

## Workshop 3

“Foresight transnational watermanagement and –policies”

on the conference

“Present Needs Future Options – Issues and Topics for Transnational Foresight”

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# Two Transnational Water Issues

## Mobile Chemicals and Wastewater Systems

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## Overview

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Theme 1:

Assessment and Regulation of Mobile Substances

Theme 2:

Structuring Wastewater Disposal and Treatment Systems



### Problem formulation:

- rivers propagate risks originating in one area to take effect on another area  
e.g. floods (water quantity), pollution (water quality)
  - here: focus on quality – risk potential by polar and persistent substances
  - polarity and persistence result in high mobility and therefore exposure at long-distances
  - additional risk potentials: several mobile substances with low-dose-effects
  - mobile substances outrun national efforts of regulation  
-> not manageable on national level
  - necessity of transnational regulations
  - but: lack of communication and consistent regulations between nations
  - EU supports research (ERAPharm, NOMIRACLE)
  - but: research mostly limited to classic environmental risk management (knowledge, causality, hazard, single substance regulations) not innovative (consideration of uncertainty, no-knowledge, new risk concepts)
- mobile substances need coordinated transnational river management



### EU Water Framework Directive (EU-WFD):

- list of 33 priority and priority hazardous substances with known hazards
- but almost no regulation of mobile substances with low-dose-effects (e.g. organic phosphates, synthetic musk compounds)
- little knowledge about an adequate risk assessment

### Management options:

- elimination in wastewater treatment plant – expensive
- elimination in drinking water treatment by ozone – disputed subsequent problems
- precautionary principle – how to realise?

### ➤ Lack of instruments for

- assessment of specific and general potential risks and
- decision about treatment of problematic substances in different fields of use



### General challenges:

- development of regulation structures beside the priority list of WFD
- bring together national regulations and overcome administrative barriers
- participation of governmental and non-governmental organisations, industry, ...
- participation in WFD
  - today: implementation of WFD, formulation of objectives (Art. 14)
  - missing: participation in formulation of measures for reaching objectives (Annex VII)
- monitoring and transnational data exchange

### Specific research needed:

- capacity of natural barriers and filter systems (especially groundwater recharge)
- effects of treatment with ozone and characterisation of risks of product fragments



Today's wastewater disposal and treatment systems:

- **centralised concept**
  - huge amount of water passes through the sewer system
  - water from a wide area is concentrated to centralised treatment plants
  - spatial transfer of water resources without value for landscape and ecology
- **acceleration of the dynamic of water flows and budget with stress potential for rivers**
- **chemical characteristic of rivers due to specific treatment techniques**

Additional disadvantages of large wastewater treatment plants:

- inflexible – low adaptability to changing conditions
- energy need (ventilation with oxygen and elimination of nitrate and phosphate) and
- produce hazardous waste (sludge)



Factors pressurising the European infrastructure of wastewater disposal and treatment systems (and water supply systems):

- fixed costs increase due to negative demographic growth, environmental regulations, technical innovations
  - spatial enlargement of infrastructure due to migration from urban centre -> periphery and simultaneous stagnation or decrease of population
- **result: efficiency decrease of centralised concepts**

Characteristics of small wastewater treatment facilities:

- higher adaptability to locally changing (demographic) conditions
- slowdown of water discharge and higher availability of water in the ecosystem
- more efficient use of water resources
- return of energy (methane) and nutrients



Necessity:

- turning away from the dominance of centralised systems
- insight that there is not *one* optimal system
- discussion about structure of wastewater systems already in progress
- research and development on about how to transform the system considering ...
  - adaptivity (small feedback loops)
  - management of complexity (variety of solutions, interests and needs)
  - evaluation
  - participation (also of transnational parties)
- differentiation of implementation according to framing conditions



### Challenges:

- new differentiated concept = balance between centralised and decentralised concepts
- integration of societal dynamics into design and implementation of new concepts
- assessment of consequences of transforming the system structure for
  - administration, regulation, management
  - technique of wastewater disposal and treatment
  - natural balance
    - spatiotemporal distribution of water volume in subsequent rivers
    - flow of nutrients and pollutants

### Transnational issues:

- reduction of variability in water quantity (prevention of floodings, protection of groundwater bodies, improvement of water balance of ecosystem)
- regulation of water quality due to technical implications of wastewater systems
- change of administrative structures (governance)