The new Guidance for the Sediment and Biota Monitoring under the Common Implementation Strategy of the Water Framework Directive

Stefano POLESELLO (IRSA-CNR, Italy)
Mario CARERE (ISS, Italy)
Valeria DULIO (INERIS, France)
Georg HANKE (JRC, EC)
Madalina DAVID (European Commission, DG Environment)
Caterina SOLLAZZO (MATT, Italy)

EU legal background on Sediment monitoring: Directive 2008/105/EC on environmental quality standards in the field of water policy

- Possibility for Member States (MS) to define **sediment EQS** for specified substances.
- Such EQS should be established through a transparent procedure, involving notifications to the Commission and other MS, so as to ensure a level of protection equivalent to the EQS for water established at Community level .
- MS shall arrange for the **long-term trend** analysis of concentrations of those priority substances listed in Part A of Annex that tend to accumulate in sediment and/or biota.
- Monitoring shall take place at least once every year, unless technical knowledge and expert judgment justify another interval.

Why another guidance on Sediment&Biota monitoring?

- Requested by Member States
- Gaps in the link WFD inland - marine monitoring
- Further guidance needed with final adoption of EQS Directive

- Mandate for Sediment Biota Monitoring drafting group issued by CMA plenary

DRAFTING GROUP MEMBERS

Organisation and Institutes: BAFG, MARLAB, ISPRA, MUMM, RWS, UNEPMAP, MERMAYDE, Finnish EPA, Swedish EPA, Swedish Natural History Museum, Uni-Trier, CEMAGREF, ISSEP, ITM, ISS, CNR-IRSA, JRC, INERIS, NIWA, OSPAR, SEDNET, Eurometaux, MedPol

Members: Sara Danielsson; Ian Davies; Kees Kramer; Chiara Maggi; Elisabeth Nyberg; Michael Angelidis; Antonella Ausili; Anders Bignert; Petros Gikas; Per Jonsson; Roland Klein; Jaakko Mannio; Yves Marneffe; Gerrit Niebeek; Markus Quack; Francesco Regoli; Mathias Ricking; Patrick Roose; Birgit Schubert; Ashley Tilghman; Branislav Vrana, Ian Allan, Raphael Demouliere, Maria Belli, Joan Staeb, Lidia Regoli, Robert Loos, Bern Gawlik

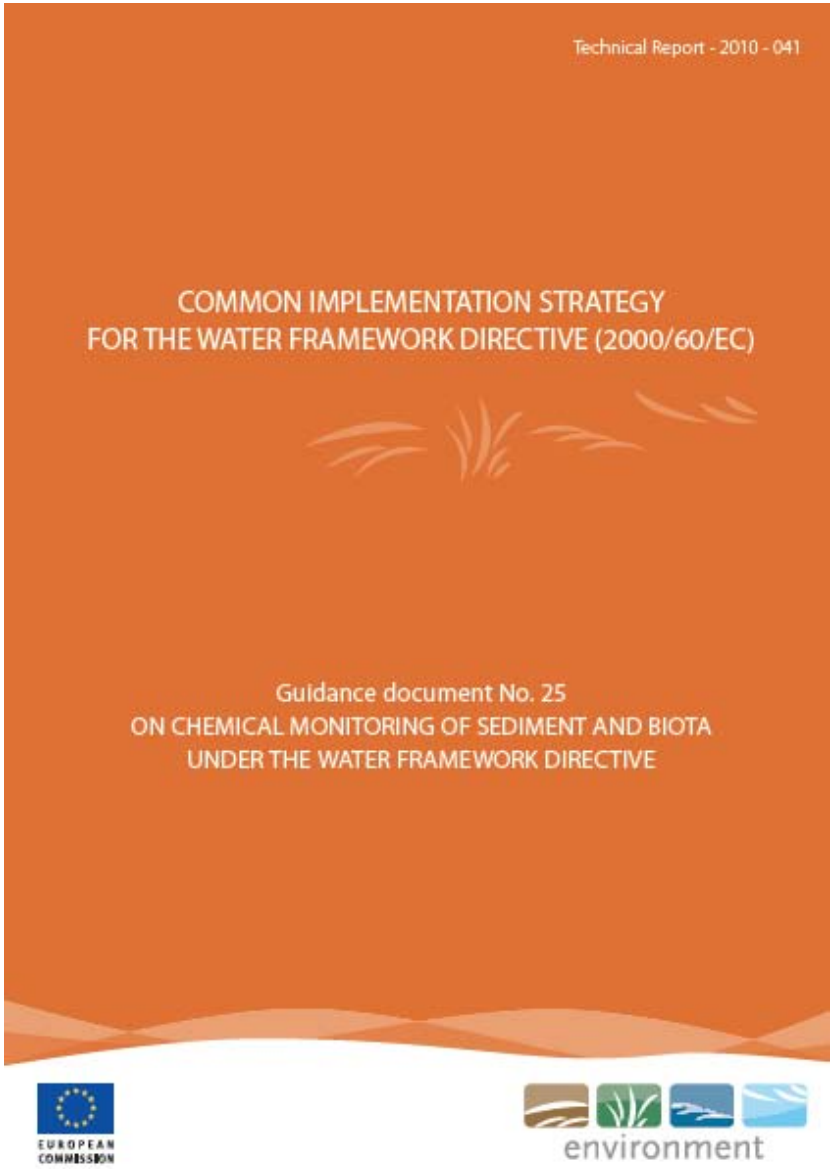
Comments from: Catherine Muntschy, Peter Lepom, Norman Green, Susanne Heise, Marine Coquery, John Batty

Chair:
Mario Carere
Valeria Dulio
Georg Hanke
Stefano Polesello

Timetable

- Early 2008: CIS Mandate CIS to Chemical Monitoring and Analysis (CMA) expert group
- May 2008: First meeting of the Drafting Group
- February 2010: Final adoption by CMA
- March 2010: consultation with WG-E and SCG
- May 2010: endorsement of the guidance by the Water Directors

CIS Guidance Document No. 25 *Guidance on chemical monitoring of sediment and biota under the Water Framework Directive*



Downloadable from

http://circa.europa.eu/Members/irc/env/wfd/library?l=/framework_directive/guidance_documents/guidance_monitoring/_EN_1.0_&a=d

General Considerations

⇒ The Guidance is not intended to be an exhaustive manual on sediment and biota monitoring. The main objective of this guidance should rather be to provide ***practical recommendations for the application of WFD and Daughter Directive's requirements in the EU countries***

⇒ Fields of application are ***surface, transitional and coastal waters*** according to WFD

⇒ Monitoring programmes for sediment and biota are already on-going. In some countries / regions they have been put in place several years ago, especially those that are carried out under international conventions in transboundary rivers and coastal areas. ***Continuity with these monitoring programmes should be maintained*** (which entails continuity with the procedures and strategies in place).

⇒ The Guidance is the ***result of compromises among Member States*** and on some issues compromise has been, and will be, difficult to achieve, if not impossible. There was a general concern among MS that the *Guidance shall not be too prescriptive*. On the other hand, MS frequently complained that the Guidance does not give easy-to-follow practical procedures or criteria for the operators, i.e. the current *Guidance is too generic or theoretical*.

Integration of > 300 comments from MS and stakeholders

Comments from	No.	Sed/biota guidance reference Ch.	Section	Page	Para.	Topic	Comment	Proposal for modification	Rationale / supporting data	Action /answer
DENMARK	3	1	1.3	5			TBT should be included together with hexachlorobenzene, hexachlorobutadiene and mercury			
EUROMETAUX	1	1				EQS GUIDANCE	In general, we would like to make the comment of aligning the monitoring guidance document to the EQS guidance document elaborated by			
UK	1	1				GUIDANCE AIM. compliance or ONLY trend analysis?	Was it seen as a diagnostic tool to illustrate trends and assess the efficacy of measures undertaken or as a compliance regime?	This reinforces our view that sediment and biota data may perhaps be better suited to long term trend assessment than as a specific compliance assessment measure. UK experts believe that sections (4&/or7) of the guidance document should be expanded to set out the data requirements, the potential risks, and	It may be opportune to expand on our second CMA intervention above-In particular to inform Sections 1.3 and 4 of the guidance document. The group must decide upon the primary reasons for undertaking sediment and biota monitoring. This is most important as the monitoring approach selected for the purposes of trend analysis may be very different to that adopted to demonstrate compliance against an EQS value. It is clear from available	variability of data for organic trace analysis is an actual issue both for sediment and water analysis, both for compliance checking and trend monitoring. We do not understand while the variability issue should weight different for the different purpose. The quesion is which should be the minimum variability neded to detct a temporal trend? It depends on therate ot the temporal variation. It is not possible to fix a minimum requirement
AUSTRIA	1	1				GUIDANCE AIM. compliance or ONLY trend analysis?	There is a need for a clear definition of the purpose of the guidance - is it only guidance for trend monitoring? In this case the general description are a valuable informations for the member states,			
GERMANY	3	1				GUIDANCE AIM. compliance or ONLY trend analysis?	The guidance document should address different requirements for compliance checking und temporal trend monitoring for biota and for sediments, e.g. as regards sampling frequency, selection of species etc. The draft includes several descriptive paragraphs. However, there is a lack of conclusions. Generally, monitoring for the purpose compliance checking requires more harmonisation and more clear recommendations than			

Structure of the Guidance

- 1. **Scope of the guidance**
- 2. Terms and definitions
- 3. **Compound and matrix selection for sediment and biota monitoring**
- 4. **Sampling strategy: general requirements and statistical principles**
- 5. **Monitoring of chemical substances in sediment**
  - 5.1. Sampling strategy for chemical monitoring in sediment
  - 5.2. Technical aspects of sediment sampling
  - 5.3. Analytical methods
  - 5.4. Normalisation co-factors
- 6. **Monitoring of chemical substances in aquatic biota**
  - 6.1. Introduction
  - 6.2. Sampling strategy for chemical monitoring in biota
  - 6.3. Technical aspects of biota sampling
  - 6.4. Choice of tissue for analyses and tissue preparation
  - 6.5. Analytical methods
  - 6.6. Preparation of data for analysis
  - 6.7. Environmental Specimen Banking (ESB)
- 7. **Complementary methods**
  - 7.1. Passive sampling techniques
  - 7.2. Sediment ecotoxicity test
- 8. **Case studies**

Chapter 3: Compound and matrix selection for sediment and biota monitoring

- **Sediment is a recommended matrix for the assessment of chemical status for some metals and hydrophobic compounds in marine and lentic water bodies.** In dynamic lotic water bodies, however, sediments do not often provide an appropriate matrix for compliance checking because of high variability.
- In these cases this assessment could be made by measurement of the concentrations in **suspended solid matter (SPM)**. In large lowland rivers, freshly deposited sediment collected by **sedimentation traps** can be used instead of SPM. In the latter case the equivalence between SPM and freshly deposited sediment must be verified.
- **For the purpose of trend monitoring, sediment, or alternatively SPM, and biota are the most suitable matrices for** many substances because they integrate, in time and space, the pollution in a specific water body

Chapter 3

Matrix selection

P = preferred matrix, O = optional matrix., N = not recommended, n.a. = not applicable

Priority Substance	BCF	Log K_{ow}	Water	Sediment/SPM	Biota
Alachlor	50	3.0	P	O	N_
Anthracene	162-1440	4.5	O	O	O
Atrazine	7,7-12	2.5	P	N	N
Benzene	13	2.1	P	N	N
Brominated diphenyl ethers [a]	14350-1363000	6.6	N	P	P
Cadmium and its compounds		n.a.	n.a.	n.a.	n.a.
C10-13-chloroalkanes	1173-40900	4.4-8.7	N	P	P
Chlorfenvinphos	27-460	3.8	O	O	O
Chlorpyrifos (-ethyl, -methyl)	1374	4.9	O	O	O
1,2-Dichloroethane	2-<10	1.5	P	N	N
Dichloromethane	6,4-40	1.3	P	N	N
Di(2-ethylhexyl)phthalate (DEHP)	737-2700	7.5	N	O	O
Diuron	2	2.7	P	N	N
Endosulfan	10-11583	3.8	O	O	O
Fluoranthene	1700-10000	5.2	N	P	P
Hexachlorobenzene	2040-230000	5.7	N	P	P
Hexachlorobutadiene	1,4-29000	4.9	O	O	P
Hexachlorocyclohexane [b]	220-1300	3.7-4.1	O	O	P
Isoproturon	2,6-3,6	2.5	P	N	N
Lead and its compounds		n.a.	n.a.	n.a.	n.a.
Mercury and compounds [c]		n.a.	N	O	P
Naphthalene	2,3-1158	3.3	O	O	O
Nickel		n.a.	n.a.	n.a.	n.a.
Nonylphenols [d]	1280-3000	5.5	P	P	O
Octylphenol [d]	471-6000	5.3	P	P	O
Pentachlorobenzene	1100-260000	5.2	N	P	O
Pentachlorophenol	34-3820	5.0	O	O	O
Polyaromatic Hydrocarbons [e]	9-22000	5.8-6.7	N	P	P
Simazine	1	2.2	P	N	N
Tributyltin compounds	500-52000	3.1-4.1	O	O	P
Trichlorobenzenes	120-3200	4.0-4.5	O	O	O
Trichloromethane	1,4-13	2.0	P	N	N
Trifluralin	2360-5674	5.3	N	P	O
DDT (including DDE, DDD)		6.0-6.9	N	P	P
Aldrin		6.0	N	P	P
Endrin		5.6	N	P	P
Isodrin		6.7	N	P	P
Dieldrin		6.2	N	P	P
Tetrachloroethylene		3.4	O	O	N
Tetrachloromethane		2.8	P	N	N
Trichloroethylene		2.4	P	N	N

Chapter 4: Monitoring strategy: general requirements /common aspects to sediment and biota monitoring

- Aim: Statistical criteria for developing sampling and monitoring strategy common to sediment and biota monitoring

  - Statistical principles of sampling
  - Spatial Representativity
  - Methods for trend analysis of time series
  - QA/QC issues

Chapter 5: Monitoring of chemical substances in sediment

- Aim: Definition of procedures and parameters for sediment sampling, analysis and data normalisation
- Key procedural issues:

- Frequency:
  - Sediment: Annual sampling for first WFD cycle (6 years) and then reduce frequency if appropriate
  - Sampling of suspended solids for trend analysis should be carried out at least 4 times a year

- Sampling depth:
  - Sampling depth should depend on deposition rate
  - But it depends also on the actual habitat for living organisms
  - So sampling depth = 1-5 cm
  - Possibility to increase to > 5 in particular cases (e.g. large perturbed rivers)

Chapter 5: Monitoring of chemical substances in sediment

- Fraction to be analysed:
  - Some Member States proposed using the fraction < 2 mm for both organic and inorganic
  - But the procedures adopted in the on going monitoring activity should be taken into account (e.g.< 63 µm for OSPAR).
  - Consequently the recommended procedure for the correction for grain size effects in sediments is the collection of the <63 µm sediment fraction.
  - An alternative procedure is to analyse <2 mm fraction and then normalise to a sample consisting of 100% of the <63 µm fraction. In this case it is mandatory to measure the actual granulometry of the analysed sediment sample.

- Normalisation co-factors:
  - Normalising co-factors (e.g. Al, Li, POC) are introduced as means to interpret spatial distribution
  - It is mandatory to report raw data together with co-factors, not corrected data

Database content (INERIS)

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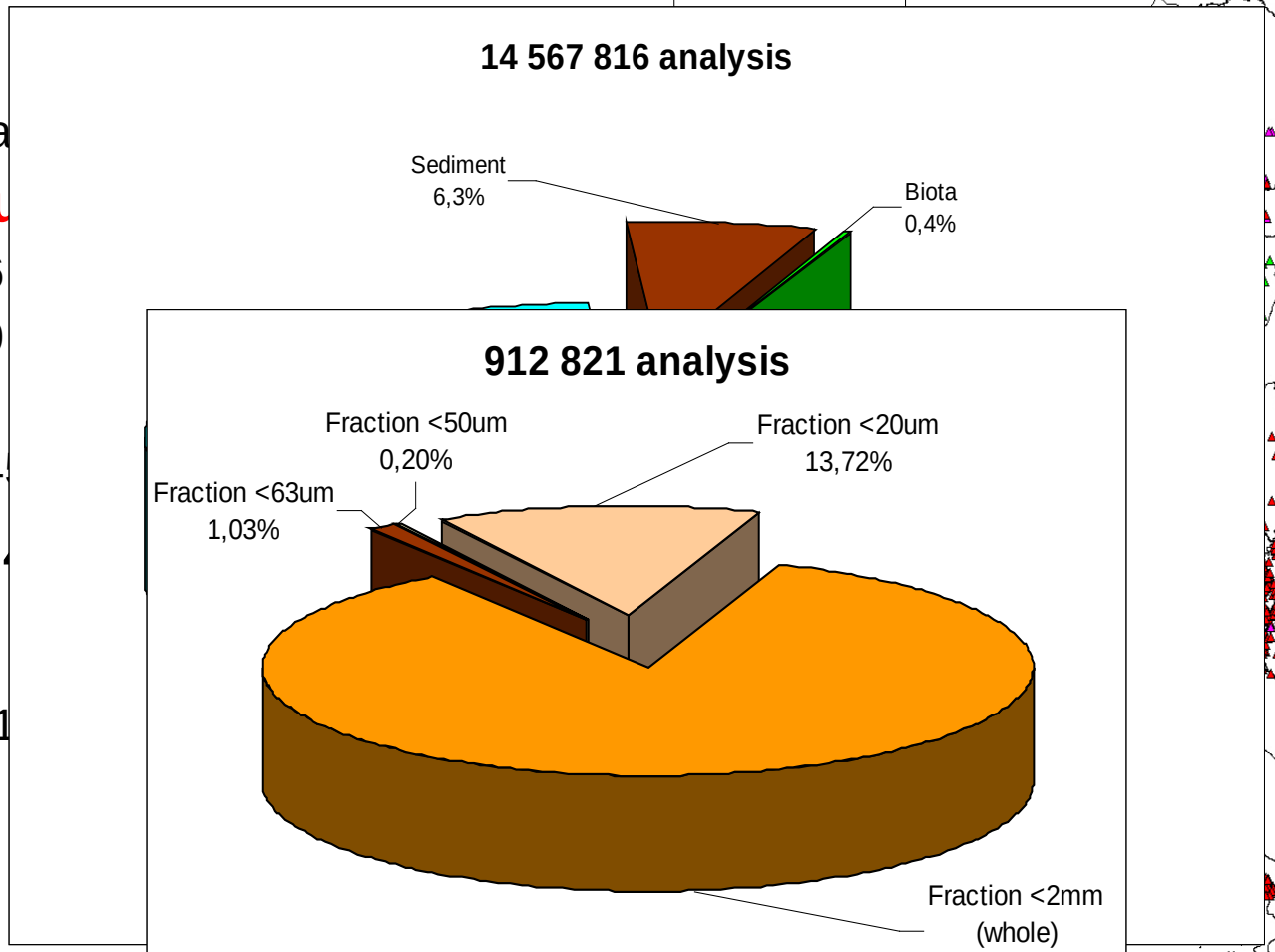

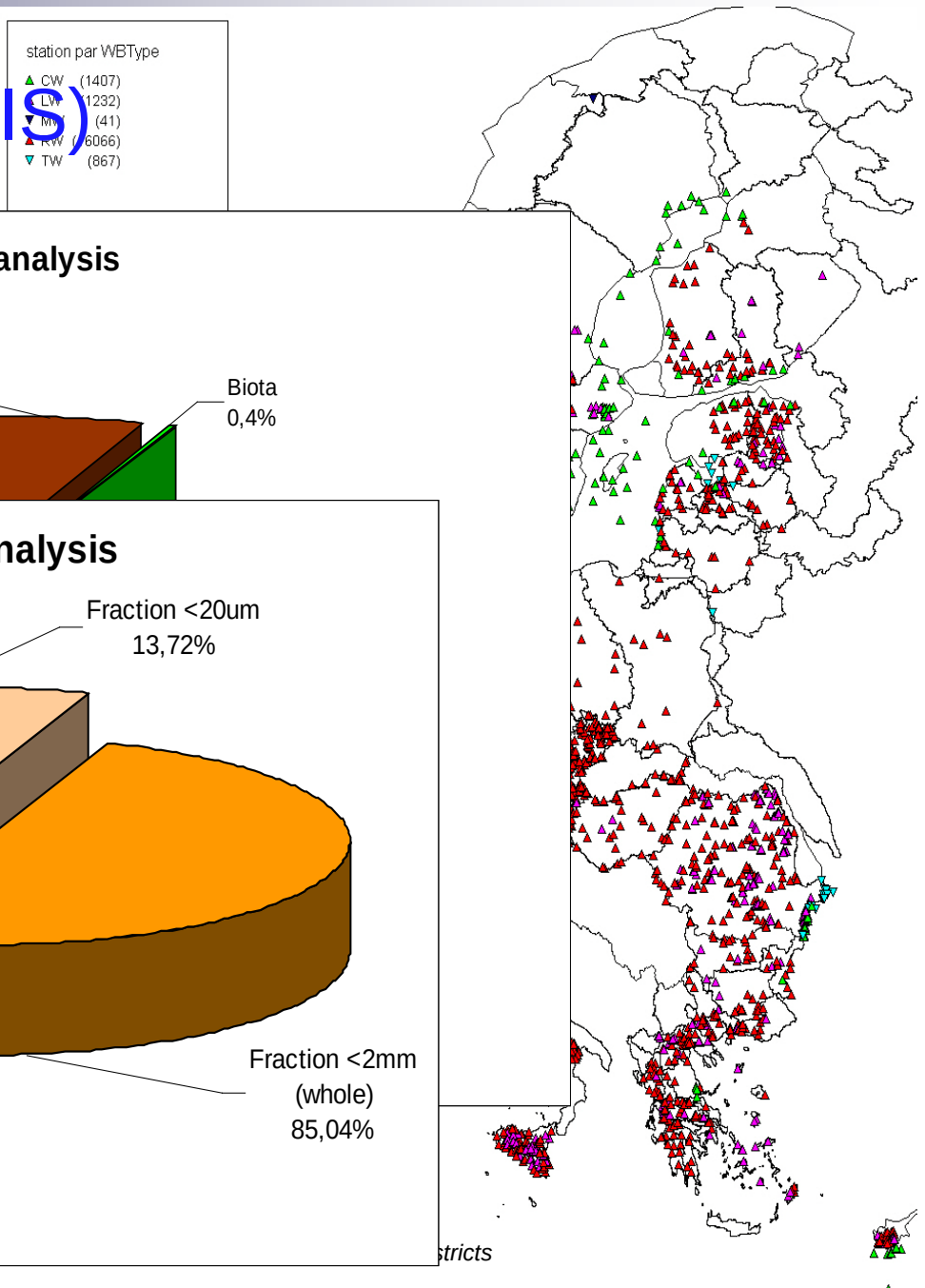

Chapter 7: Complementary Methods

- Aim: Describing upcoming and complementary techniques which could be used in sediment/biota monitoring

- **Passive sampler techniques:**
- Application to sediment for pore water monitoring
  - What is really measured?
- Application in biomonitoring for mimicking biota accumulation
  - Pro and cons of this approach
  - Comparison with monitoring by caged organisms

- **Sediment ecotoxicity tests for the evaluation of the ecological status and investigative monitoring**
  - TIE and EDA

Chapter 8: Case studies

- Aim: To collect case studies at EU level of sediment/biota monitoring with a common format

  - French National Marine Network: mussel watch and sediment monitoring from 1974 to 2007
  - Sediment and SPM in river Elbe, Germany
  - Sediment cores in Finnish lakes
  - POPs in fish of river Tiber, Rome, Italy
  - National Swedish Contaminant Monitoring Programme in Marine Biota

We would like to acknowledge all the Members of the drafting group for their unvaluable contribution

for more information:

polesello@irsa.cnr.it