Consideration of bioavailability in regulation, requirements and consequences

Dr. Joachim Heidemeier, Federal Environment Agency

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Key principles of the WFD (2000/60/EG)

The WFD

- is based on the precautionary principle and on the principles
  - that preventive action should be taken,
  - environmental damage should, as a priority, be rectified at source
  - and that the polluter should pay
- aims at maintaining and improving the aquatic environment in the Community
- is to contribute to the progressive reduction of emissions of hazardous substances to water
- aims ultimately at the elimination of priority hazardous substances

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Key principles of the WFD (2000/60/EG)

WFD objectives and approach

- good ecological and chemical status until 2015 (exemptions)
- management in river basin districts
- water body as smalles units in management
- ~10 000 surface water bodies in D
- transparent management process with clearcut time frame
  - analysis of rbd (pressures and impacts)
  - monitoring (status)
  - management plan / program of measures (response)
  - success control
  - max. 3 cycles foreseen

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priority substances and good chemical status

good chemical status

«... that is the chemical status achieved by a body of surface water in which concentrations of pollutants do not exceed the environmental quality standards established in Annex IX and under Article 16(7), and under other relevant Community legislation setting environmental quality standards at Community level«

only for EU-wide regulated substances

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priority substances and good chemical status

Priority substances

» means substances identified in accordance with Article 16(2) and listed in Annex X. Among these substances there are priority hazardous substances which means substances identified in accordance with Article 16(3) and (6) for which measures have to be taken in accordance with Article 16(1) and (8).«

european-wide identification with legal consequences

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priority substances and good chemical status

Art. 16 Strategies against pollution of water

- Adoption of specific european measures aiming at
  - a progressive reduction for priority substances
  - at the cessation or phasing-out of discharges, emissions and losses for priority hazardous substances
- EU-wide EQS and reduction measures to be developed

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priority substances and good chemical status

Regulations for for other pollutants (Annex VIII)

- relevant for the ecological status
- selection and EQS derivation at member state level
- substances of regional concern
- EQS derivation method according TGD

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Directive 2008/105/EC on environmental quality standards

- reduction measures and phasing out on member state level
- AA and MAC EQS for priority and priority hazardous substances
- EQS in whole water samples for organic compounds
- EQS in filtered samples for metals
- Biota EQS for Hg, HCH, HCBd based on secondary poisoning
- methodological flexibility at fixed protection level – notification requiered
  - substitute water EQS for Biota EQS
  - substitute Biota/sediment EQS for water EQS

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objectives of WFD compliant monitoring

- a coherent and comprehensive overview of ecological and chemical status
- classification of water bodies into five/two classes
- support decision making in river basin management
- success control of measures
- monitoring of long term trends and developments
- both biological quality elements and chemical analyses
- three types of monitoring networks

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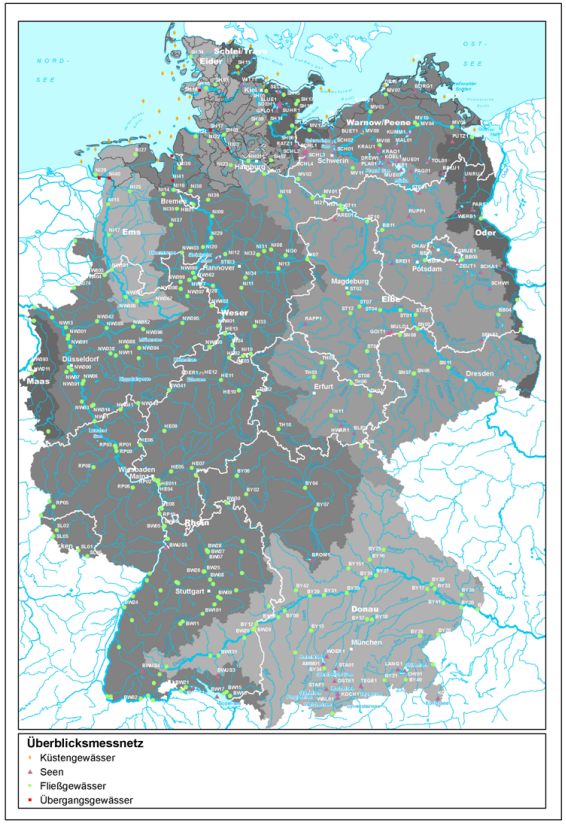
Surveillance Monitoring

- long term overview of larger areas
- static network
  - location
  - monitoring parameters
- long time series
- 361 surveillance monitoring stations in D



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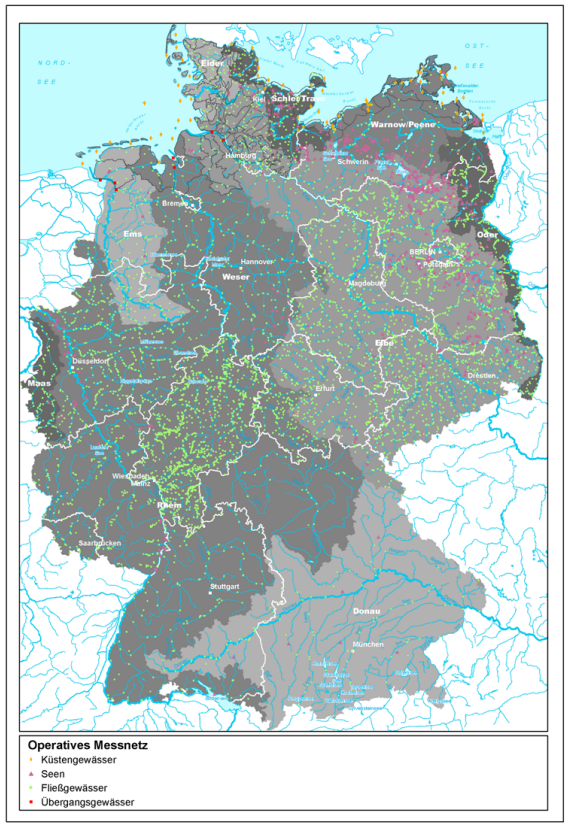
Operational Monitoring

- determine status of waterbodies, not expected to reach "good status"
- monitor implementation success of measures
- relatively flexible network
  - locations
  - monitoring parameters
- 6244 operational monitoring stations in D



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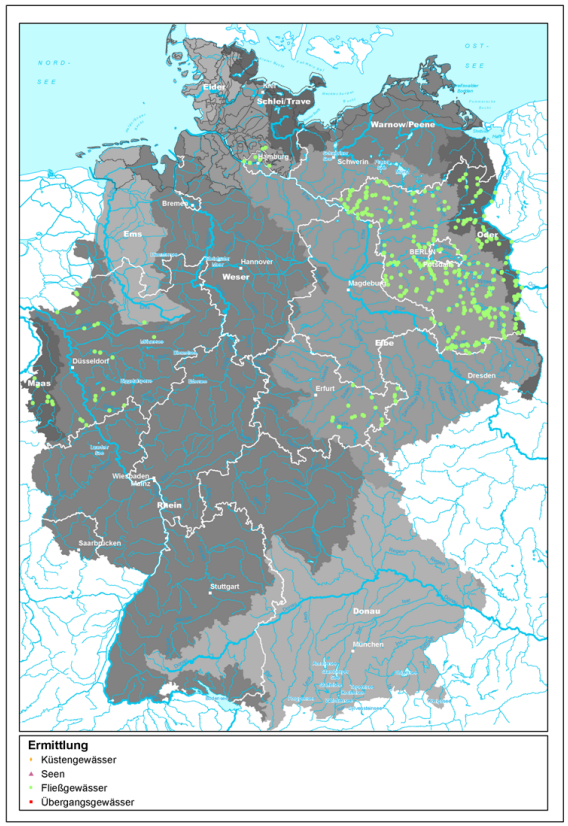
Investigative Monitoring

- find out reasons for exceedances of EQS
- ascertain the magnitude and impacts of accidental pollution
- flexible and targeted network
  - location
  - monitoring parameters
- 373 investigative monitoring stations in D



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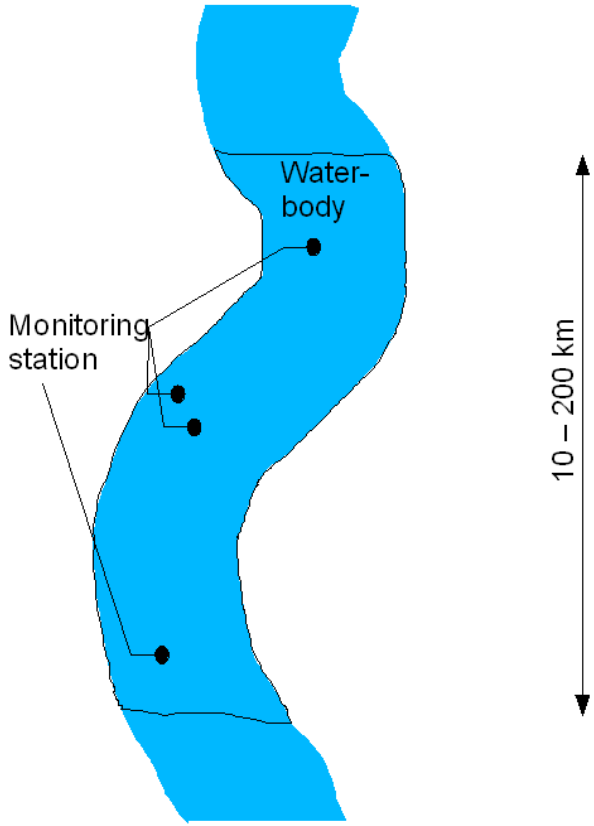
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- one type – one status
- ecological and chemical status determination required
- status determination for chemical pollutants
- mandatory step in river basin management



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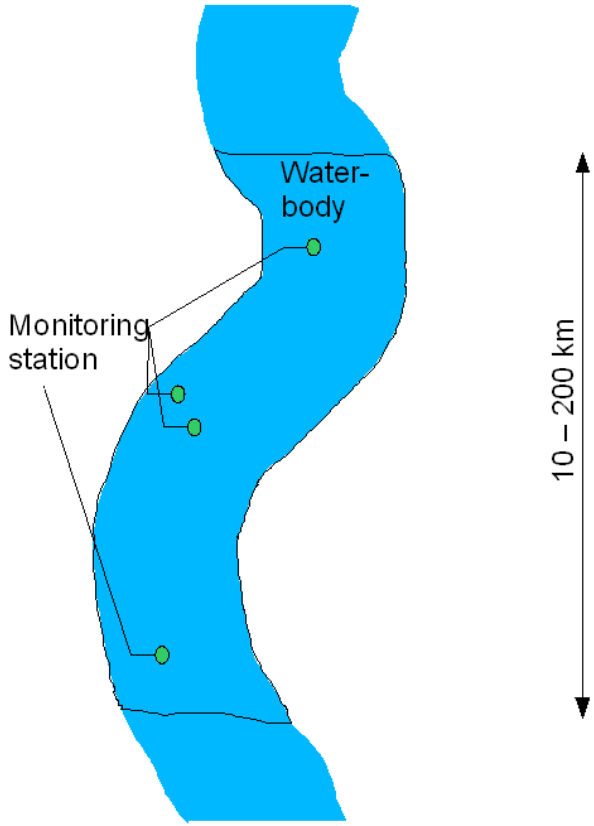
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- based on monitoring results from "representative monitoring stations"
- analytical methods minimum performance prescribed
- evaluation steps described
- analytical problems adressed



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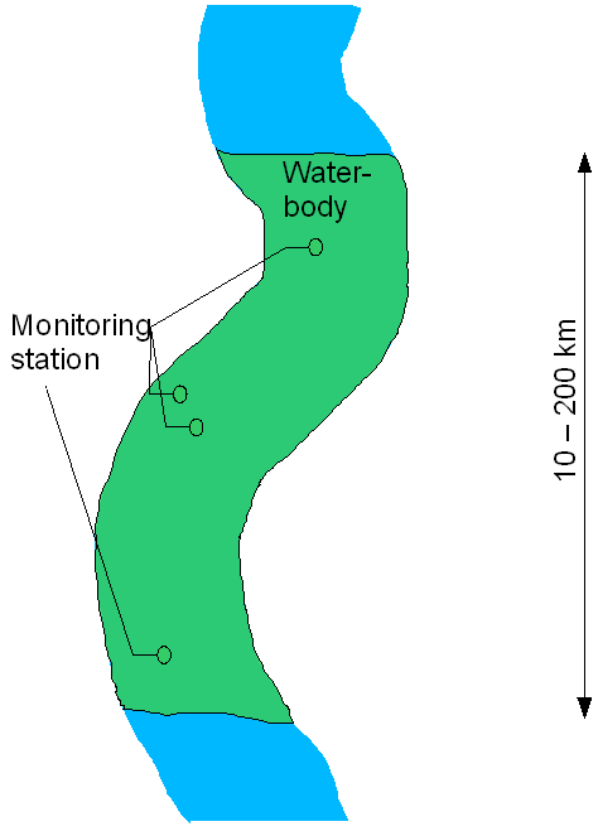
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- "good status" ⇒no additional measures required



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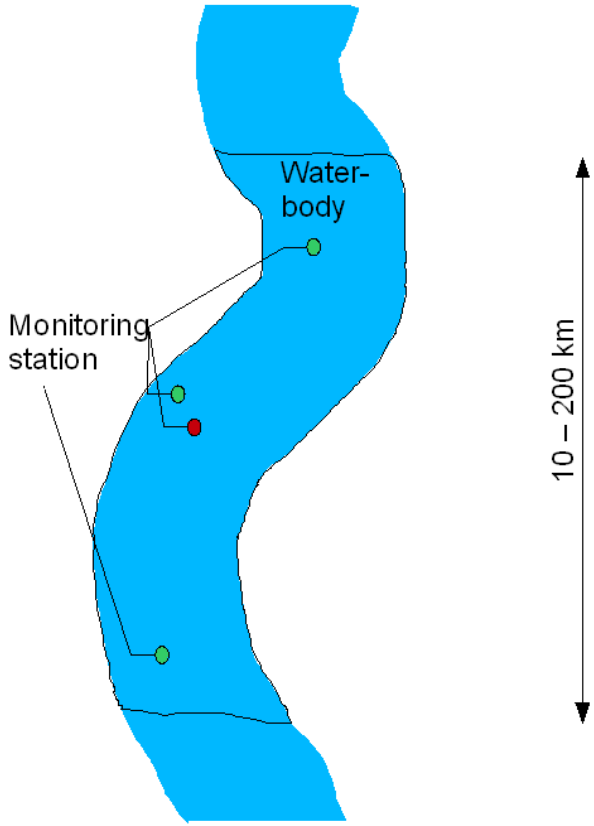

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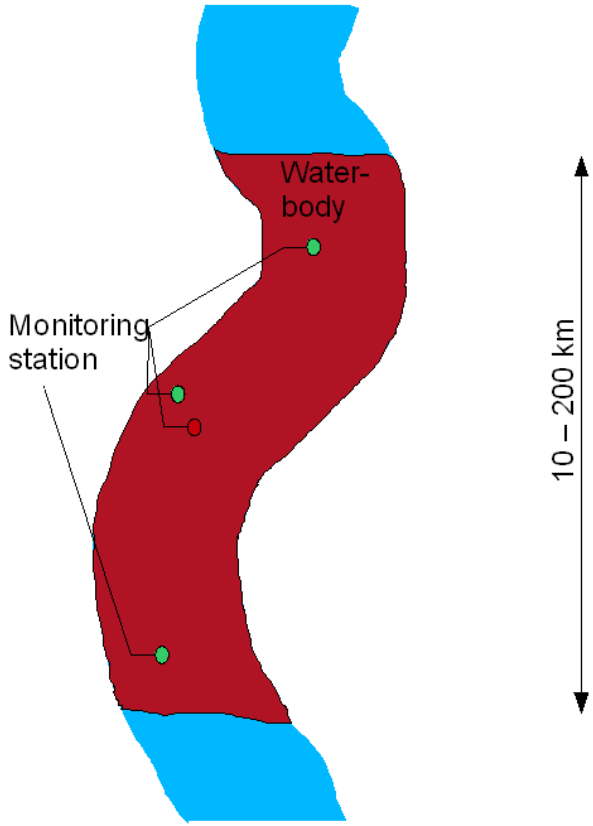
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- "one out – all out" principle
- water body not in good status

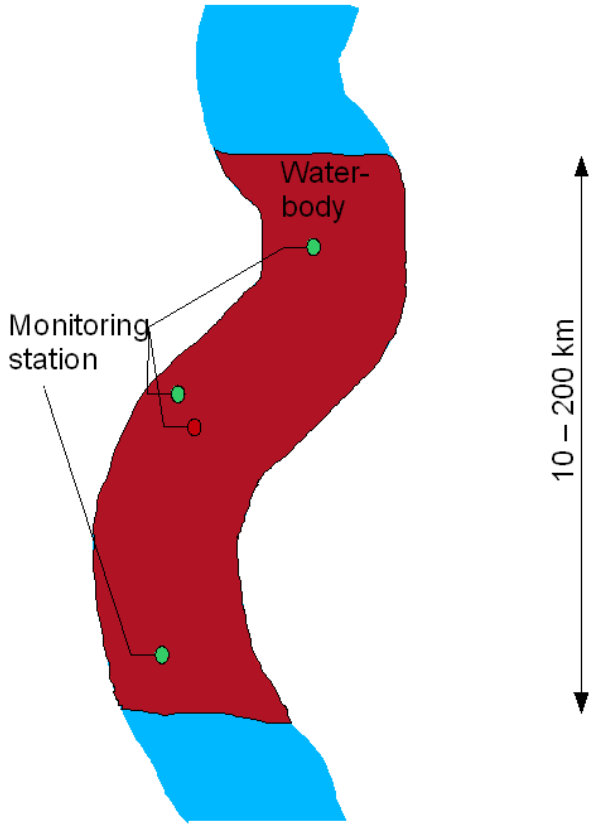


How to assess the status of a waterbody?

"a discrete and significant element of surface water"

consequences of "not in good status"

- determine causes of failing
- plan and implement measures
- transparent decision and management process incl. discussion of "socio-economic factors"



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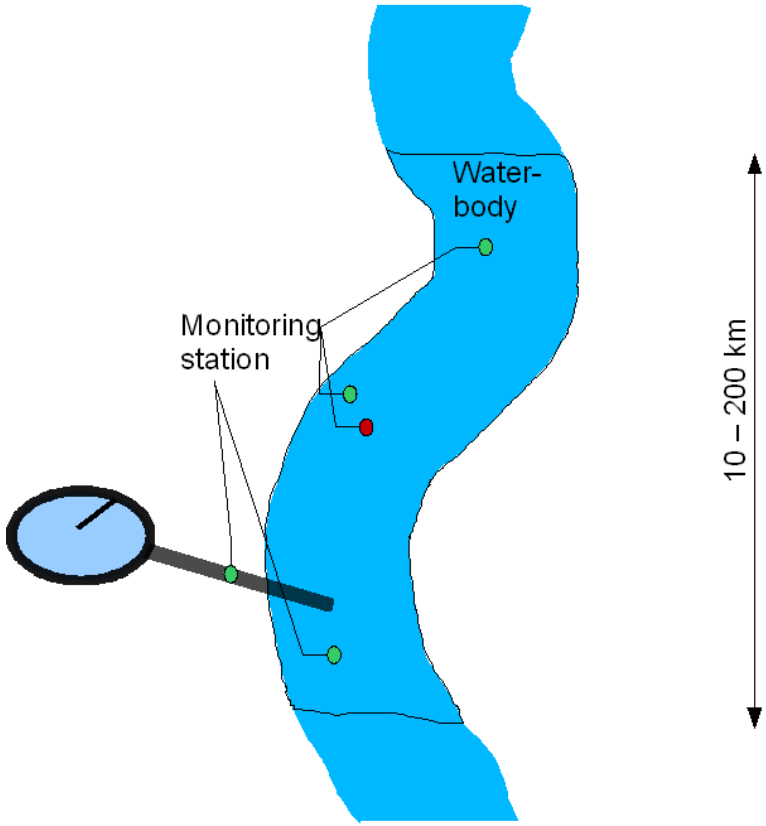
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- Point source using BAT?
- monitoring station not representative?
- directly influenced by point source?
- consequences for status?



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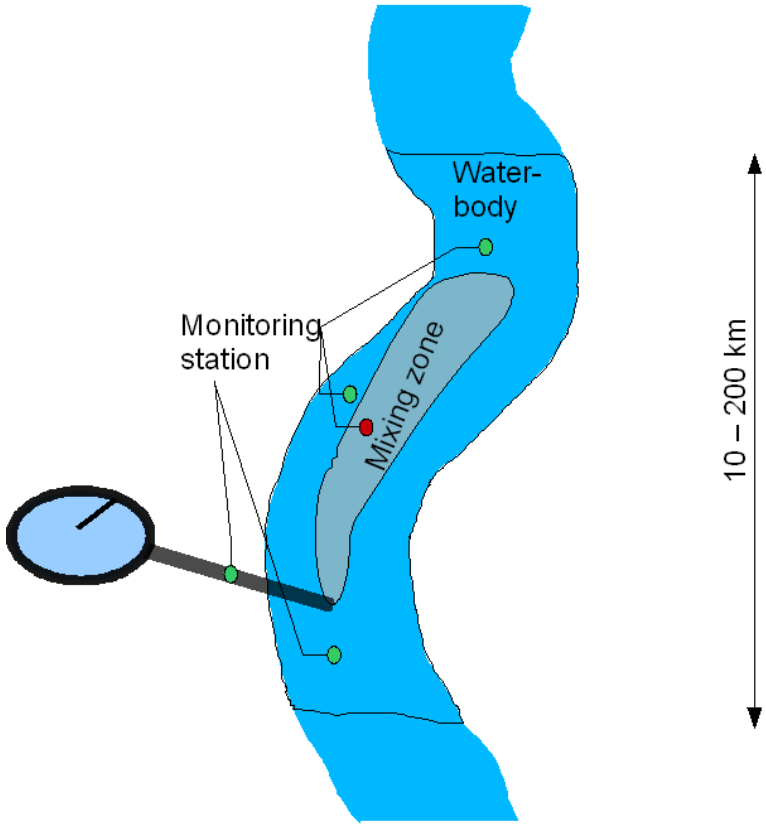
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- possibilty to delineate "mixing zones" (Art. 4 PS Directive)
- ongoing european discussion on methodology
- practicability, administrative burden



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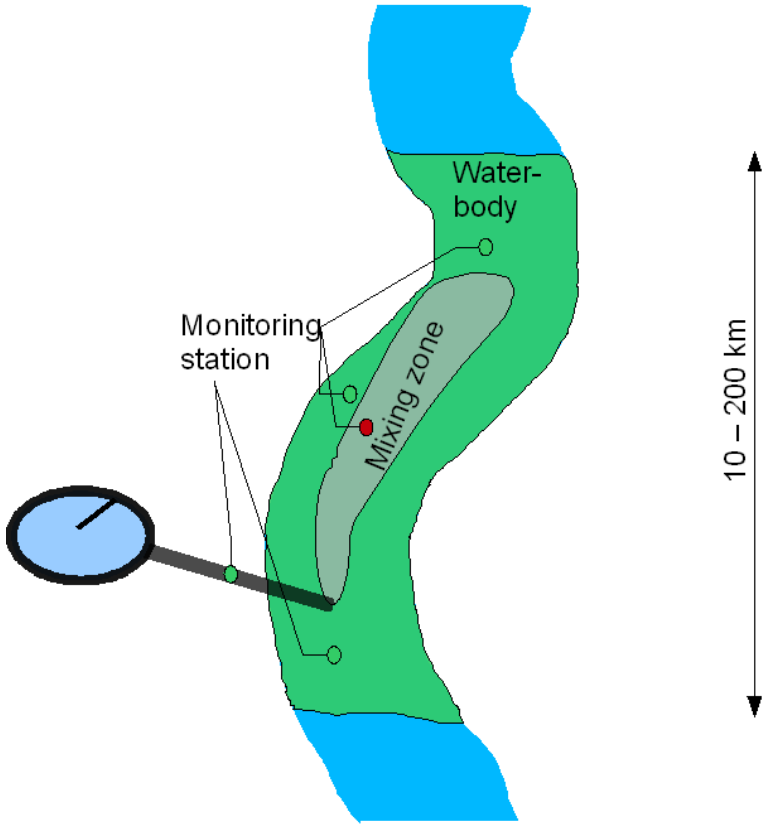
How to assess the status of a waterbody?

"a discrete and significant element of surface water"

under certain prerequisites

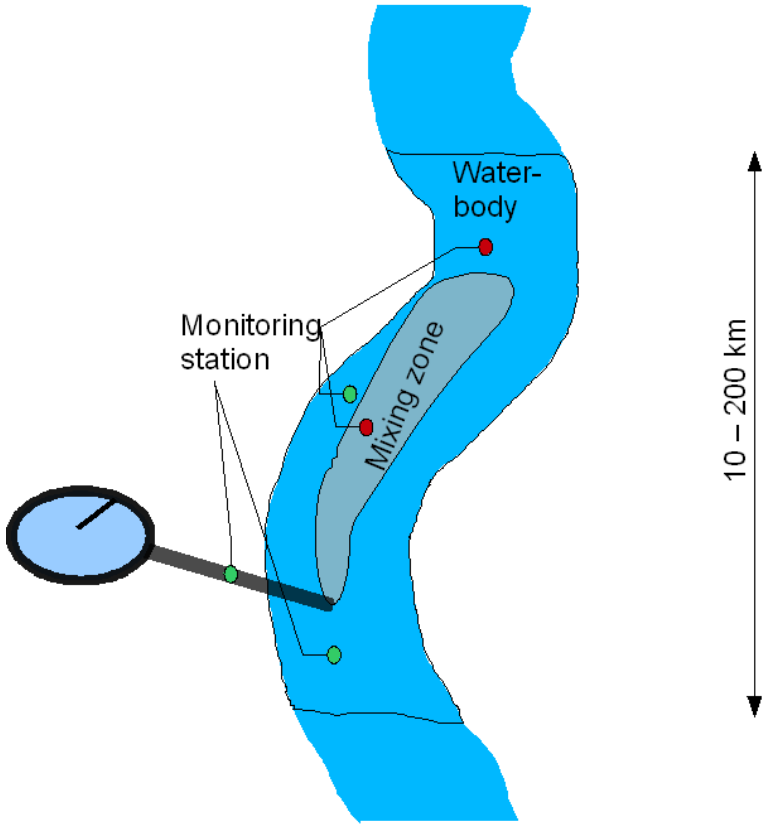
- good status possible



How to assess the status of a waterbody?

"a discrete and significant element of surface water"

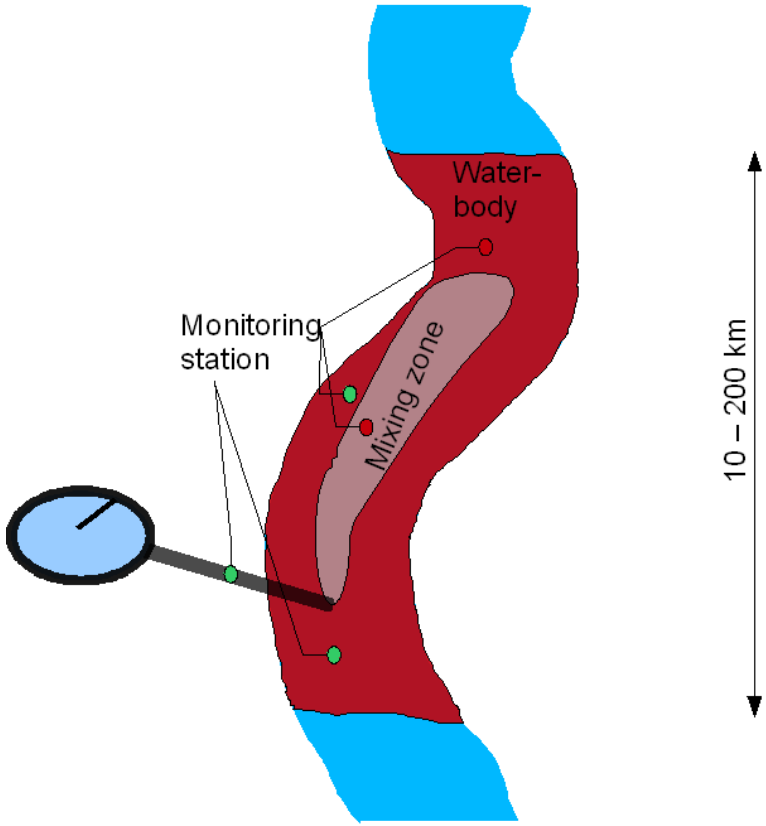
- all other station results unaffected



How to assess the status of a waterbody?

"a discrete and significant element of surface water"

- measures required – costs involved
- status determination must be litigable
- clear and transparent rules required
- conflicting objectives:
  - scientific foundation and sophistication
  - transparency
  - monitoring efforts and costs ...



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bioavailability in Directive 2008/105/EU

two footnotes in Annex 1 relevant:

- "for cadmium and its compounds (No 6) the EQS values vary depending on the hardness of the water as specified in five class categories
  - Class 1: < 40 mg CaCO3/l, Class 2: 40 to < 50 mg CaCO3/l, Class 3: 50 to CaCO3/l"
- "Member States may, when assessing the monitoring results against the EQS, take into account:
  - (a) natural background concentrations for metals and their compounds, if they prevent compliance with the EQS value; and
  - (b) hardness, pH or other water quality parameters that affect the bioavailability of metals"

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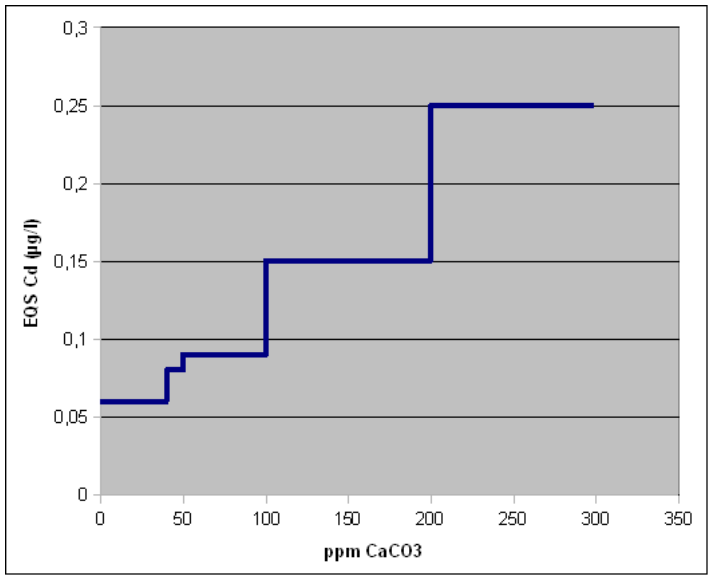
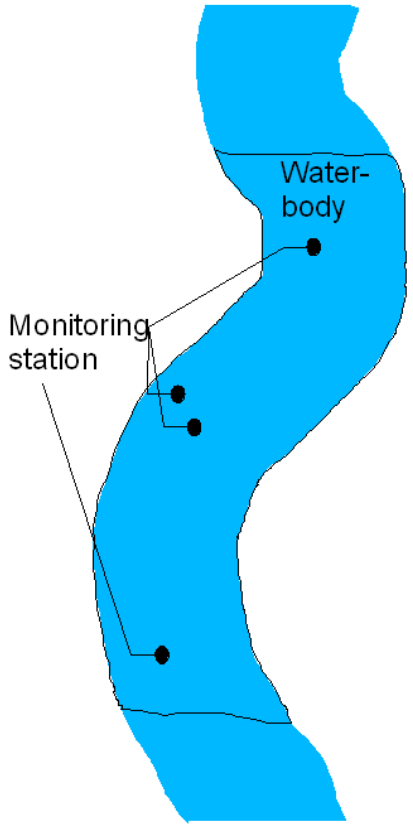
consequences of additional parameters





A possible montoring series for Cd ..

	c Cd	c CaCO3	Hardness class	Pass / fail EQS
sample 1	0,12	98	3	fail
sample 2	0,12	98	3	fail
sample 3	0,12	98	3	fail
sample 4	0,12	98	3	fail
sample 5	0,12	98	3	fail
sample 6	0,14	111	4	pass
mean	0,123	100,17	–	????
upper quantile	0,12	98	3	

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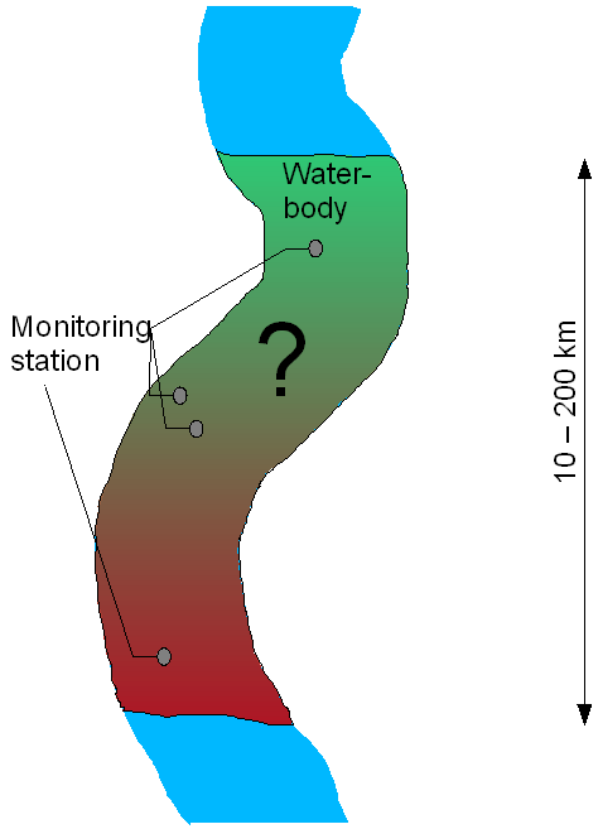
The status answer must be given..

increasing number of additional parameters lead to exponential growth of "corner cases"

- status determination obligatory so either
  - complex regulations (aka bureaucracy) or
  - litigations and a job creation scheme for lawyers ...
- or no environmenatal progress ...



Summary and Conclusions

- in water management monitoring is an important cornerstone which requires a lot of resources
- its objective is to determine the status of water bodies as one obligatory step in the WFD management cycle
- the status determination requires clear rules and litigable regulations
- scientific sophistication is one of several conflicting issues to be considered when drafting the regulations
- uncertainty, lack of knowledge on sources, effects and results should be dealt with at later stages of the management cycle

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