be essentially supported by measurements with the consequence of possible poor quality data yielding to wrong decisions with severe economic or societal consequences.
- Costs of repeating analyses (linked to errors or possible conflicts) are generally estimated at 10% of the overall analytical costs. On this basis, all the efforts to reduce the incidence of repeat analyses are crucial.

=HIGHLIGHTING NEED TO CONVINCE DATA USERS AND ESTABLISH A LEGALLY-BINDING FRAMEWORK

'Institutional hook' - Common Implementation Strategy 2007-2009



CHEMICAL MONITORING ACTIVITY (Common Implementation Strategy)



Chemical monitoring needs

surface waters
(inland, transitional,
coastal, territorial
and other marine)

Ground
waters

Chemical monitoring guidance document,
guidelines, technical specifications
(**not legally binding**)

Common issues :

- Analytical quality assurance and control = **'QA/QC Directive'**
 - Data quality requirements
 - Analytical methods (incl. Standardisation)

GROUND WATER :

- Sampling strategies
- Monitoring representativeness
 - Background concentrations
- Trend identification and reversal
- Direct and indirect discharges

SURFACE WATERS:

- Location / frequency monitoring
- Matrices (water, sediment, biota)
 - Sampling strategies
- Background concentrations
 - Area of impact
- Data to be reported

**Draft
COMMISSION DIRECTIVE
of [Day Month 2008]**



**laying down, pursuant to Directive 2000/60/EC of the
European Parliament and of the Council, technical
specifications for chemical analysis and monitoring of
water status**

- Developed since midst of 2006: formed the basis for DG ENV request for scientific support to policy in FP6 and to EAQC-WISE
- Continuous exchanges with MS representatives and scientific experts in the CMA group, including active participation of EAQC-WISE consortium
- Adopted at the unanimity (after several rounds of discussion!) by the WFD Committee on 15 May 2008
- Transmitted to EP for 3-months scrutiny
- Adoption expected by end of 2008

Outlook



- **Subject matter:** Technical specifications for chemical analysis and monitoring of water status (this includes sediment and biota analyses)
- **Definitions:** Taken from ISO standards, they concern LoD, LoQ and measurement uncertainty
- **Requirement** that all methods (incl. laboratory and field) used for chemical monitoring are validated according to ISO 17025 principles
- **Minimum performance criteria** set in accordance to relevant EQS or use of BATNEEC
- **Rules** concerning 'less than LoQ' values and total sums of a given group of physico-chemical parameters or chemical measurands
- **Quality assurance / control rules** imposing participation in PT schemes and analysis of RMs, with common interpretation rules

Legally-binding rules with expected harmonisation effects but what about implementing them at EU scale?

The reality of environmental chemical analyses



- ✓ Many different matrices (even for water, e.g. suspended-rich freshwater, salt water, rainwater etc.), which strongly influence the analytical process
 - ✓ Variety of analytical problems in relation to a multitude of substances and sample types
 - ✓ Needs for preliminary steps prior to laboratory analyses (sampling, storage etc.) and related drawbacks (e.g. sample stability, homogeneity)
 - ✓ Need for specific tools for measurement' quality control (e.g. "matrix" reference materials)
 - ✓ In general, methods composed of successive analytical steps, each requiring validation ("stepwise" validation)
- Difficulties to establish result's traceability and calculate total uncertainty: on-going discussions since more than 15 years

Achieving traceability for WFD monitoring (1): feasible or unrealistic?



Traceability= (1) references, (2) unbroken chain of comparisons, (3) uncertainty

- ✓ **SI units**: no “mole standard”, so traceability to mass unit (amount of substance/mass of sample). In practice, results given in amount of substance/volume (e.g. $\mu\text{g/L}$)
- ✓ **Standard methods**: written standards (ISO, CEN) prescribing minimum quality criteria and technical specifications. Voluntary or linked to regulatory framework. Better comparability (not necessarily trueness) – Should be mandatory for operationally-defined parameters but support also provided for methods for which better performance criteria are required (ex. current mandate to CEN)

Achieving traceability for WFD monitoring (2): feasible or unrealistic?



- ✓ **Reference methods:** methods with “high metrological qualities” (exempt from systematic errors and only affected by few random errors), e.g. primary methods. However, hardly available for complex multi-steps analytical processes (e.g. extraction, derivatisation). No prescriptions in the WFD
- ✓ **Reference materials:** for validation and control charting, “matrix-matched” RMs but necessary compromises (considering matrix varieties), still scarce availability, production difficulties (stability/homogeneity). Now clearly referred in the “QA/QC” Draft Directive
- ✓ **Proficiency testing:** interlaboratory testing may be considered as “external references” for method performance evaluation (several methods or single method), based on RM distribution or “reference site”. Also referred to in the “QA/QC” Draft Directive

EAQC-WISE – Providing elements of a strategy to be proposed to Member States



blueprint for the future

story by Ianie Johnson

Dirt was broken, and ribbons were cut. Parts of campus changed each semester as the "Southern at 150" plan progressed. The plan called for SUDC to become one of the top 75 research institutions in the nation by the year 2019, the University's 150th anniversary. Some of the plan's proposals were completed early on, while others were just beginning. Beautification projects turned some unattractive areas on campus into mere meadows. Just last year, the barracks between Fanner Hall and Morris Library were torn down, leaving a muddy construction site. Students returned in the fall semester to find the former eyesores gone and a grassy, open view in its place.

UPDATED SCHOOL OF MUSIC
Algeld Hall's renovation was completed before the start of the

fall semester. The oldest building on campus, it was constructed in 1896. The long-awaited renovation project made the building more suitable for the School of Music.

The Algeld Hall project included a fully renovated interior, the purchase of state-of-the-art equipment and the construction of a 20,000-square-foot addition. The renovation featured a new recording studio and an enclosed passage connecting Algeld Hall to Shrock Auditorium.

As the fall semester began, the building housed classes and rehearsals for music students and faculty who had been scattered throughout campus and were glad to have their own space again.

Robert Wray, director of the School of Music, said the University had "...moved from the bottom of the list of music facilities

Three firms involved in library renovation project:

- Phillips Swager Associates acted as a coordinating firm.
- Woollen Molzan and Partners offered its expertise in library building and design.
- Henneman, Raufeisen and Associates specializing in structural and engineering issues.

A description of a system, how to tackle QA/QC issues in a structured, systematic and sustainable way, making maximum use of already existing structures and initiatives

What comes next? NEED FOR RECOGNITION BY MEMBER STATES & STAKEHOLDERS



Chemical Monitoring Activity (CMA)
- Legal framework -

Monitoring strategies and related QA/QC
- Scientific/Analytical framework -

Role of the Commission (ENV, RTD, JRC)?
Role of the Member States?

Role of the analytical/metrology community?

QA/QC

Proficiency testing
(interlab. + field trials)
RMs, training

Link with EAQC-WISE
+ EA (accreditation)

Standardisation

Pre- & co-normative
research
In-situ validation

Link with CEN/TC 230
via DG ENTR

Emerging pollutants

Analytical developments
Ecotoxicity testing
Pollutant pathways

Link with NORMAN
(links with ECHA?)¹³

Bottlenecks (1)



- **Analytical data** are key elements of the WFD implementation; **however, awareness about data quality is not equally shared among (policy) decision-makers, scientists and routine laboratories.**
- **Traceability principles** are well accepted by the “metrological community” but not yet in water management decision-maker’s minds. An important step will be the “QA/QC” Directive adoption, then **need for operational mechanism enabling efficient QA/QC to take place (120 river basin districts in 27 EU countries and several associated ones!)**
- **Implementation** will require **multidisciplinary synergies, including with the scientific community, keeping “feet on the ground”**: metrological theory can hardly match the practice at the present stage of knowledge and recognition – **Expected input from EAQC-WISE blueprint – WHICH WILL HOWEVER HAVE TO BE ADOPTED BY MEMBER STATES**

Bottlenecks (2)



- **Implementation of monitoring programmes** under the WFD is left to Member States responsibility: **fully under subsidiarity principle** – the only legal instrument concerning data comparability will be the QA/QC Directive
- **Development of methods** not to be seen as a top-down approach (many situations will require specific methods) but standardisation will remain an useful way to achieve comparability – however: **the COM Directive cannot impose a compliance to given standards**
- **Need for efficient relays** at national and regional levels, including a strengthening of the applicability of EU rules at the most appropriate scale – Are the Member States ready for this?

Possible timeframe



- **On the short term (2008-2009)** the adoption of the 'QA/QC Directive' (expected before the end of 2008) will raise awareness not only of routine laboratories but also of data users (in particular environment ministries/agencies) – **this awareness is not sufficient and needs to be relayed by strategic planning (EAQC-WISE blueprint?)**
- **On the medium term (2009-2012)** concrete 'multi-stakeholders' plans should be developed in support of **RBMP**, leading to EU-wide harmonisation – needs to join forces and funding capacities
- **On the long term (2012 and beyond)** EU coordination on **environmental (chemical) metrology** will be a key aspect of **integrated environmental management** (linked to the three pillars of CMA). Support could be envisaged in the light of the developing European Metrology Research Programme

Open questions (1)



- **Voluntary self-organisation vs. legal requirements, where do we stand?** In other words, what will be the effects of the QA/QC COM Directive and will there be a self-regulating mechanism in the Member States?
- **What could be the link with the CIS?** In particular, what could be the role of the CMA, support to implementation and exchanges or more?
- **How to best integrate existing structures in the Member States?** or how will it be possible to establish a coordination of existing mechanisms and establish synergies? This is not a matter of legal requirement but rather of open cooperation – are we ready for this?

Open questions (2)



- **How to involve other actors, such as accreditation and standardisation bodies and RTD funding providers?** Is it desirable to impose strict rules or should it be left to voluntary undertakings?
- **What about funding?** Will cooperation and prioritisation help?
- **Will the proposed EAQC-WISE system work on the long term?**

**IN OTHER WORDS:
Who will cook the hot potato and
which recipe(s) should be best used?**



Patate chaude

Heiße kartoffel

Batata quente

Batata caliente

Hete aardappel

Patata calda

