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RISK BASE

Risk assessment in risk-based management of European river basins

Outcome of the
MODELKEY/RISKBASE
conference/workshop
12-15 November 2007 in Leipzig

Michaela Hein, Peter von der Ohe & Werner Brack, UFZ

RISKBASE

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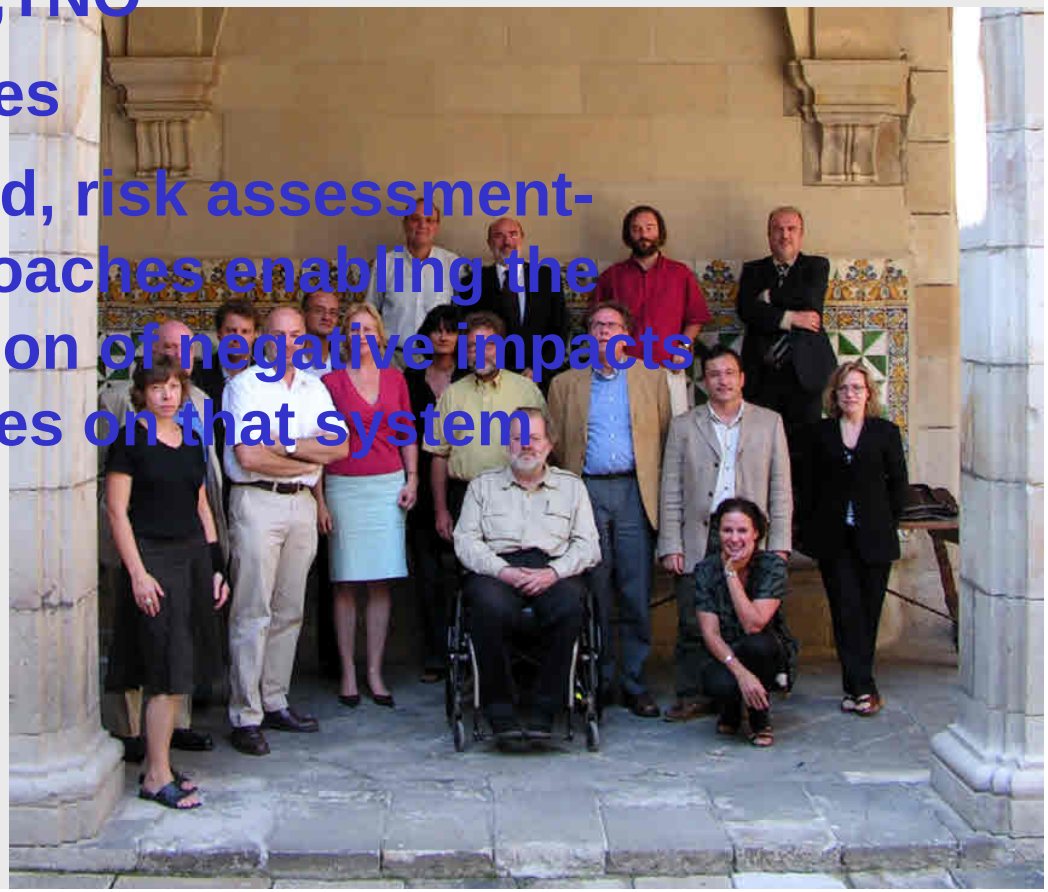
- Coordination Action on Risk Based Management of River Basins (FP6, contract 036938-GOCE)
- Coordinated by Jos Brils,TNO
- 9 partners from 6 countries
- Aim: to develop integrated, risk assessment-based management approaches enabling the prevention and/or reduction of negative impacts caused by human activities on that system
- www.riskbase.info



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- **Deliverables:**
  - ➢ **overarching concept, generic approach and guiding principles to integrated risk based management of EU river basins**
  - ➢ **recommendations towards evolution and implementation of risk based management in policies and in management**
  - ➢ **proposal for the European research agenda related to risk based management**
- **WP 4: Risk Assessment & Harmonisation**

Objectives

- share and discuss scientific ideas/results from projects with scientific community and end-users
- link and integrate EU projects on risk assessment in river basins
- formulate science-based recommendations for policy makers based on scientific results of EU projects
- create a basis for RISKBASE dissemination (book chapter, journal special issue, short papers for Brussels, water managers…..)

Approach

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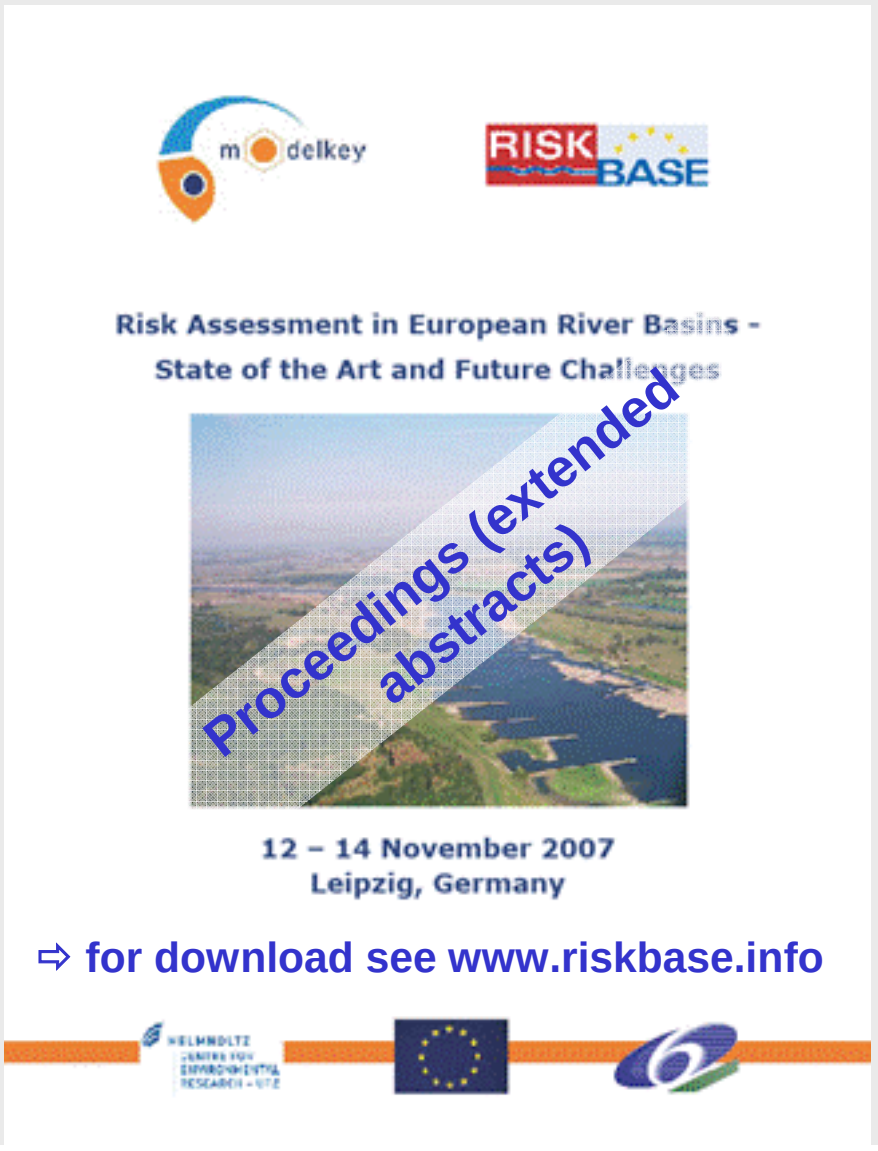
Knowledge basis was created by overview presentations by

- **stakeholders and**
- **scientists from major European projects like**

MODELKEY, FLOODsite, Flood-ERA, GLOWA Elbe, MEDROPLAN, Watersketch, Eurolimpacs, REBECCA, ALARM, NoMiracle, AQUATERRA, NORMAN



⇨ **for download see www.riskbase.info**

Receptors

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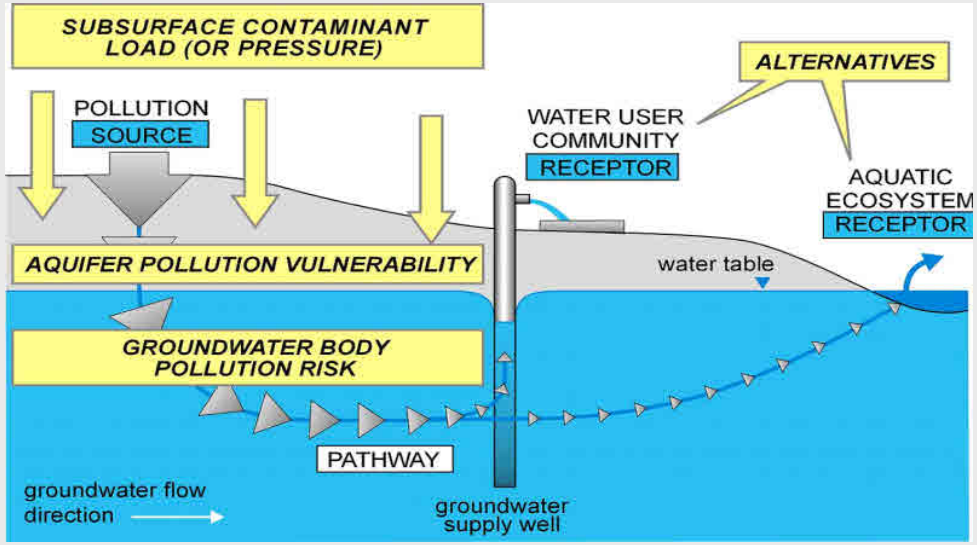
Ecosystem goods and services as risk receptors

- human health
- groundwater ecosystem
- drinking water supply
- biodiversity

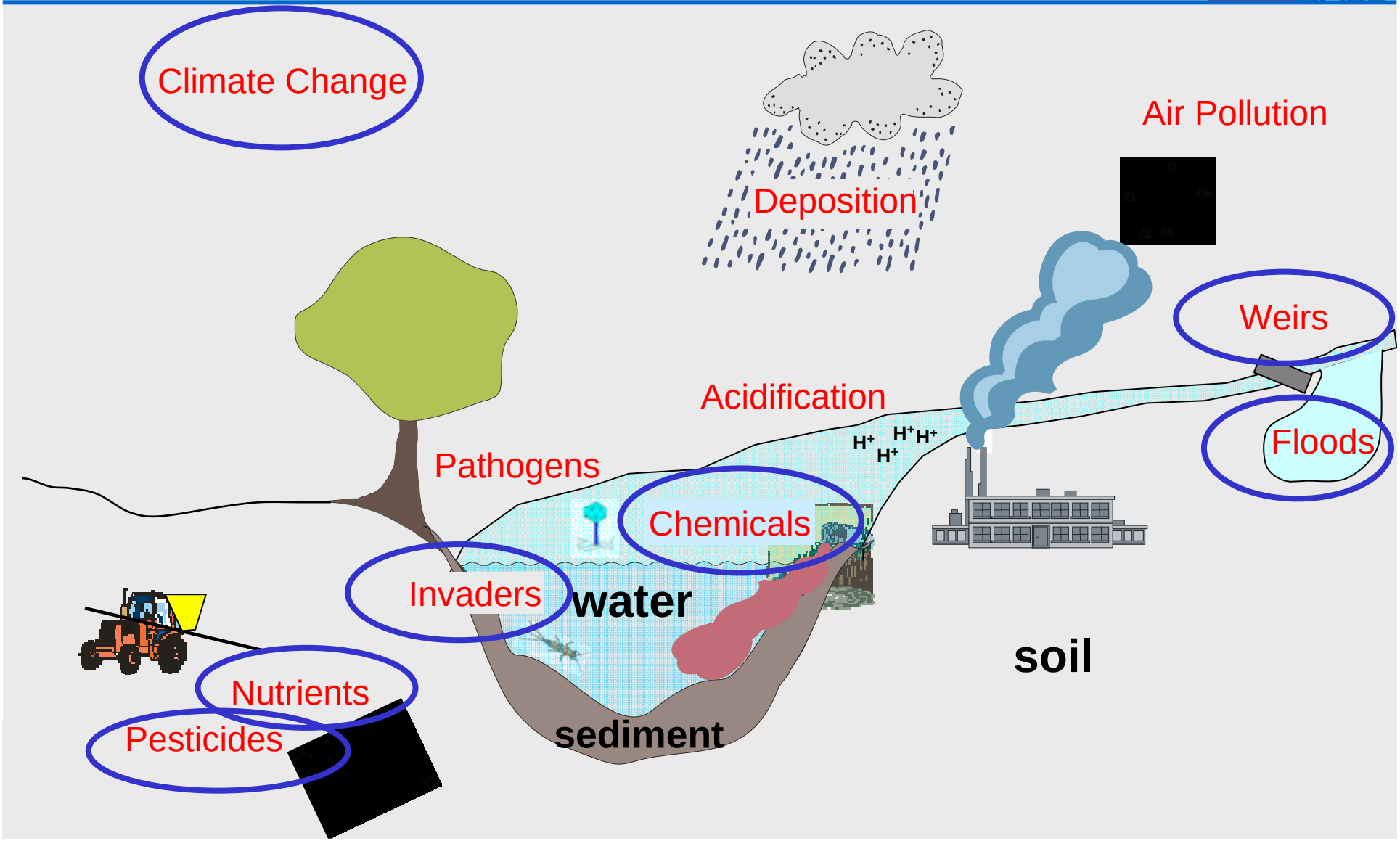


⇨ groundwater status monitoring

⇨ threshold values for "risk substances"

⇨ sustainable water protection and management

Stressors


Climate Change
Deposition
Air Pollution
Weirs
Floods
Acidification
H+ H+ H+ H+
Pathogens
Chemicals
Invaders
water
soil
sediment
Nutrients
Pesticides

Stressors

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Water regulation

- floods
- droughts
- climate change impacts

⇨ distribution of risk reducing effects

⇨ preventive measures vs. crisis management

⇨ flow regimes and water availability

Stressors

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Hydromorphological changes and risks to biodiversity

- water level regulation
- ecological functioning of catchment
- community degradation

⇨ environmental impacts on flora & fauna

⇨ effects of restoration measures

⇨ physical-biological coupling

Stressors

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Eutrophication risks to biodiversity

- loss of functional groups
- impacts of climate change

⇨ species richness assessment

⇨ temperature and flow regime effects

Stressors

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Invasive species

- assessment of biopollution
- assessment of socio-economic impacts

⇨ prevention, control

⇨ likelihood, perception, costs

Stressors

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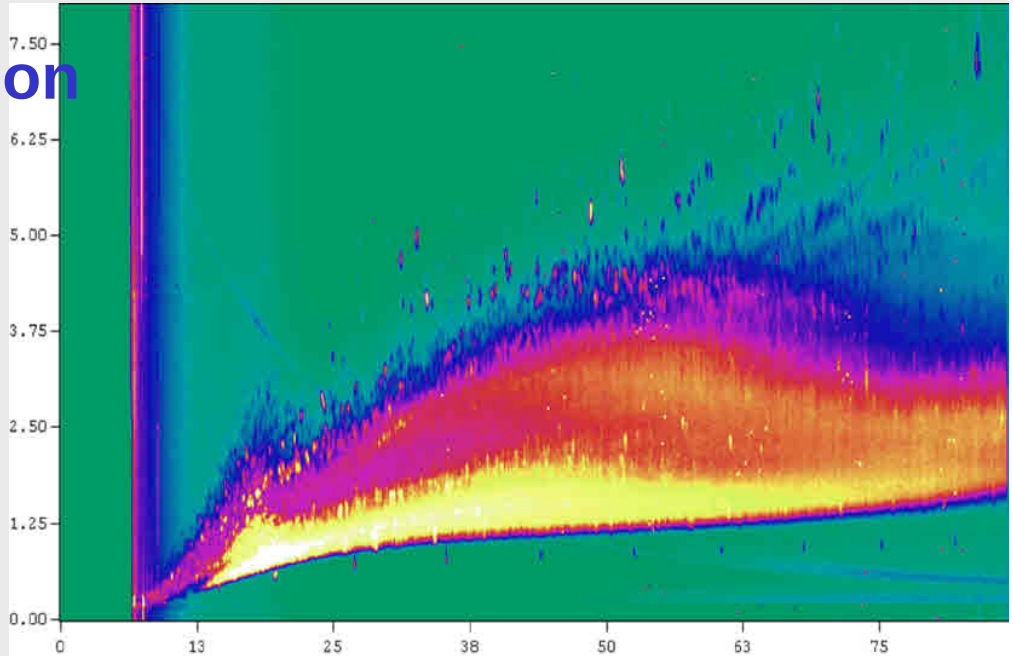
Environmental pollutants and their impacts on ecosystem and human health

- **protection, probabilities and uncertainties**
- **polluted sediments & prioritisation**
- **pollutant fluxes**
- **bioavailability**
- **effects-directed identification of unknown toxicants**
- **assessment concepts for mixtures of contaminants**
- **community-level effects**
- **estrogenic effects**



Integration

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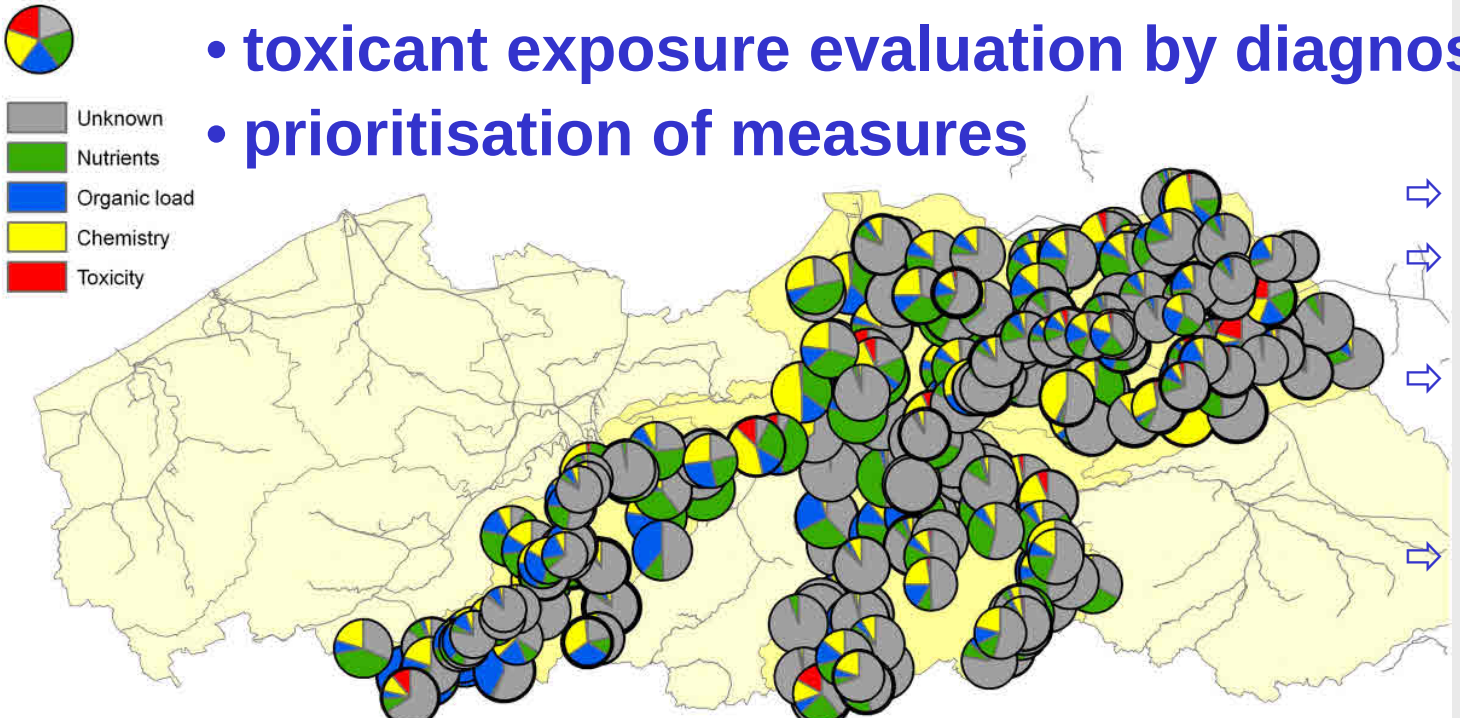
Integrated risk assessment at basin scale

- challenges for management
- pollution control
- resilience of ecosystems (incl. responses of structures and functions)
- toxicant exposure evaluation by diagnostic modelling
- prioritisation of measures



⇨ monitoring

⇨ cause-effect relationships

⇨ environment as a whole (system-oriented)

⇨ stressor-specific indicators

Recommendations

Chemical status

Last decades: Focus on distinct hazardous substances + Best Available Technology ⇒

⇨ significant reduction of excess contamination

⇨ based on the experience:
33/41 priority pollutants → chemical status

⇨ powerful management tool for phasing out certain chemicals
but does not reflect toxic hazards!!

Recommendations

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Chemical status – Recommendations:

- Focus on river basin/stretch-specific toxicants
- Regular update of priority lists with focus on emerging toxicants
- Reduce monitoring efforts for compounds no longer in use where appropriate
- Consider state-of-the-art mixture toxicity concepts and bioavailability to link chemical and ecological status
- Add a short list of priority effects and develop EQS for these effects

Recommendations

Ecological status

- Important step towards holistic river basin management
- However: Needs to be based on understanding of ecosystem functioning
- On a European scale improvement of hydromorphology and eutrophication crucial
- On a local and regional scale multiple pressures. Contaminants may be quite important

Recommendations

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Ecological status

Major challenges:

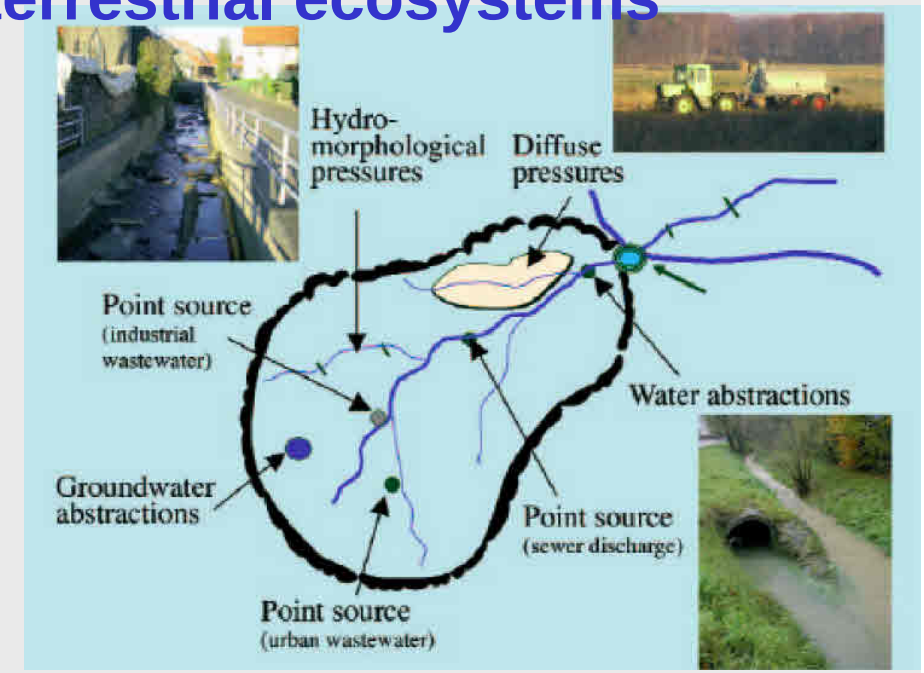
- Multiple pressures
- Stressor-specific metrics
- Linking causes and effects (bioassays, biomarkers, EDA, bioavailability)
- Understanding ecosystem dynamics rather than focusing on reference conditions (hardly available in Europe)
- Understand ecology of recovery

Recommendations

Holistic approach required

Ecosystems are dynamic and interconnected
⇨ Required: Integrated Monitoring and management of the whole water-, sediment-, groundwater-, soil-system including landuse in terrestrial ecosystems adjacent to the river

When major stressor is tackled often another one becomes apparent
⇨ Required: Multi-solution for multiple stressors



Borchardt et al. 2005

Recommendations paper

Common recommendations paper for IEAM:

Towards a holistic and risk-based management of European river basins

(19 authors from science and policy making)

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THANKS FOR YOUR ATTENTION!