

Hydrogeologic field testing in research – (legal) area of conflict

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Background and motive: current issues in water management (selected examples)

- **Climate change**

Temperatures, altered precipitation patterns, extreme weather events, declining groundwater supply

- **Water quality**

Lack of good ecological and chemical status of water bodies in Germany (WFD - WRRL); pollution, nutrient contamination

- **Water withdrawal and use**

Increasing demand for water (drinking water, agriculture, industry) → usage / resources conflicts

- **Ecological river design**

Habitat fragmentation, purpose of restoration of rivers and streams, necessity of promotion of bio-diversity, implementation of ecological improvement measures

- **Integration of sectors**

Existing need to increasingly work in an interdisciplinary manner to integrate different sectors, e.g. agriculture, energy, urban planning, existing uses, usage interests to ensure sustainable water management

- **Public participation**

Different interests, lack of acceptance → involving the public in water management planning & decision-making processes

- **Funding and resources**

Challenging implementation of the WFD → financing issues of water management projects

- **Legal and administrative hurdles**

Difficulties for implementation of WFD & Water Resources Act (WHG) by complex legal frameworks / bureaucratic processes

Different issues are drivers for investigations, research / pilot projects or various implementation measures in sustainable and innovative water management on the one hand

These projects and measures trigger impacts on socio-economic and legal subjects on the other hand

→ Areas of (possible) conflicts



Selected areas of conflict for research projects with effects on water bodies

- **Technical conflicts**

Feasibility, data availability, choice of methods: The selection of research methods can lead to conflicts, especially if certain methods are considered invasive or harmful to the water bodies, new / innovative, not yet tested

- **Environmental conflicts**

Ecological impacts, long-term consequences etc.: Research may have negative impacts on aquatic ecology, e.g. through changes in water quality or disturbance of habitats; there may be uncertainties about the long-term effects of the research on water bodies and surrounding ecosystems

- **Socio-economic conflicts**

Conflicts of use, economic interests, resource conflicts: Research projects may conflict existing uses of water bodies, such as drinking water supply, agriculture or recreational use (e.g. fishing, swimming). There may be resistance from economic actors who fear that the research will have a negative impact on their businesses, e.g. through restrictions on water extraction or use. Research can lead to competition for water resources, especially in regions with water scarcity

- **Social conflicts**

Public perception, public participation, legal remedy: Research projects can meet with skepticism or resistance from the population, especially if the impact on the environment is not sufficiently communicated or predicted. Insufficient public involvement in the planning process can lead to mistrust and resistance. Citizens may feel excluded, which affects the acceptance of the project. Different interest groups (e.g. environmental associations, residents, companies) may have different and often conflicting interests

- **Legal conflicts**

Permit requirements: The need to obtain various permits (e.g. under the Water Resources Act, environmental law, building law) can lead to delays and legal disputes

Compliance with regulations: Conflicts can arise if the research does not comply with existing legal frameworks (e.g. nature conservation laws, Water Framework Directive, statutes of water use, technical requirements)

Appeal / legal remedy: Affected third parties (e.g. residents, environmental associations) are capable of appeals against the approval of the project, which leads to further legal disputes

TOP-principle

- How to avoid conflicts?
- How to deal with these issues?

General principles of environmental protection and public participation in environmental field testing and research → TOP

- **Transparency and participation**

The public and affected stakeholders should be involved in the planning process in order to create transparency and address possible concerns at an early stage

- **Observance of legislation**

Legal and technical requirements must be addressed thoroughly, comprehensive and correct in order to avoid critical conflicts

- **Precautionary principle**

The precautionary principle must be observed in the planning and operation of environmental investigation, research, pilot scale measures like e.g. water treatment plants in order to avoid negative effects on groundwater or any other environmental compartment from the outset

Different issues affect the efficiency of investigations, research, pilot projects and the necessary approval procedures and ultimately the implementation of measures

Explicit legal regimes must always be observed in order to protect natural resources, livelihoods, environmental compartments in general, as well as groundwater and surface water in particular

These conflicts can be reduced by application of the TOP-principle



Excursus: legal hierarchy

- **Public legislation**

Constitutional law: regulates the fundamental principles of the state, the organisation of state power and the fundamental rights of citizens (e.g. constitution law)

Administrative law: regulates the organisation and activities of the administration as well as the legal relationships between citizens and the administration. It also covers general administrative law and special areas of administrative law (e.g. **construction** and **environmental law**)

Soil & water protection law, pollution control legislation, chemical legislation, environmental liability, damage & penal legislation, police and regulative law, tax law, social law, public commercial law

- **Private legislation (civil law)**

Civil law (BGB): regulates general civil law matters, including **contract** law, tort law, family law, and inheritance law
Commercial law, company law, **copyright**

- **Criminal law**

- **Adjective legislation**

Administrative procedural law: regulates administrative procedures and appeals against administrative acts
Civil procedure law, criminal procedure law

- **European legislation**

Primary law: The treaties of the EU, which form the legal basis of the Union

Secondary legislation: Regulations, directives and decisions issued by the EU institutions (e.g. WFD)

- **International law**

It is important to know and consider the current legislation in research and measures

Excursus: key laws, ordinances, leaflets, regulations, guidelines and standards for water protection (selection)

■ **Laws**

Water Resources Act (WHG), Federal Nature Conservation Act (BNatSchG), Environmental Damage Act (USchadG), Environmental Impact Assessment Act (UVP), ...

■ **Ordinances**

Groundwater Ordinance (GrwV): Regulates the protection of groundwater in Germany and sets limit values for pollutants.

Ordinance on the Quality of Water for Human Consumption (Drinking Water Ordinance – TrinkwV): Regulates the requirements for the quality of drinking water obtained from surface or groundwater.

Ordinance on Wastewater Disposal (AbwV): Regulates the requirements for the disposal of wastewater and the protection of waters from pollution.

Water Framework Directive (WFD): An EU directive that promotes the protection and sustainable use of water bodies in the European Union.

■ **Technical standards**

DIN / ISO standards: Various DIN standards concern water protection, e.g. standards for water analysis, wastewater treatment or the quality of drinking water.

Technical Rules for water management (e.g. DVWG, DWA): These rules provide technical specifications and recommendations for the management of water resources.

■ **Fact sheets and guidelines**

Leaflets from the responsible water authorities, technical information and guidance from environmental and water authorities, guidelines for carrying out environmental impact assessments

■ **Other relevant regulations**

e.g. Nitrates Directive, statutes of water protective areas (WPA – Trinkwasserschutzgebietsverordnungen)



Necessity of approval aspects

- **Water Resources Act (WHG) and Water Framework Directive (WFD)**

WRA (WHG) forms the basis for the protection of water bodies and regulates the use of water resources. It stipulates that permits are required for withdrawal, discharge or use in any other way. The EU directive has impact on national legislation and calls for integrated management of water resources. Projects must be in line with the objectives of the WFD, in particular with regard to achieving good ecological / chemical status of waters.

- **Purpose limitation**

Permits must take into account specific project purposes, e.g. drinking water supply, agricultural irrigation or industrial use.

- **Environmental protection**

Environmental protection concerns must be taken into account when approving the permit. This includes the effects on water quality, ecosystems and biodiversity or any other compartment.

- **Public participation**

Public participation is required, in which those affected and interested parties have the opportunity to submit comments.

- **Approval procedures**

The procedures for approving water law projects can vary depending on the type and scope of the project. Different authorities are often involved, and it may be necessary to obtain further permits (e.g. under the building code).

- **Appeals / legal remedies**

Appeals can be lodged against decisions in the approval procedure under water law. This applies to both the applicants and third parties affected by the project.

- **Monitoring and obligations**

Permits may contain certain conditions relating to the monitoring of the project's impact on water and the environment.

Several legal aspects must be taken into account when approving water law related projects in Germany. These aspects are essentially regulated in the Water Resources Act (WHG) and in the respective state water laws

These aspects are crucial to ensure that projects are carried out in accordance with the legal requirements and the objectives of water protection.



Environmental & economic consequences of R&D (affecting ground- & surface water)

■ Ecological consequences

Degradation of water quality: Pollutants or nutrients that enter the water can deteriorate water quality, which has a negative impact on aquatic habitats and organisms.

Loss of biodiversity: Changes in water quality or balance can lead to a decline in plant and animal species that rely on certain water conditions.

Ecosystem disruption: Interventions in water bodies can disrupt the natural habitats of fish, amphibians and other aquatic organisms, which can lead to an imbalance in the ecosystem.

Deterioration of soil quality: When groundwater is contaminated by pollutants, it can also affect soil quality and endanger the health of plants and animals.

Changes in the water balance: Interventions such as pumping out or bypass water can disrupt the natural water balance, which may lead to drought in certain areas or even flooding in others.

■ Economic consequences:

Water treatment costs: Deterioration in water quality can lead to higher costs for drinking water treatment, which can be expensive for both municipalities and consumers.

Economic losses in agriculture: When groundwater or surface water is contaminated, it can affect agricultural production, which can lead to crop failures and financial losses for farmers.

Tourism and leisure industry: Waters that are affected by research projects can become less attractive for tourism and leisure activities such as fishing, swimming or boating, which can result in economic losses for the region.

■ Legal consequences:

Responsibility: Liability for project members, esp. project sponsors, project managers, coordinators and professors, implementing staff and cooperation partners.

Legal and compensation costs: Violations of environmental laws may result in legal consequences and compensation claims that incur additional costs.

Long-term remediation costs: Remediation of contaminated waters can be very costly and time-consuming, which can entail long-term financial burdens for the responsible institutions or companies.



Affecting aspects of permissions due to measures (including experiments / investigations)

■ **Admissibility of the project**

Permit or permit requirement: According to § 8 WHG (WRA), a permit is required for the withdrawal of water, the discharge of (waste)water or the implementation of other water management projects (construction, injection, substantial changes etc.).

■ **Purpose limitation**

The project must serve a specific purpose that is in accordance with the requirements of water law (e.g. drinking water supply, agricultural irrigation, industrial use, flood management etc.).

■ **Public interest and interests of third parties**

Balancing of interests: The interests of public safety, the environment and the third parties concerned must be taken into account when granting approval, including the interests of local residents, land users and other users of water resources.

Public participation: According to § 73 WHG and the corresponding regulations in the BayWG, public participation is required, in which those affected and interested parties have the opportunity to submit comments.

■ **Environmental protection and water quality**

Protection of waters: The permit must ensure that water quality is not impaired. This includes compliance with the requirements of the Water Framework Directive (WFD) and ensuring good ecological and chemical status of water bodies.

Avoidance of pollutant inputs: When injecting substances the requirements for pollution must be observed.

■ **Sustainable use of water resources**

Resource conservation: The permit must ensure that water resources are used sustainably. This means that the withdrawal of water must not lead to overuse or damage to the waterbodies.

Water management planning: The permit should be in line with the water management planning.

■ **Technical and economic feasibility**

Feasibility study: It must be checked whether the project is technically and economically feasible. This may also include the need for technical measures to ensure water protection.

■ **Monitoring and Requirements**

Monitoring measures: The permit may contain conditions relating to the monitoring of the effects and may include reporting



Possible violation of legal bases due to...

- **Lack of permits**

...by carrying out research projects without the necessary permits for interventions in the water bodies or water balance.

- **Water pollution**

...by introduction of pollutants or other contaminants into surface waters or groundwater, whether through improper handling of chemicals, inadequate disposal of waste or uncalculated side-effects of sampling, injection or any other research related measures.

- **Impairment of water bodies**

...by implementation of measures that lead to a significant impairment of water quality or water quantity, such as pumping water without a permit or changing water courses.

- **Non-compliance**

...by failure to comply with conditions imposed as part of a permit, e.g. with regard to the monitoring of water levels or the quality of water samples.

- **Inadequate environmental impact assessments**

...by carrying out research projects without the required environmental impact assessments, if these are required by law.

- **Lack of documentation and reporting**

...by failure to prepare the required reports on the impact of the research on water bodies or to not submit them on time.

In the case of research projects that affect groundwater or surface water, various violations of the principles of the Water Resources Act (WHG) and other legal fundamentals may be conceivable

It is important that researchers inform themselves about the applicable legal framework before starting their projects and ensure that all necessary permits and requirements are complied with



Legal consequences of violations

- **Administrative offences**

Many offences, such as non-compliance with permit requirements or carrying out activities without the required permit, are usually treated as administrative offences.

→ These can be punished with fines

- **Criminal offences:**

Serious offences that lead to significant damage to water bodies or the environment can be classified as criminal offences.

This can be the case, for example, if water bodies are contaminated intentionally or through gross negligence or if there is a significant impairment of the water balance.

→ These can be punished with penalty orders.

A violation of the principles of the Water Resources Act (WHG) or any other legal fundamental can be classified as both an administrative offence and a criminal offence, depending on the severity of the violation. The exact classification depends on the circumstances of the individual case

→ It is advisable to seek technical / legal advice & contact relevant authorities in order to avoid such conflicts



Wrap-up

Decision of the Environmental Agency [...]:

*‘[...] The **legal requirement** for the introduction of substances into the groundwater **does not apply**, if no detrimental changes to the groundwater are to be expectable. The project only needs to be notified to the environmental agency one month before construction begins (§ 49 (1) sentence 2 of the Water Resources Act - WHG).*

*An adverse change to the groundwater is **generally** assumed if [...] the material of the substances introduced **may** have a negative impact on the quality of the groundwater [...]*

Entscheidung des Umweltamts der Stadt [...]:

*„[...] Die **Erlaubnispflicht** für das Einbringen von Stoffen in das Grundwasser **entfällt**, wenn hierdurch keine nachteiligen Veränderungen des Grundwassers zu erwarten sind. Das Vorhaben muss lediglich einen Monat vor Baubeginn dem Umweltamt angezeigt werden (§ 49 Abs. 1 Satz 2 Wasserhaushaltsgesetz - WHG).*

*Von einer nachteiligen Veränderung des Grundwassers wird grundsätzlich ausgegangen, wenn [...] sich das Material der eingebrachten Stoffe negativ auf die Qualität des Grundwassers auswirken **kann** [...]*

Groundwater is the most important resource for drinking water purposes → sustainable management is required

In the planning and implementation of projects that affect surface water and groundwater various laws, ordinances and leaflets must be observed. In addition, public participation, synchronization with those affected as well as with specialist and consultation of licensing authorities is required

It is important to obtain comprehensive information about the applicable legal framework before starting a project and, if necessary, to seek technical and legal advice

One has to double-check which effects a field research / investigation project has

Environmental research is thrilling – prevent it from becoming a crime story!