



## Risk and monitoring based indicators of receiving water status: alternative or complementary elements in IWRM?

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# The Water Framework Directive



- since 22 December 2000
- shift from traditional approaches towards ecological orientated strategies
- main objective: 'good status' in all surface- and groundwater bodies
- Timeline:

# Timeline of the WFD



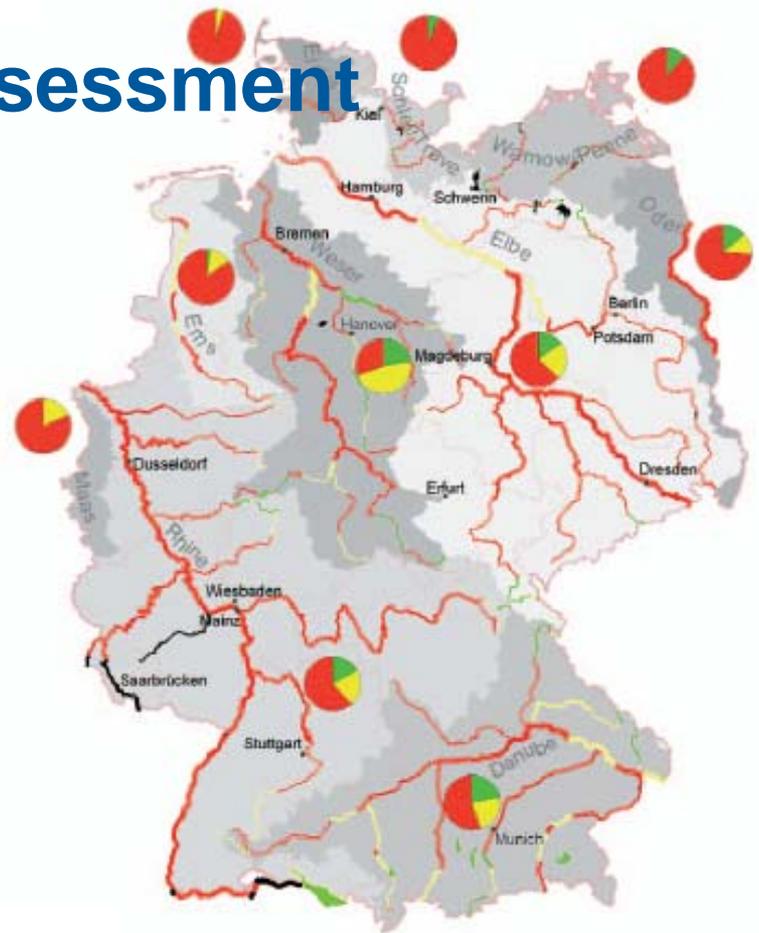
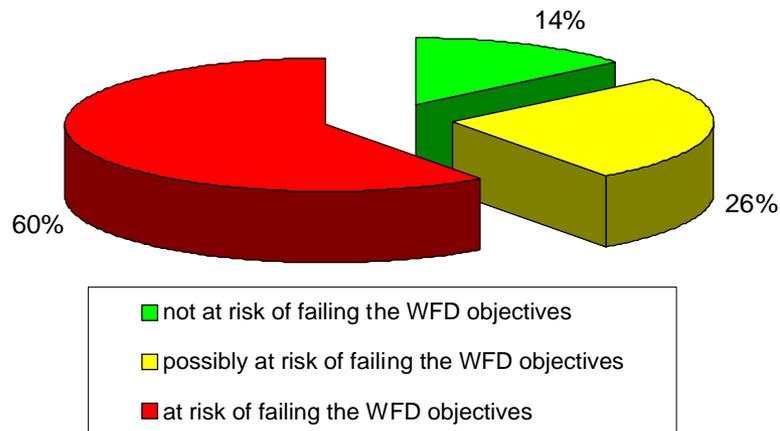
Milestone	Deadline	Work step
Final deadline for implementation of the Water Framework Directive objectives	Dec. 2027	
Beginning of third river basin management plan period	Dec. 2021	
Environmental objectives achieved. Beginning of second river basin management plan period	Dec. 2015	Period during which Water Framework Directive objectives are to be met
Implementation of the relevant measures	Dec. 2012	
Establishment of river basin management plans and programmes of measures. Beginning of first river basin management plan period	Dec. 2009	Implementation of programmes of measures
Monitoring programmes ready for implementation	Dec. 2006	Establishment of river basin management plans and programmes of measures
Characterization results	Dec. 2004	Establishment monitoring programmes
Legal transposition	Dec. 2003	Characterization
Effective date of the Water Framework Directive	Dec. 2000	

Risk assessment

# Characterization process and risk assessment in 2004

- Characterization of water bodies and anthropogenic pressure
- Based on existing data
- Focused on
  - (a) water bodies which might fail the objectives,
  - (b) identification of main pressures and
  - (c) development of monitoring strategies
- Indicators for risk assessment:
  - pressures on oxygen balance (saprobia)
  - nutrient input
  - specific pollutants
  - warming, salinization, acidification
  - abstractions and flow regulations
  - morphological alterations

# Results of the first risk assessment



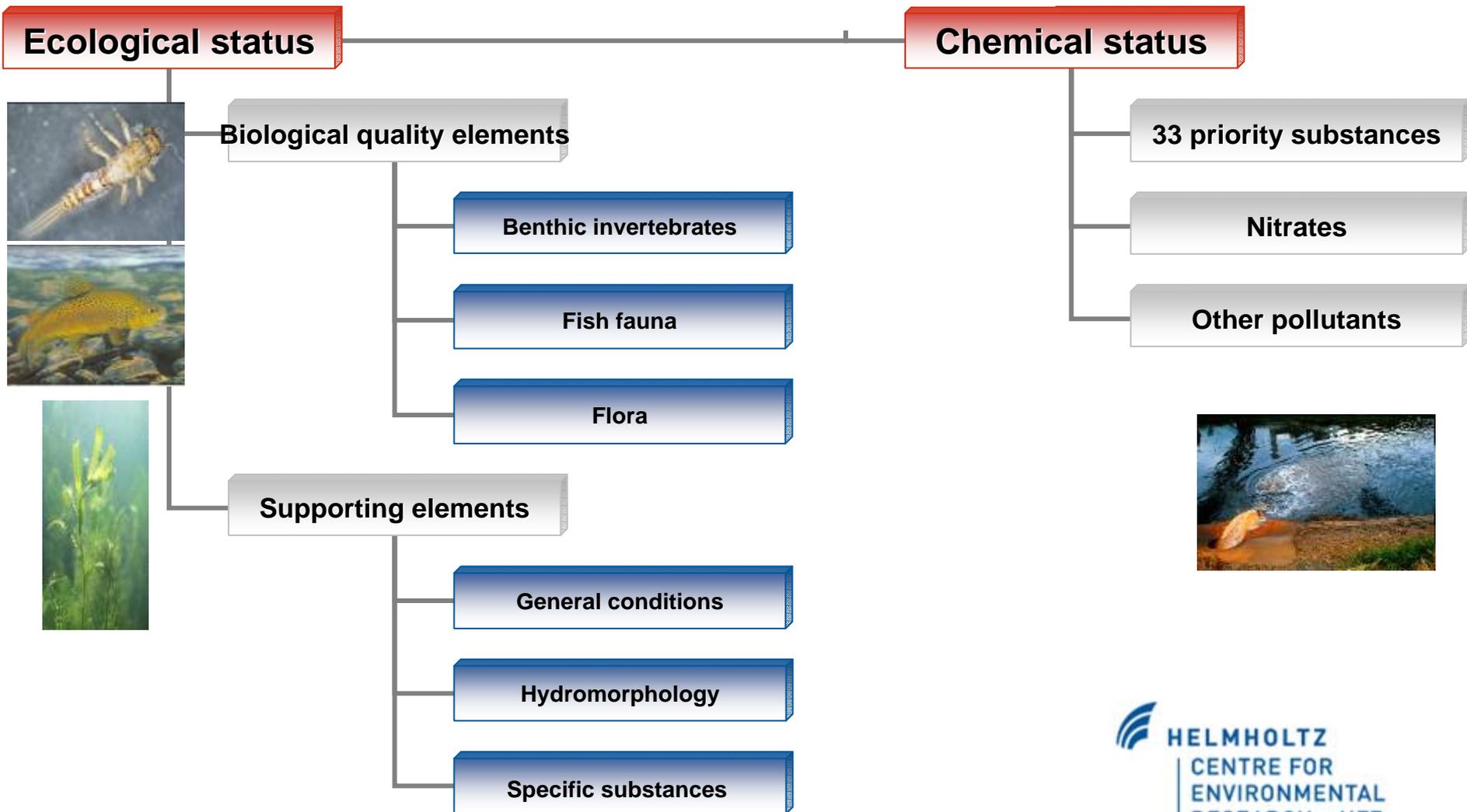
Borchardt et al. 2005

## Further steps:

- Development and implementation of monitoring programmes (10,000 sampling sites in German surface water bodies)
- Development of new indicator systems and quality standards to assess water body status

# Water body status assessment

(surface water bodies)



# Timeline of the WFD



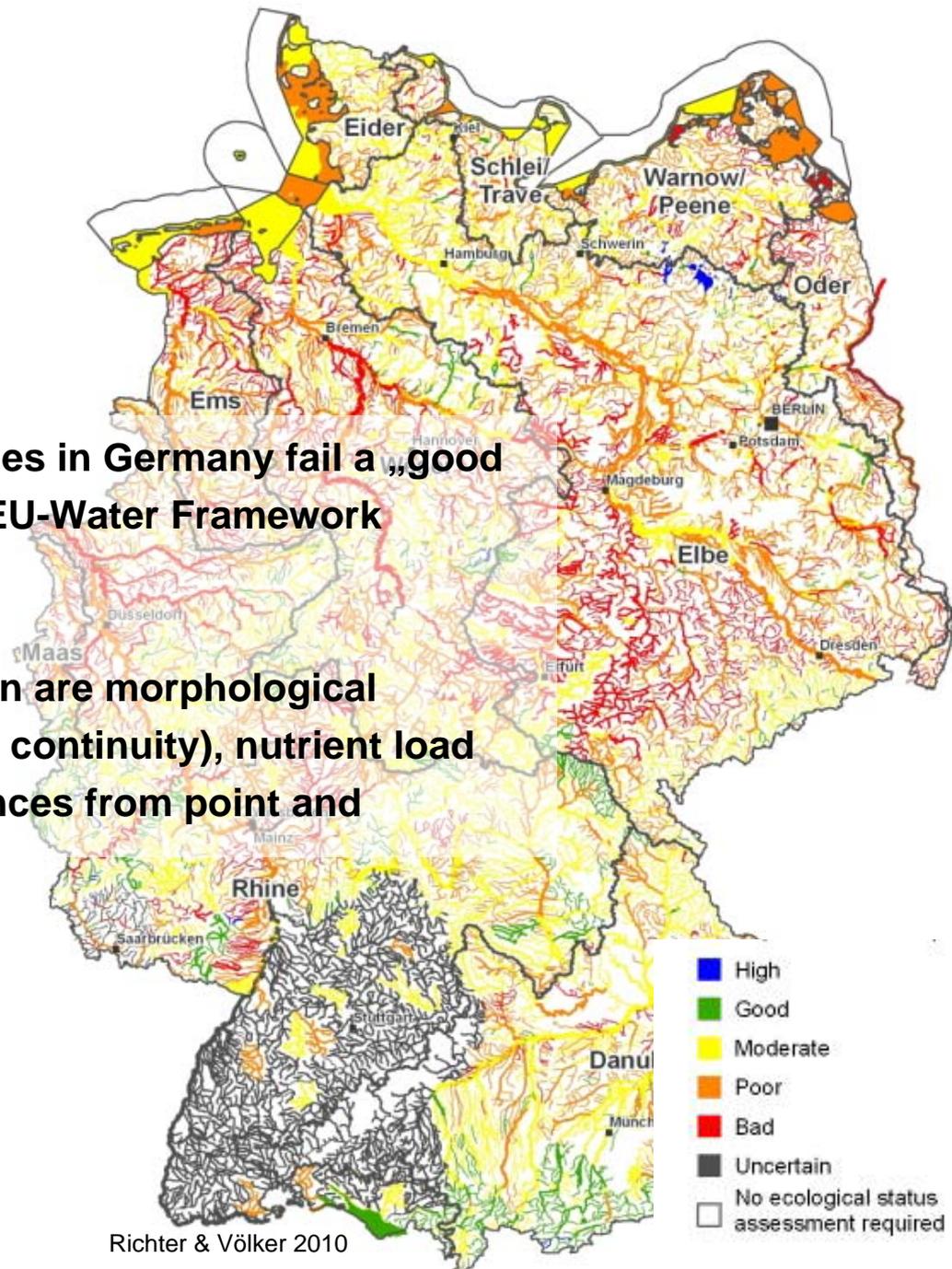
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Monitoring based assessment

# Ecological status

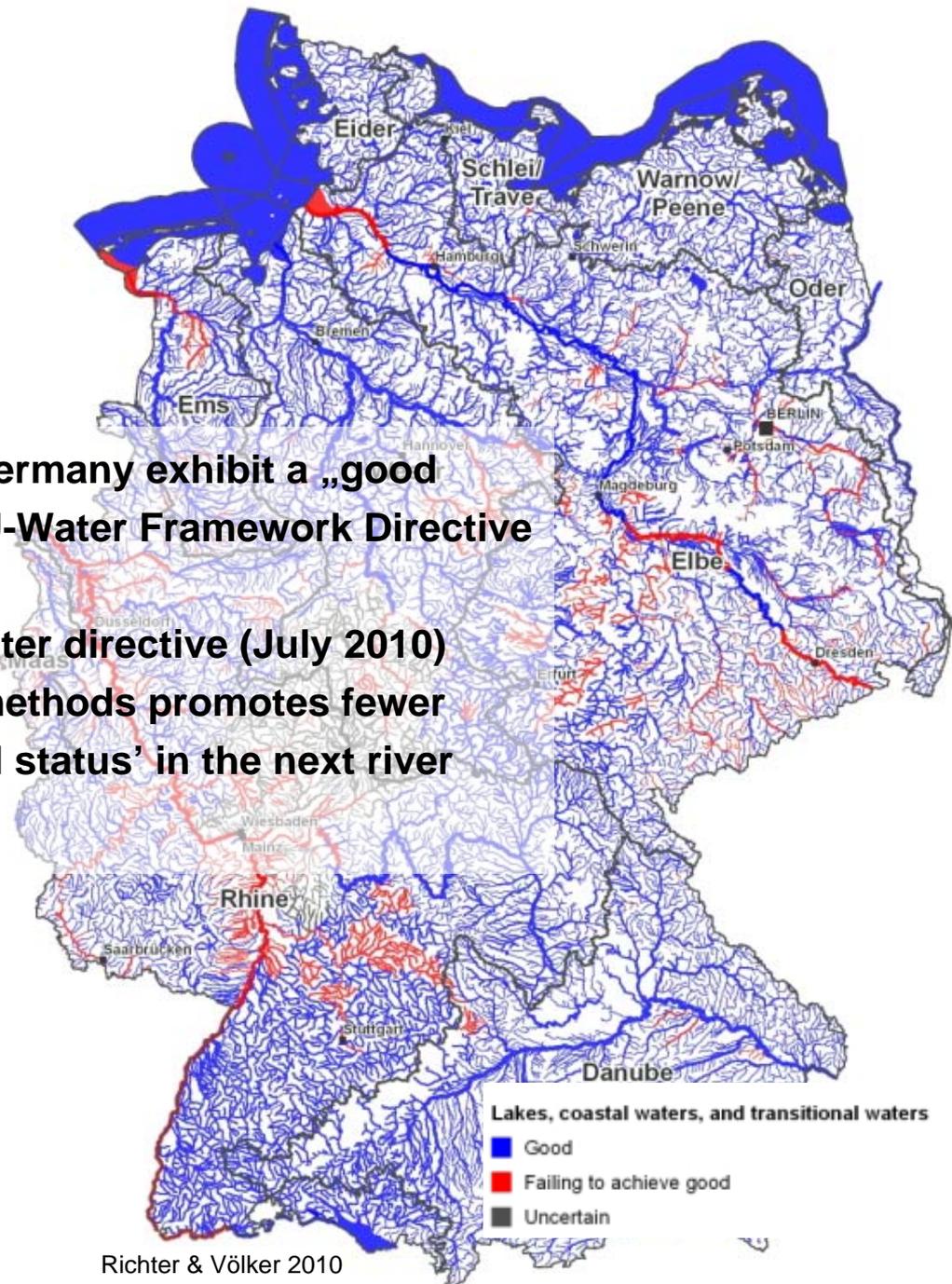
➔ **Nearly 90%** of surface water bodies in Germany fail a „good ecological status“ according to EU-Water Framework Directive

➔ **Major causes** under consideration are morphological degradation (incl. disrupted river continuity), nutrient load and pollution by specific substances from point and nonpoint sources



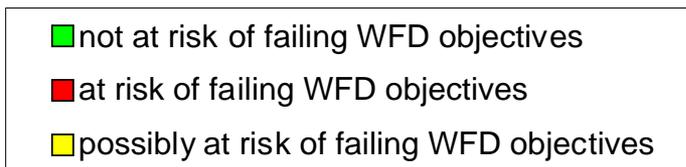
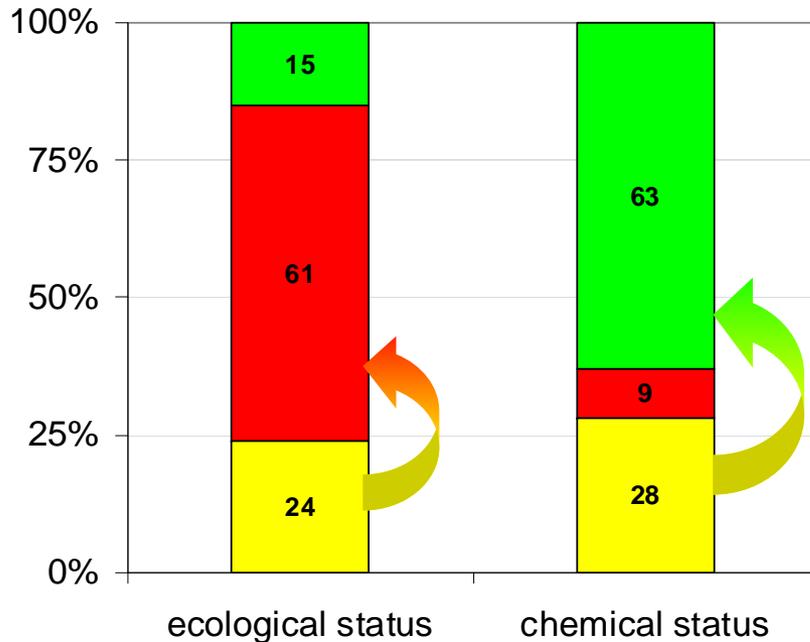
# Chemical status

- ➔ **88% of surface water bodies in Germany exhibit a „good chemical status“ according to EU-Water Framework Directive**
- ➔ **Implementation of the new daughter directive (July 2010) with new quality standards and methods promotes fewer water bodies with ‘good chemical status’ in the next river basin management plan period**

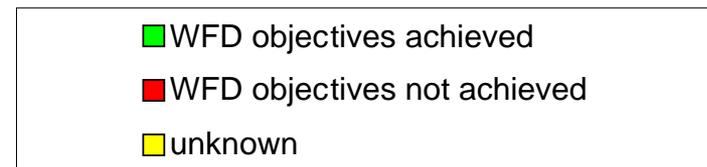
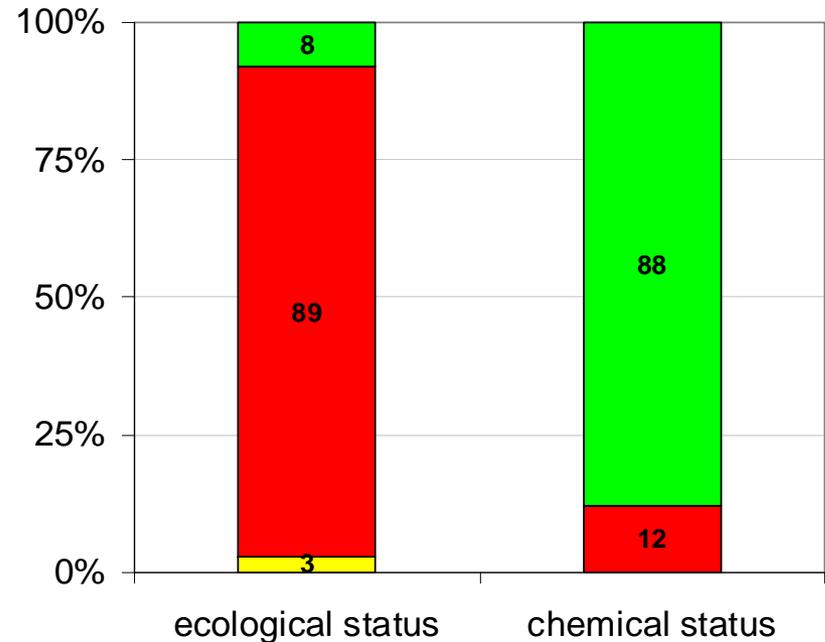


# Risk and monitoring based assessment

## Risk assessment



## Monitoring based assessment



# Summary and conclusions

- According to IWRM: risk assessment is a good tool to evaluate water bodies in a first step
- Risk assessment shows a clear trend of failing water management objectives
- Main impacts and pressures can be identified and monitoring programmes can be developed
- Use of indicators and indicator systems is necessary for further management strategies (e.g. programmes of measures)
- Next step is to find out indicators for the performance of water management focused on the effectiveness of measures (ecologically and economically)



Thank you for your attention!